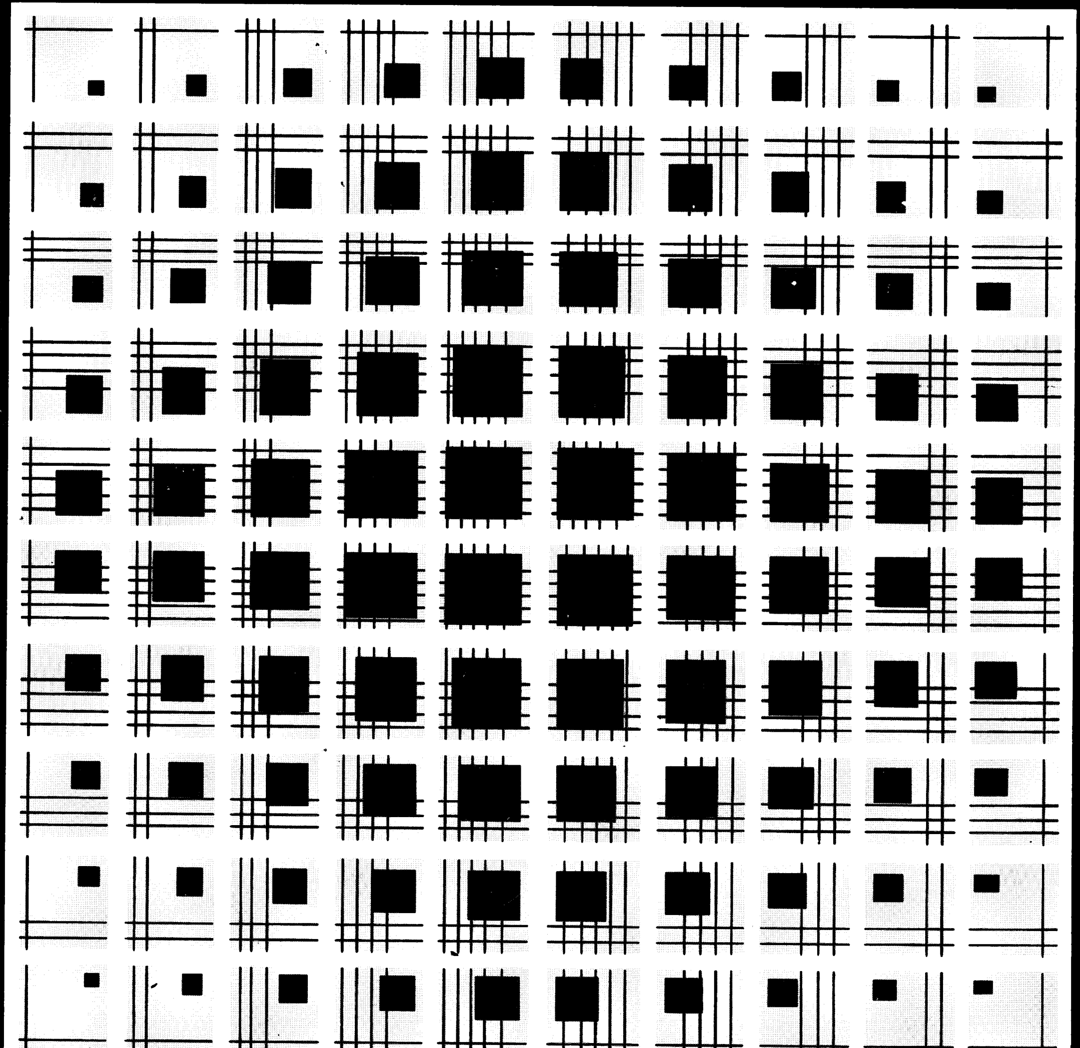
Systems And Models For Developing Programs For The Gifted And Talented

Edited By Joseph S. Renzulli



Jean Judson

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Preface

How Did This Book Come About?

Our knowledge about the education of gifted and talented students has grown rapidly during the past several decades, and in recent years there has been a veritable explosion of new books, journal articles and scientific papers. This expansion of knowledge has resulted in a rich repository of information about new theories, ideas, research findings and descriptions of a broad variety of identification and programming practices.

One of the more favorable events of recent years has been an attempt on the parts of several writers to synthesize the growing body of information about the gifted and talented into systems and models that can be used as the basis for program organization and development. In spite of the deepening interest and new wave of literature, however, there is no single source to which students and practitioners can turn for a survey of the major models that have been designed to guide special programs for highly able youth.

The primary objective of this book is to provide such a survey and, in the process, to encourage a more critical understanding and sounder utilization of the principles and practical procedures set forth in each model. Implicit in this work is my own strong conviction that the consumer of information about methods for serving the gifted should have at his or her disposal a fair and representative description of that which is available in the "marketplace" of ideas about how we can organize the delivery of services to special populations. Such information is vital for both researchers who wish to examine the effectiveness of particular approaches to programming, and practitioners who must make informed decisions about the adoption of a major plan or pattern of program organization. One of my strongest beliefs about the field of education for the gifted and talented (or any service oriented field, for that matter) is that program success is a direct function of the degree to which a program is based on a unified and coordinated set of principles. Without such an organizational pattern, programs are likely to end up being random collections of scattered practices that lack theoretical integrity and internal consistency. In such an "anything goes" atmosphere, we are likely to lose sight of the major goals that give uniqueness to a field which is striving to differentiate between general education and education for a specially designated population. The systems and models included in this book were selected because they represent organized and unified approaches to serving gifted children and youth. As such, they should be viewed as both practical and theoretical compasses that can be used to guide us toward the goals set forth in the respective models.

Two Kinds of Models

In a review of the literature on programs for the gifted and talented, Silverman (1980)[1] found over sixty provisions currently being used to provide services for gifted students at the elementary and secondary levels. Silverman's list includes mainly patterns of administrative organization such as full-time classes, summer programs, apprenticeships, pull-out programs, etc. Although these provisions are sometimes referred to as "models," I have attempted to make an important distinction between the kinds of provisions included on Silverman's list and the general type of model that has been selected for inclusion in this book. For purposes of discussion I will deal with this issue by referring to one category as Administrative Models and the other as Theoretical Models.

Administrative models consist of patterns of organization and procedures for dealing with such issues as how we should group students, develop schedules for the time spent in special programs, and arrange for the delivery of services. Theoretical models, on the other hand, consist of principles that guide the instructional process and give direction to the content, thinking processes, and outcomes of learning experiences that might take place within any given administrative pattern of organization. Theoretical models are mainly influential in determining the quality of special program experiences, whereas administrative models are more concerned with the efficiency and "smoothness" of program operation and the ways that special programs "fit into" the total school program.

It should be pointed out that certain administrative models sometimes evolve into *de facto* theoretical models. Acceleration, for example, has traditionally been viewed as an administrative model; however, when it is used mainly to promote more rapid coverage of traditional subject matter, then it also assumes theoretical purposes. Theoretical models are based on collections of principles about the nature of learners and the learning process. As such, they can generally be applied to almost all patterns of administrative organization. One of the criteria for selecting models for this book was that the material fall mainly into the category of a theoretical model. This type of material represents a more analytical treatment of issues related to identification and programming; and as such, it has greater potential for giving direction to the substantive (rather than organizational) nature of our field. And although it is undoubtedly valuable to debate the advantages and disadvantages of various administrative models, I believe that theoretical models are more provocative and therefore make for more lively reading and greater opportunity for critical analysis.

What Is Different About This Book?

This book differs from existing texts in several important ways. First and foremost, the book contains descriptions of the major systems and models that were specifically developed to guide programs for the gifted and talented. In the early years of special programming for the gifted, most of the literature dealt with administrative models or the application of models that were developed for other purposes, usually general education. Most of these models focused on the development of cognitive and affective processes (e.g., Bloom's Taxonomy, Kohlberg's moral development model), or systematic procedures for the organization and delivery of instructional strategies (e.g., Taba's teaching strategies program, Suchman's inquiry strategies model). These models served a useful purpose in the evolution of our field for two basic reasons. First, they represented an early effort to search for "something different" from that which was

[1]Silverman, L. K. (1980). Secondary programs for gifted students. *Journal of Education of the Gifted*, 4(1), 30–42.

going on in general education. This search also represented a strong reaction against the content centered curriculum. A large concern (indeed, even an obsession) with earlier efforts was to build special programs around the concept of process development. But these models were never intended to be used only with the gifted. The fact that they were being given little attention in general education, however, made them fair game for persons and programs that were seeking to develop a differentiated approach to learning. In a certain sense, we might say that persons in gifted education were the first educators "to discover" Bloom's Taxonomy and other process models; but it was not too long before general educators recognized the need for process development in *all* students. Indeed, the "hottest" issue in general education today is the thinking skills movement. The theories and suggestions being put forth in this movement are not restricted to high ability students; in many ways, this present day emphasis on thinking is a replication of the efforts that were first developed for the gifted more than two decades ago.

The early search for something different was also important because it became a salient characteristic of almost all of the developmental efforts that were to follow in the field of education for the gifted and talented. It is this type of searching that has helped to give the field a pioneering and dynamic nature. It also has resulted in the leadership role that gifted education has provided for education in general. I believe that the models presented in this book are a clear reflection of the search for unique solutions that face persons striving to provide a differentiated education for highly able youth.

A second reason that the general educational models were important in the evolution of our field is that many of these models, or component parts thereof, subsequently became integrated into models that were specifically designed to serve high potential youth. Thus, for example, we note that in the Enrichment Triad Model, one category of service (Type II Enrichment) consists mainly of cognitive and affective process development that is based on the work of general models such as Bloom's Taxonomy and Guilford's Structure of the Intellect.

This book differs from currently available general textbooks in another way. Each chapter has been prepared by the originator(s) of the model; and this approach offers certain advantages for persons surveying the field or teaching courses that focus on the major systems and models in gifted education. Very few, if any, of the textbooks currently available cover all the models included in this book; and in certain cases, the general textbooks provided only limited treatment of some of the major models. It also must be said that some of the descriptions of the systems and models written by other authors are less than accurate representations of the original works. Given these circumstances, persons seeking information about the models must resort to wading through several book length descriptions of each model, and/or tracking down numerous and frequently difficult to locate journal articles. I believe that one of the advantages of this book is that it provides compact and yet comprehensive summaries of the major models written by the persons who originated them. From this book the reader can secure the authors' own overviews of several approaches to programming and, from these overviews, make informed decisions about which models might be pursued in more detailed sources.

Guidelines Without Straightjackets

Although I wanted to maintain a certain amount of uniformity and "quality control" over the contributions to this volume, I did not want to place restrictions on any of the authors so far as their individual approaches were concerned. Nor did I want to limit the creativity and innovation that has caused these authors to make their respective contributions. Thus, wide laterality was provided so far as length and content of any given chapter was concerned; the authors were, however, asked to include the following three dimensions in their respective chapters.

1. **Rationale.** Authors were asked to deal with the question of *why* their model was developed and why this particular approach to programming for gifted and talented students is recommended. Authors were asked to include theroetical background and research studies underlying their respective models, and personal experiences that might have led to the development of their organizational framework and specific recommendations.

2. **Practical Applications.** Authors were asked to give a practical description of the specific components of their models and ways in which the model can be applied in a school setting. They were asked to describe each component, the objectives relating thereto, and practical procedures for implementing any and all components. Also requested were specific examples of the model in action, the responsibilities of teachers, best-case examples of students' work, and anything else that the authors felt would give a comprehensive picture of their respective models.

3. **Research and Evaluation Studies.** The final request related to any and all research data and field studies that supported the various models. Both quantitative and qualitative research data were requested and outstanding case studies from research sites were also recommended for inclusion. Finally, authors were requested to make this section "instructional" in the sense that persons using their model could derive evaluation procedures and materials by using this section of each chapter.

Because of the many different approaches to model development, and the different styles of the authors in pursuing their own research and writing, variations on the three topics listed above can be found in the chapters that follow. At the same time, however, there is enough uniformity in approach to guarantee a book that was written by design rather than as a collection of already published articles. There is, of course, material from previous publications included within the various contributions, but each chapter was written specifically for this volume; and in this sense, it represents new material so far as organization and synthesis are concerned.

Selecting material for a book such as this is always a difficult process, and one which is bound to recieve some criticism regarding decisions about the models that were finally selected for inclusion. Three major criteria were used as guides for selection. First and foremost, I wanted the book to include models that were both theoretically sound and, at the same time, developed in such a way that they could be implemented in a wide variety of school settings. In this regard, my main concern was to produce a volume that had the advantage of practical application as well as one which was grounded in contemporary research about the characteristics of highly able youth and present day knowledge about instructional practices. A second criterion had to do with what might best be described as integrity and internal consistency. In this regard, one of my own biases entered into the selection process. With the exception of cases in which individual authors recommend the integration or blending of their work with the components or subcomponents of other models, I am generally not in favor of an eclectic approach to program development. If a model represents anything at all, it should be an integrated set of principles and procedures that has internal consistency and integrity. When program developers start to borrow a little bit from one model and a little bit from another, the end result might be a patchwork approach to programming that defeats the very purpose of model construction in the first place. In a similar vein, I also sought to include models in which there was a logical relation between the definition or conception of giftedness underlying the work of a particular author, and the types of programming practices that seemed to be logical derivations of the ways in which giftedness was viewed. I do not believe that there is a "right" or "wrong" definition of giftedness; however, I do believe that the ways in which one defines this population should serve as major guides to the types of programming activities recommended within any given model. All of our efforts in programming at the school level, from identification and curriculum to the evaluation of program effectiveness, are much easier and more defensible when we have maximum internal consistency and a clear relationship between our conception of giftedness on one hand, and related programming activities on the other.

The third criteria for selection of material for this book, and one that has already been mentioned above, was the purposeful development of models to serve the gifted and talented. Within this criterion, I also considered the longevity of the models and the extent to which they have been implemented in various schools and districts. Taken collectively, all three criteria were designed to help avoid the fly-by-night approaches, practices or provisions that are mistakenly referred to as "models," and the untested and unverified approaches that periodically pop up because of either single site recognition or the salesmanship of a charismatic individual. Although no selection process can be perfect, an attempt was made to apply the above three criteria to the selection process as vigorously as possible. But it is also important to keep in mind that the very differences in the models that give them their relative uniqueness also means that they will show varying degrees of adherence to any one of the criteria that were used for selection.

Extra Added Attractions

A few other items have been included in this book to make it more useful to the teacher and practitioner. First, we have attempted to provide a brief summary of each model. These summaries can be shared with persons who may not have the time to read full-length chapters, but who also need some general information about a particular plan or model. The information can also be used as "bait" for enlisting a greater in-depth study of models by busy administrators or policy makers who might need a brief synopsis before delving into a full-length description.

Also included at the end of each chapter is a series of discussion questions that were formulated by the authors themselves. These questions were designed for class discussions and I hope that they will focus attention on some of the factors that authors consider to be important or unique features of their respective models.

I would like to express my gratitude to the authors of each chapter who worked so diligently to prepare material and meet deadlines within their always busy schedules. I also would like to thank my colleague Gina Schack for the excellent organizational and editorial assistance that she lent to this effort. The remarkable and indispensable editorial review and revision provided by Linda H. Smith and Patricia Ludwig helped to bring an element of uniformity and clarity to the widely diverse writing styles of the many authors represented here. The book is unquestionably more readable because of the endless hours that they spent with each manuscript. And finally, I owe a debt of gratitude to staff members Ann Marie Fortier and Deanna Korner for their valuable services in the preparation of material for this book.

Joseph S. Renzulli
Storrs, Connecticut
August 1986

Camilla Persson Benbow

I

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Associate Professor
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Dr. Camilla Persson Benbow worked at the Study of Mathematically Precocious Youth (SMPY) at Johns Hopkins University for nine years. In the end she was its co-director along with Professor Julian C. Stanley, the founder of SMPY. In July 1985 Dr. Benbow began as an associate professor in the Department of Psychology at Iowa State University (ISU). A new branch of SMPY, called "*SMPY at ISU*," has been created at Iowa State University. SMPY at ISU carries out the SMPY longitudinal studies and is in the process of starting SMPY programs there. When Dr. Stanley completely retires, SMPY's activities will be based at Iowa State University under Dr. Benbow's direction.

Summary

SMPY's Model for Teaching Mathematically Precocious Students

One practical model for providing sound programming for most intellectually talented students can simply be accomplished by schools' allowing curricular flexibility. For over a dozen years, the Study of Mathematically Precocious Youth (SMPY) at Johns Hopkins has utilized already available educational programs to meet the needs of its talented students through educational acceleration. SMPY students are offered a "*smorgasbord*" of special educational opportunities from which to choose whatever combination, including nothing, best suits the individual. Some of the options are entering a course a year or more early, skipping grades, graduating early from high school, completing two or more years of a subject in one year, taking college courses on a part-time basis while still in secondary school, taking summer courses, and credit through examination. Clearly, SMPY utilizes already available educational programs to meet the special needs of talented students. Because this approach is extremely flexible, teachers or administrators can choose and adapt the various options in ways to fit their schools' unique circumstances and their students' individual abilities, needs, and interests.

Moreover, this method avoids the common criticism of elitism and costs little for a school system to adopt. Actually, the various accelerative and enriching options devised by SMPY may save the school system money. Yet this rather simple adjustment, i.e., advancing a gifted child in each school subject to the level of his/her intellectual peers, is rarely made because of bias against acceleration. It is important to note, however, that no research study to date has found properly effected educational acceleration detrimental, but rather the contrary.

SMPY's Model for Teaching Mathematically Precocious Students

Since 1971, the Study of Mathematically Precocious Youth (SMPY) at The Johns Hopkins University has systematically explored various possibilities for identifying and educating mathematically precocious secondary students. Out of this work several promising procedures have been developed. Dr. Julian C. Stanley, Professor of Psychology at Johns Hopkins and the founder and director of SMPY, deserves most of the credit for this SMPY model, which will be described in this chapter. Without his foresight, creative ideas and dedication, the findings presented could not have been made.

SMPY's Definition of Mathematical Precocity

It is conventional for new investigators to define or conceptualize giftedness before they start to work in this area. SMPY, however, has not concerned itself very much with conceptions of giftedness (Stanley & Benbow, 1986), even though it has been in existence since 1971. The staff of SMPY has had their reasons for this lack of action. The following quotation illustrates their position well:

What is particularly striking here is how little that is distinctly psychological seems involved in SMPY, and yet how fruitful SMPY appears to be. It is as if trying to be psychological throws us off the course and into a mire of abstract dispositions that help little in facilitating students' demonstrable talents. What seems most successful for helping students is what stays closest to the competencies one directly cares about: in the case of SMPY, for example, finding students who are very good at math and arranging the environment to help them learn it as well as possible. One would expect analogous prescriptions to be of benefit for fostering talent at writing, music, art, and any other competencies that can be specified in product or performance terms. But all this in fact is not unpsychological; it simply is different psychology" (Wallach, 1978, p. 617).

SMPY has, of course, an operational definition of giftedness, which is consistent with the above position. SMPY's indicator of mathematical talent or precocity is simply a high score at an early age on the mathematics section of the College Board Scholastic Aptitude Test (SAT-M). This may appear narrow. The staff of SMPY feel, however, that its elegance lies in its simplicity and objectivity. Moreover, few would argue that such an ability (to be described further below) does not indicate a high level of cognitive functioning. Although some students may be overlooked by this criterion, we identified more youths who reason exceptionally well mathematically than we could handle.

The Talent Search Concept

In order to identify mathematically talented students, SMPY developed the concept of an annual talent search and conducted six separate searches, in March 1972, January 1973, January 1974, December 1976, January 1978 and January 1979. During those years 9,927 intellectually talented junior high school students between 12 and 14 years of age were tested. Students attending schools in the Middle Atlantic Region of the United States were eligible to participate in an SMPY talent search only if they scored in the upper 5 percent (1972), 2 percent (1973 and 1974), or 3 percent (1976, 1978 and 1979) in mathematical ability (not computation or learned concepts)

I should like to thank Dr. Julian C. Stanley for helpful comments on an earlier version of this chapter.

on the national norms of a standardized achievement-test battery, such as the Iowa Test of Basic Skills, administered as part of their schools' regular testing program.

In the talent search, such students took the SAT-M and, except in 1972 and 1974, also the verbal (SAT-V) sections. These tests were designed to measure developed mathematical and verbal reasoning abilities, respectively, of above-average 12th-graders (Donlon & Angoff, 1971). Most of the students in the SMPY talent searches, however, were in the middle of the seventh grade and less than age 13. Few had received formal opportunities to develop their abilities in algebra and beyond (Benbow & Stanley, 1982a, b, 1983c). For example, we have found that among the top 10 percent of our talent search participants (i.e., those eligible for fast-paced summer programs in mathematics), a majority do not know even first-year algebra well. Thus, they must begin their studies with Algebra I.

Therefore, most of these students were demonstrably unfamiliar with mathematics from algebra onward, yet many of them were able to score highly on a difficult test of mathematical reasoning ability. Presumably, this could occur only by the use of extraordinary ability at the "*analysis*" level of Bloom's (1956) taxonomy. We concluded that the SAT-M must function far more at an analytical reasoning level for the SMPY examinees than it does for high school juniors and seniors, most of whom have already studied rather abstract mathematics for several years (Benbow & Stanley, 1981, 1983c). Moreover, because the test was so difficult and many students viewed the talent searches as a competition, our mode of identification also selected for high motivation.

Although it is not well known how precocious mathematical reasoning ability relates to "*mathematical reasoning ability*" of adults, SMPY has a protocol any researcher can reproduce (many have), that enables the selection of groups of individuals with high tested ability. Criticisms of whether we are measuring "*true*" mathematical reasoning ability are presently not germane. If a test can predict future achievement, it has value regardless of the exact nature of the aptitude measured. If the test does predict high achievement, then we may want to determine what it measures or what mathematical reasoning ability may be. SMPY's purpose is in part to determine the predictive validity of the SAT-M. Our work to date indicates that it does predict relevant criteria (e.g., Benbow & Stanley, 1983a). For example, SAT-M scores identified mathematically highly talented 11th-graders better than their mathematics teachers (Stanley, 1976).

Finally, SMPY has sought already-evident ability, rather than some presumed underlying potential that has not yet become manifest. Thus, we have not concerned ourselves with possible late bloomers. We are not even convinced that there exist many late bloomers in terms of ability. Although it is possible to find a student whose SAT scores improve greatly in one year, for example over 200 points more than other students his/her age, the chance is remote. We at SMPY feel that nearly all late bloomers are more the result of early lack of motivation or test sophistication than of suddenly developed ability.

Talent Search Results

Results from the six SMPY talent searches are shown in Table 1. Most students scored rather high on both the SAT-M and SAT-V. Their performance was equivalent to the average scores of a national sample of high school students. On the SAT-V, the boys and girls performed about equally well. The mean performance of 7th grade students on SAT-V was at the 30th percentile of college-bound 12th graders. On the SAT-M seventh grade boys scored at approximately the 37th percentile of college-bound senior males

Table 1
Performance of Students in the Study of Mathematically Precocious Youth in Each of the First Six Talent Searchers (*N* = 9927)

		Number		SAT-M Scores[a]				SAT-V Scores[b]			
				Boys		Girls		Boys		Girls	
Test Date	Grade	Boys	Girls	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.
March 1972	7	90	77	460	104	423	75				
	8+	133	96	528	105	458	88				
January 1973	7	135	88	495	85	440	66	385	71	374	74
	8+	286	158	551	85	511	63	431	89	442	83
January 1974	7	372	222	473	85	440	68				
	8+	556	369	540	82	503	72				
December 1976	7	495	356	455	84	421	64	370	73	368	70
	8[c]	12	10	598	126	482	83	487	129	390	61
January 1978	7 and 8[c]	1549	1249	448	87	413	71	375	80	372	78
January 1979	7 and 8[c]	2046	1628	436	87	404	77	470	76	370	77

[a]Mean score for a random sample of high school juniors and seniors was 416 for males and 390 for females.

[b]Mean score for a random sample of high school juniors and seniors was 368 for males and females.

[c]These rare 8th graders were accelerated at least 1 year in school grade placement.

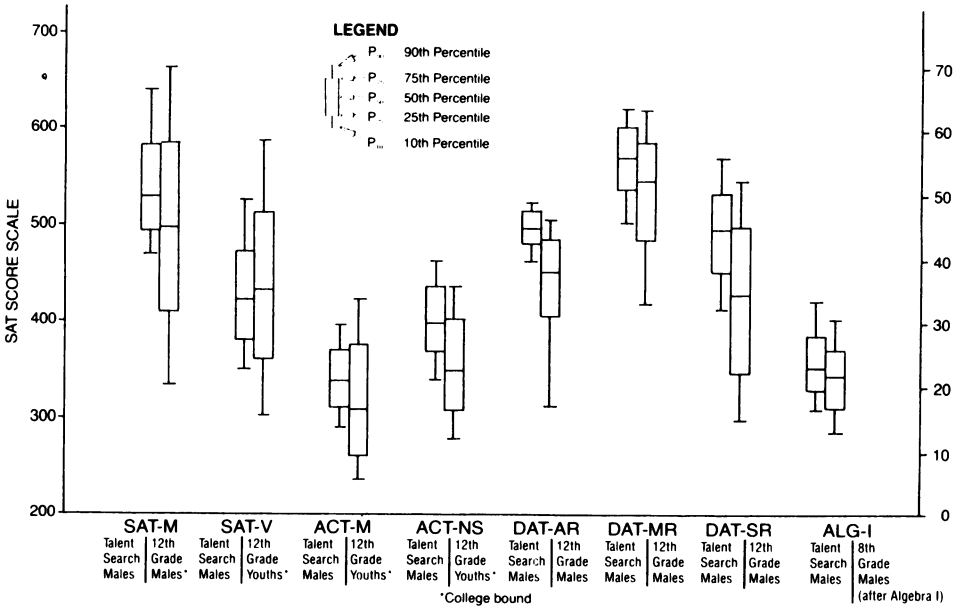
Taken from Stanley & Benbow (1983b).

and the seventh grade girls at approximately the 39th percentile of college-bound senior females. The eighth graders scored slightly better than the seventh graders, as would be expected.

Clearly, SMPY identified a group of mathematically precocious students who also tended to be highly able verbally. Cohn (1977, 1980) and Benbow (1978) found that mathematically talented students are also advanced in their other specific cognitive abilities and in their knowledge of science and mathematics (see Figures 1 and 2). SMPY students tended to have especially strong spatial, mechanical, and nonverbal reasoning abilities. Their performance was similar to students several years older than our talent search participants. Their verbal abilities were also superior, but less so than their mathematical abilities (as is predicted by regression towards the mean).

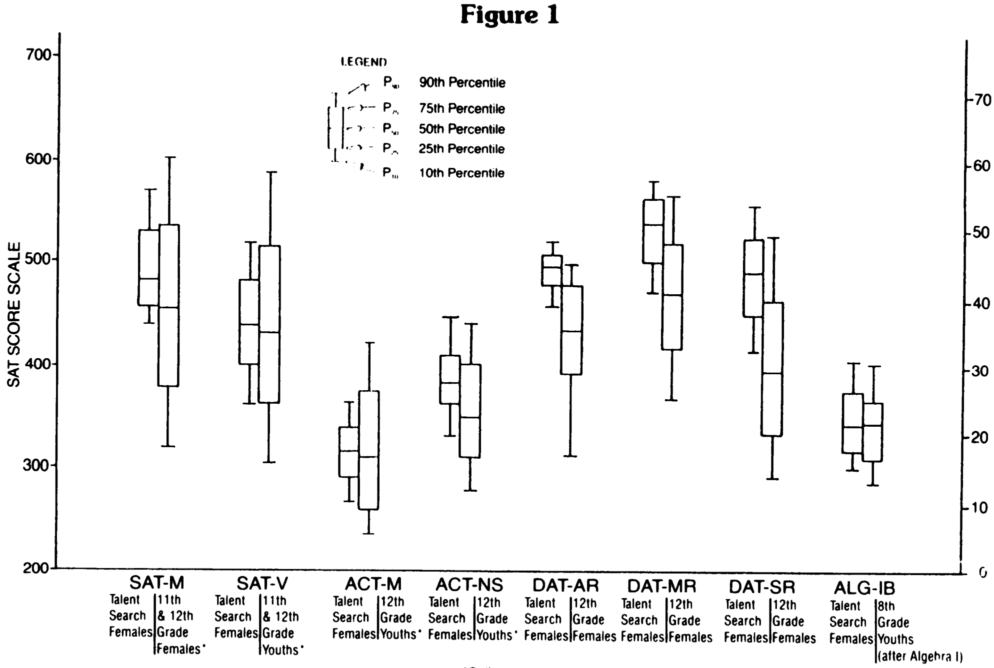
Renzulli (1978) has argued that giftedness is made up of three separate components: above-average ability, task commitment, and creativity. The students identified by SMPY exhibit two of the three qualities: high mathematical reasoning ability and motivation. An objective of SMPY is to provide the knowledge necessary to be creative and to determine if the SMPY participants then become creative as adults. As Keating proposed (1980), in order to be creative a person needs to have knowledge. Creativity cannot exist in a vacuum. Moreover, creativity is difficult to measure. For these reasons, SMPY has largely ignored using an explicit creativity measure as part of its identification procedure.

In addition, SMPY chose to focus on mathematical reasoning ability rather than general intelligence or IQ. The IQ is a global composite, perhaps the best single index of general learning rate. One can, however, earn a certain IQ in a variety of ways, e.g., by scoring high on vocabulary but much lower on reasoning, or vice versa. Therefore, it seemed to the staff of SMPY illogical and inefficient to group students for instruction or



Comparison of scores earned on eight cognitive tests by 7th grade MALES (N = 188) who participated in the December 1976 Talent Search and were called back for further testing with the scores earned by various normative groups of older youths. NOTE: Since the score scales are not equivalent across the different tests, compare the scores earned by the Talent Search males on a particular test with the scores earned by the normative group for that test only.

Figure 1



Comparison of scores earned on eight cognitive tests by 7th grade FEMALES (N = 90) who participated in the December 1976 Talent Search and were called back for further testing with the scores earned by various normative groups of older youths. NOTE: Since the score scales are not equivalent across the different tests, compare the scores earned by the Talent Search females on a particular test with the scores earned by the normative group for that test only.

Figure 2

special programs in mathematics mainly on the basis of overall mental age or IQ. Often this is done and students who lag behind are accused of being underachievers or not well motivated. The true reason often is that they simply have less aptitude for learning mathematics than some in the class who have the same IQ.

The first six talent searches (1972–1979) were conducted to seek young people who reason extremely well mathematically. This was, however, primarily a means to the end of finding suitable students on whom to develop educational principles, practices, and techniques that schools could then adapt to meet their own needs. As of the seventh talent search, conducted in January 1980, SMPY relinquished that important service function to the newly created agency at Johns Hopkins, the Center for the Advancement of Academically Talented Youth (CTY). CTY adapted and extended the talent search model to discover verbally and/or generally talented students, also. The effectiveness of this approach for these three areas has been proven by CTY thus far in seven massive talent searchers, 1980–1986, involving about 125,000 students.

SMPY's Four D's

The first book on SMPY's work (Stanley, Keating & Fox, 1974) was entitled ***Mathematical Talent: Discovery, Description, and Development.*** Since then we have added a fourth D, ***Dissemination*** of our findings, and abbreviated that title to MT:D[4]. ***Discovery*** is the identification phase during which the talent is found through the talent searches. ***Description*** is the phase during which the top students in the talent searches are tested further, affectively and cognitively. This leads to SMPY's main goal, ***development.*** During this phase mathematically talented students are continually helped, facilitated and encouraged. Each is offered a smorgasbord of special educational options (see Stanley & Benbow, 1982a) from which to choose whatever combination, including nothing, that best suits the individual. The staff of SMPY provides as much guidance as its resources permit.

Most studies of talent do not provide educational facilitation for those students identified as part of their investigations. From the start the SMPY staff was determined to steer a different course. Intervention on behalf of the able youths found took an important role. Thus, discovery and description were seen as essential only in that they lead to emphasis on accelerating educational development, particularly in mathematics and related subjects.

We chose to emphasize educational acceleration rather than enrichment. There were both logical and empirical reasons for this. Our rationale was that the pacing of educational programs must be responsive to the capacities and knowledge of individual children. As Robinson (1983) eloquently stated, this conclusion is based on three basic principles derived from developmental psychology. The first is that learning is a sequential and developmental process (e.g., Hilgard & Bower, 1974). The second is that there are large differences in learning status among individuals at any given age. Although the acquisition of knowledge and the development of patterns of organization follow predictable sequences, children progress through these sequences at varying rates (Bayley, 1955, 1970; George, Cohn, & Stanley, 1979; Keating, 1976; Keating & Schaeffer, 1975; Keating & Stanley, 1972; Robinson & Robinson, 1976).

The final such principle influencing SMPY's work is that effective teaching involves assessing the student's status in the learning process and posing problems slightly exceeding the level already mastered. Work that is too easy produces boredom; work that is too difficult cannot be understood. This Hunt (1961) referred to as ***"the problem***

of the match," which is based on the premise that "learning occurs only when there is an appropriate match between the circumstances that a child encounters and the schemata that he/she has already assimilated into his/her repertoire" (p. 268). Hunt notes that *"the principle is only another statement of the educator's adage that 'teaching must start where the learner is'* " (p. 268).

These three principles, as delineated by Robinson (1983), form the guiding premise behind SMPY's work. Its implication for education, as interpreted by SMPY, is that the pace of educational programs must be adapted to the capacities and knowledge of individual children. Clearly, gifted students are not at the same levels academically as their average-ability classmates. Moreover, what is offered in the regular classroom for all children cannot possibly meet this requirement.

SMPY has found adapting existing curricula rather than writing new curricula to be most productive in meeting this need. A side benefit of this approach is that it avoids the common criticism of elitism and costs little for a school system to adopt. Actually, the various accelerative and enriching options devised by SMPY may save the school system money.

Educational Options

The various options the staffs of SMPY and CTY have established as being effective and thus present to their students who express a desire for more rapid educational growth will be described in more detail in this section. They have been articulated earlier in such publications as Stanley and Benbow (1982a, 1983) and Benbow and Stanley (1983b). The main attraction of these dozen alternatives is that they are extremely flexible. Thus, teachers or school administrators can choose and adapt them in ways to fit their unique circumstances and their students' individual abilities, needs and interests.

1 The least unsettling alternative for many students is to have them take as many stimulating high school courses as possible, but yet enough others to ensure high school graduation. At the same time, the student takes one or two college courses a semester from a local institution on released time from school, at night or during summers. Thereby, the student graduates from high school with the added bonus of some college credit. Some of the college courses may even be used for high school credit as well. The individual can, therefore, enjoy the atmosphere of high school while being challenged intellectually.

2 In lieu of the above option, or in addition to it, it may be possible for a bright student to receive college credit for high school course-work through examination. The Advanced Placement Program, which has been sponsored by the College Board since 1955, offers able and motivated students the opportunity to study one or more college-level courses and then, depending on their examination results, to receive advanced standing in college, credit or both.

The program provides schools AP course descriptions in over 20 disciplines, such as biology, chemistry, mathematics, physics and computer science. These course descriptions are prepared by committees of school and college teachers and are revised biennially. The extensive guidelines for high schools to use in setting up and conducting AP classes can be obtained at a minimal cost by writing to ***College Board Publications Orders,*** Box 2815, Princeton, New Jersey 08541.

The committees responsible for the course descriptions also prepare a three-hour examination in each of the respective subjects except Studio Art, for which a portfolio of the student's art is used instead. The Educational Testing Service (ETS) administers these examinations each May. Readers from various schools and colleges then assemble to grade the examinations on a five-point scale: 5, extremely well qualified (or A + in a college course); 4, well qualified (or A); 3, qualified; 2, possibly qualified; or 1, no recommendation. Each candidate's grade report, examination booklet and other materials in support of his application for advanced placement or credit are sent in July to the college he/she plans to enter. It is then up to the college to decide whether and how it will recognize his/her work. Scores of 4 and 5 on the five-point scale are usually accepted for credit by even the most selective colleges; often, even a 3 is accepted.

The staff of SMPY has encouraged high schools to offer AP courses that prepare students for these examinations and also provide much needed intellectual stimulation. For those small high schools where there are not enough students to fill AP classes, independent study arrangements for the few students ready for AP work could be instituted. Under the supervision of a teacher, students could study at the AP level of a topic following the guidelines of the AP syllabus. Such independent study arrangements should be in lieu of a class.

The rewards of conducting an AP class are rich. Gifted students become intellectually stimulated and thereby avoid boredom while they study at the college level. Successful students may also receive exemption from the first-year course in college so that they can move initially into more appropriately difficult materials there.

Do not, of course, confuse the AP exams with the College Board's Achievement tests. The former are at college level, whereas the latter cover the standard content of high school courses. With the occasional exception or foreign languages, students cannot usually receive any college credit for high scores on the achievement tests.

3 If an appropriate course is not available for a gifted student, have that student take correspondence courses at the high school or college level from a major university, such as Wisconsin or California. This approach requires so much self-discipline from the student, however, that frequently it is less than satisfactory. Nevertheless, this is another possible option for providing an appropriate education for the gifted, especially if a suitably motivating and pacing procedure can be set up. The student must not count on receiving college credit for such studies, however, unless arrangements have been made in advance with the appropriate department in the college or university at which he or she will matriculate.

4 The mechanism of choice when programming for gifted students may be subject-matter acceleration. For example, an individual may complete Algebra I and II in a single school year or during the summer. This can be accomplished by *"doubling up,"* by working with a competent mentor, or through fast-paced classes (Bartkovich & George, 1980; Bartkovich & Mezynski; 1981; Mezynski & Stanley, 1980). Since 1972 SMPY has pioneered the concept of fast-paced classes in several subject matters. These classes are now offered during the academic year and in the summer by CTY. During the summer of 1984, for example, CTY offered courses in precalculus, calculus, several sciences, computer science at three levels, American history at two levels, music theory, German, Latin, writing skills (four levels), etymologies, micro-economics, and probability and statistics. Many school systems have adapted the fast-paced class model for their own use (e.g., Lunny, 1983; Van Tassel-Baska, 1983). Instructions for setting up a fast-paced class can be found in Bartkovich and George (1980) and Reynolds, Kopelke and Durden (1984).

5 A school may attempt to condense grades 9–12 into three years for especially gifted students. Those students would graduate from high school a year early and thereby reach more quickly the intellectually stimulating courses available at college. Senior-year credits, such as English, may be taken during the junior year or during summer sessions. Another possibility is to take college courses that also specifically fulfill high school course requirements, such as supplanting high school calculus with a more advanced college course in calculus (see 10 below). The key to this alternative is a school exercising flexibility in allowing individual programs.

6 In some communities there are insufficient existing educational alternatives to stimulate a very bright student. In such a circumstance, it may be advisable to have a student attend an early entrance college or program in lieu of high school. The three most notable opportunities are Simon's Rock College of Bard College at Great Barrington, Massachusetts; the Freshman Program of the New School for Social Research in New York City; and the program run by Professor Nancy Robinson of the Child Development Research Group at the University of Washington, Seattle, Washington (Robinson, 1983). Exercising this option would require strong commitment on the part of the parents.

7 A skilled local mentor (not necessarily a teacher) may work privately with the student, pacing him or her in areas in which the student is most advanced (Stanley, 1979).

8 For some students it may be desirable to enter college at the end of the tenth or eleventh grade with or without the high school diploma. This may seem extreme, but actually it has become a fairly common practice for highly able students. In fact, a number of institutions have set up specific programs and procedures for applicants who wish to enter college at the end of the eleventh grade. Moreover, the rules of several state boards of education allow the substitution of one year or even one semester of college credit for one year of high school credit. Thus, the high school diploma may be awarded at the end of the first year of college.

The staff of SMPY usually recommends that the student earn some college credits, especially via AP examinations, before leaving high school. This makes the transition smoother when the student goes from high school to college early. For many bright students, leaving high school early with advanced standing via AP examination credits and/or college courses seems to be the preferable mode.

Many of SMPY's protegés have entered college early and done well (see ***Time,*** 1977; Nevin, 1977; Stanley & Benbow, 1982b; Stanley & Benbow, 1983a). They attend or have attended a considerable percentage of the most selective universities and colleges. In SMPY's opinion, highly able, well-motivated, emotionally stable students can complete college by age 14 to 20, accruing considerable personal and academic benefit.

9 A quite simple strategy to use in meeting the needs of the gifted for advanced course-work is to allow students to take courses appropriate to their ability and achievement levels, regardless of their age. For example, allow an unusually mathematically able 7th-grader to study algebra, rather than having to wait until the 8th or 9th grade.

10 Encourage intellectually talented students to substitute college courses in mathematics for high school courses that are either unavailable or too elementary. It was not rare for SMPY's ablest, most motivated protegés to complete mathematics through the third semester of college calculus, differential equations, and/or linear algebra while still in high school. One intrepid youth finished the entire undergraduate mathematics curriculum of The Johns Hopkins University's Evening College, through complex variable theory and Fourier analysis, by age 16. Another did likewise at the University of Maryland.

11 Perhaps the most innovative option SMPY has pioneered for mathematically talented students is its fast-paced mathematics classes, where several years of mathematics are learned in one year (Fox, 1974; George & Denham, 1976; Bartkovich & George, 1980; Mezynski & Stanley, 1980; Bartkovich & Mezynski, 1981; Mezynski, Stanley, & McCoart, 1983). This approach has been adapted to the study of college physics and chemistry (Mezynski, Stanley, & McCoart, 1983), high school biology, chemistry, physics, and computer science (Stanley & Stanley, 1986), and the verbal areas (Durden, 1980; Fox & Durden, 1982).

12 Most youths who reason exceptionally well mathematically do not need the basic eighth-grade-level course in science. They normally know the concepts usually covered or can be taught them in a few weeks of review, using the DT-PI model (to be discussed in the next section). Thus, most mathematically and/or scientifically highly gifted eighth graders should begin their studies with biology. Using the DT-PI model or by teaching the course content at an accelerated pace, an instructor could easily cover biology in one semester and then chemistry in the second semester, or vice versa. Students would then advance to physics and computer science the following year. By the time the gifted student reaches tenth grade, he or she would be ready and have enough room in his/her schedule to study the sciences at the college level through the Advanced Placement Program *(see Option 2)*.

These are the main options offered to the mathematically talented students identified by SMPY. In discussions with the students, parents and the SMPY staff, an individual program is tailored for the students using a combination of options. This approach utilizes already available educational opportunities rather than designing new programs or rewriting curricula. As a result, it is politically viable and inexpensive. SMPY's approach may not be the best approach for educating the gifted child, but it is certainly the most practicable to help gifted students immediately. Longitudinal teaching teams, as proposed by Stanley (1980), may be a much better system, but would be difficult to implement. Furthermore, a different teaching approach than used with average ability students may be desirable to teach the gifted student basic material. SMPY has designed one such appropriate teaching method. It will be described in the next section.

SMPY's Instructional Approach

The extensive experience SMPY had in teaching mathematics at a fast pace to its students revealed that many of them already knew mathematical concepts not yet explicitly taught to them (Bartkovich & George, 1980; Bartkovich & Mezynski, 1981; Stanley, Keating, & Fox, 1974). Actual knowledge seemed somewhat dependent upon the individual's ability (Favazza, 1983). Moreover, the rate at which unknown mathematical concepts and principles were acquired was also a function of ability. These results verified the need for developing a teaching approach that could accommodate both the individual's idiosyncrasies in knowledge of mathematics and his/her rate of learning. The results of experimenting led to the DT-PI (Diagnostic Testing followed by Prescriptive Instructional) model (Stanley, 1978, 1979).

This individualized instructional approach, which can be used in both individual and group settings, is a strategy for teaching gifted students only those aspects of a subject they do not know at a rate dictated by their abilities. It is basically a sequential method of (1) determining the student's current level of knowledge using appropriate standardized tests; (2) pinpointing areas of weakness by analyzing items missed on a given test; (3) devising an instructional program that targets those areas of weakness and allows the student to achieve mastery of the level on a second form of the test; and (4) proceeding to the next higher level and repeating steps 1–3.

The DT-PI model has been used successfully with students as young as six years of age. It can be used to help the student master arithmetic or basic mathematics, precalculus, calculus, the sciences and other subjects such as the mechanics of standard written English. Not only teachers but also teachers' aides, mentors and qualified volunteers from the community can use this approach. It is an extremely flexible instructional model.

The diagnostic testing followed by prescriptive instruction (DT-PI) teaching method is an integral aspect of certain of the above options, especially numbers 7, 11 and 12. Below will be described step by step how to use this instructional approach with gifted students. The description is an adaption of Stanley (1978, 1979). Dr. Julian C. Stanley is the originator of the DT-PI model.

Step 1

Before using the DT-PI model, obtain an estimate of the level at which diagnostic testing should begin. Beginning diagnostic testing at the appropriate level is extremely important in order to avoid frustrating the examinees and thereby weakening motivation. An examinee should score at least half-way between the sheer chance score and a perfect score (which is generally the number of items of which the test consists) on the proper level of the measurement instrument. Usually, this will be approximately the 50th percentile of the age or grade group for which the test is most nearly optimum—that is, the score below which the scores of half of the examinees lie.

Three factors should be taken into account when estimating the level with which to begin. They are the student's standardized achievement and/or ability test performance, educational background and school curriculum. This assessment can be supplemented by remarks from the student's parents or the teacher's knowledge about the student.

With gifted children the level at which assessment commences will probably be considerably above their chronological age. To obtain an initial estimate of the student's ability, the staff of SMPY uses the SAT with 11- to 13-year-olds. Younger or less able students can have their abilities evaluated by the use of easier aptitude tests than the SAT, such as the School and College Ability Test (SCAT) or the Differential Aptitude Test (DAT). (In the appendix to this paper are names and addresses of the publishers of the various tests described.) It can also be useful to measure the student's specific abilities separately. Knowledge of his or her spatial, nonverbal and mechanical comprehension abilities are especially valuable.

In a manner similar to estimating where to begin testing with the Stanford-Binet Intelligence Scale, the examiner must use all available evidence to estimate the point where the student would score at the 85th percentile of the most stringent national norms of students having had that level of mathematics for one year. Such a level of performance indicates that the student already knows well that subject matter. On an Algebra I test, for example, this would be the 85th percentile of students having completed Algebra I. Diagnostic testing would begin at the **next** level up. Thus, if it is estimated that a student already knows Algebra I but not Algebra II, diagnostic testing would begin with Algebra II.

If the estimating procedure is successful, the testee should score around the 50th percentile of the first test administered. Then the procedure goes on to the next step. If, however, the student scores above the 85th percentile, material not yet known should be covered fast and well with a tutor *(Step 9)* before the next higher level of the subject-matter test is administered. Likewise, if the student scores below the 50th percentile of the first test taken, the examiner must go back and test at the previous level in order to insure mastery of that level. If the examinee then scores below the 85th percentile on the easier level of the test, instruction should begin with that level. Otherwise, the level first tested should be pursued.

In SMPY's and CTY's fast-paced mathematics classes for end of the year seventh graders who have scored at least 500 on SAT-M, diagnostic testing begins with Algebra I.

For diagnostic testing in mathematics, the staff of SMPY and CTY has relied on the Cooperative Achievement Tests in Mathematics (Arithmetic, Structure of the Number System, Algebra I, II, and III; Geometry, Trignometry; Analytic Geometry; and Calculus) and/or the Sequential Tests of Educational Progress *(STEP)* in mathematics (Mathematics Concepts and Mathematics Computation, several levels of each). All these were prepared by ETS in two or three essentially equivalent forms each. But other tests may be appropriate. For the teaching of science, the College Board achievement tests in biology, chemistry and physics have been utilized (address of publisher is in appendix). Other standardized tests may be as appropriate or useful.

We shall use the general case of mathematics to illustrate the process of applying the DT-PI model.

Step 2

After estimating where to begin, assess knowledge of mathematics in order to find "*holes*" in the student's background. Administer the determined level of the test to the student, observing carefully the instructions, especially time limits, and providing sufficient scratch paper and pencils.

a. Encourage the examinee to mark on the answer sheet every item that time permits, but to spend little time on those about which he/she has little knowledge.

b. Urge him/her to put a question mark next to the number of each item about whose answer he/she is uncertain. The testee should return to these for further scrutiny if time permits.

c. Notify the examinee when half the testing time has elapsed and also when only five minutes remain.

d. Do not answer any questions about the content of the items. Just say "*Do the best you can.*" Procedural questions, such as how or where to mark an item, may be answered quickly, but should have been covered before testing began.

Step 3

When the testing time expires, collect the answer sheet and score it immediately. Record the number answered correctly. Determine the percentile rank of the score on national norms. If this is at least the 50th percentile of students having had that level of mathematics for one year, but not beyond the 85th, proceed to the next step.

If the score is below the 50th percentile, repeat Step 2 with the next lower level test. As long as the student's score is at or above the 85th percentile on the lower test, continue with Step 4 for the test originally used (but also do Step 9 for the lower level test). If the score is between the 50th and the 85th percentile on the second test, proceed to Step 4, but use the lower level test. If the student scores below the 50th percentile on the second test, an even lower level test should be utilized and the whole process repeated. See the flow chart in Figure 3.

If the score was above the 85th percentile on the original test, repeat Step 2 for the next more difficult level.

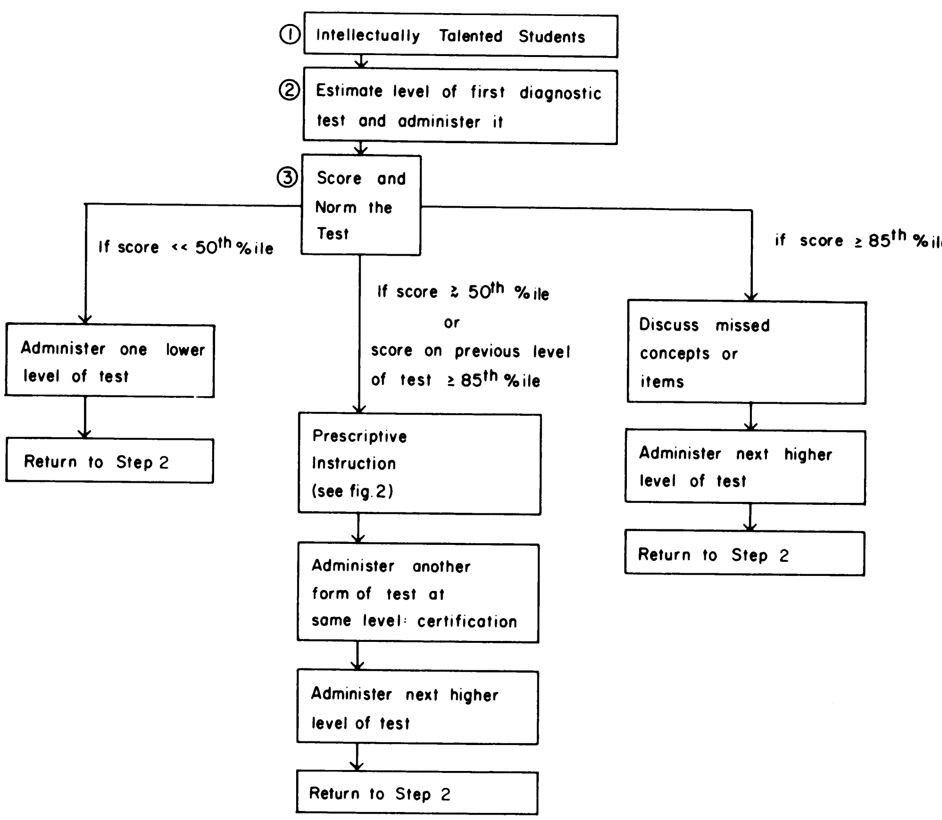


Figure 3. Diagnostic Testing Procedure

Step 4

Using the test that the examinee scored in the approximately 50th to 85th percentile range, give the examinee a list of the numbers of the items still missed on that test and have him/her try them again with unlimited time. Do not show the examinee the scored answer sheet or tell him/her how the missed items were marked. Just give the examinee the item numbers, the test booklet, and scratch paper on which to do those problems not answered correctly under the standard conditions.

Step 5

Those items the examinee still misses should be examined carefully by a mentor, especially to see how the pupil missed them both times; the same way, or a different way. If available, use an item-profile chart to determine which points the examinee does not understand. Item-profile charts are usually provided in the test's manual. If the student appears to have difficulties in more than two areas, it is useful to also administer an instructor-designed test to ensure sufficient knowledge. The purpose of such testing is to pick up those students who scored fairly well on the standardized achievement test because of their high mathematical reasoning ability, but yet do not know the subject as well as their score would indicate.

Step 6

By considering the points underlying the twice-missed items, by querying the examinee about questioned items he/she marked correctly and by further talking with the examinee, the mentor should be able to *"read the examinee's mind"* and devise an instructional program to perfect the examinee's knowledge of that level of mathematics. This should deal only with the points not yet understood. Especially, the mentor should not have his/her pupil work through the entire textbook, but instead do only suitable problems (especially the most difficult ones) concerning those topics not yet well known.

Step 7

This is mentor-paced instruction, not self-paced. The mentor stimulates the youth to move through the materials fast and well, providing help where needed.

Step 8

The goal is for the examinee to score almost perfectly on another form of the same test and also on other standardized tests at that same level. The staff of SMPY has used the 85th percentile as the mastery level.

Step 9

When the student achieves an 85th percentile on another form of the same level test, it is still beneficial to quickly go over the points missed by the student to clear up any misunderstandings. Similarly, this should be done for any test where an 85th percentile is obtained during diagnostic testing.

Step 10

After prescriptive instruction has been completed for one level of mathematics, the next higher level should be administered and Steps 2 through 9 be repeated. For example, after Algebra I has been taught in this way, proceed with Algebra II, and so on. See Figure 4.

For the **"prescriptive instruction"** one needs a skilled mentor. He or she should be intellectually able, fast-minded, and well versed in the subject area, considerably beyond that to be learned by the *"mentee(s)."* This mentor must not function didactically as an instructor, pre-digesting the course material and *"spoon-feeding"* the

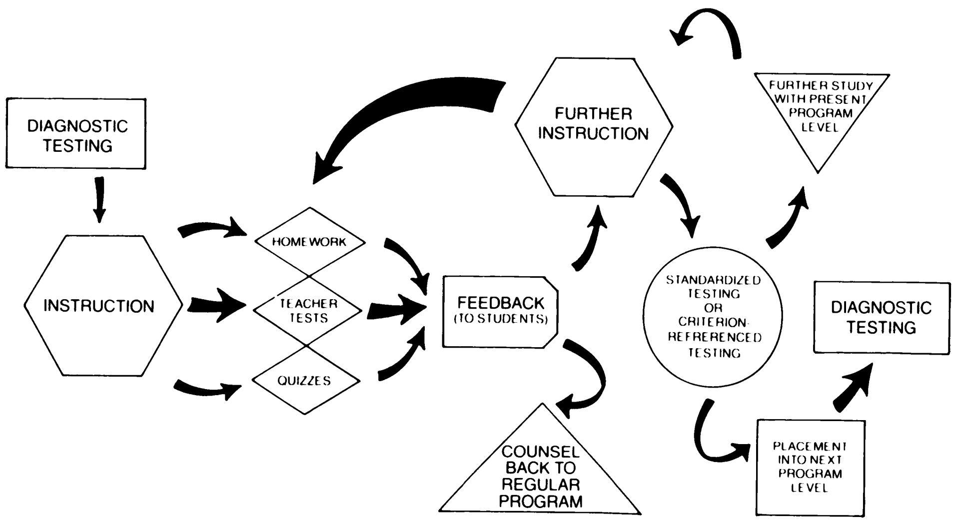


Figure 4. Evaluation process for a fast-paced mathematics class

This material was first published in* **New Voices in Counseling the Gifted, *Colangelo and Zaffron. Copyright 1979, Kendall Hunt Publishing Company.*

mentee. Instead, he or she must be a pacer, stimulator, clarifier and extender. The mentee must take responsibility for his or her own learning, especially via homework done carefully, fully and well between the meetings with the mentor. The mentor must ensure that all the homework is indeed done well.

Not all youths will want to work long under these conditions. The alternative for them is to find a *"tutor,"* someone who will *"teach"* him or her to a much greater extent than is the proper function of the mentor. Obviously, one can get ahead faster with a mentor than if a tutor is required.

The mentor need not be a trained teacher, nor need he or she even be older than the mentee (but much *"smarter,"* of course). SMPY has used a brilliant 10-year-old to serve as the mentor for a brilliant 6-year-old, and later as the 12-year-old (college-sophomore!) mentor for a 15-year-old tenth-grader. Usually, though, the mentor will be several years older than the mentee. Eleventh- or twelfth-graders or college students majoring in the relevant subject area may be excellent. So may older persons, if they are well-grounded in the modern mathematics and science and not slow-minded, pedantic or excessively didactic.

The length and frequency of sessions with the mentor is again an individual matter, depending upon the motivation, ability and time available from the student. Weekly sessions are preferable, but they may be more frequent, especially during summers.

Examples of SMPY's Instructional Approach

Example 1

Step 1. A father wrote in April about his son, 9¾ years old and in the fourth grade, including evidence of extreme mathematical precocity (i.e., SAT scores). The boy was studying algebra on his own, with some help from his parents.

Step 2. At age $9\frac{5}{6}$ this boy took the Cooperative Achievement Test, Algebra I, Form B, under standard conditions.

Step 3. He marked 30 of the 40 items correctly during the 40 minutes. He marked Nos. 17, 26, 27 and 37 incorrectly and omitted Nos. 21, 29, 32, 37, 38 and 39 (although having been encouraged to try all the items). On the most stringent norms his percentile rank was 43, meaning that he scored better than 43% of suburban eighth graders do after studying Algebra I for some 180 45- or 50-minute periods. His score of 30 exceeded the scores of 87% of eighth graders across the country who have studied Algebra I for a school year, and 89% of ninth graders.

Step 4. When given plenty of extra time to try again the 10 items he had missed, the boy worked 6 of them correctly.

Step 5. By studying missed items and consulting an item-profile chart, it seemed clear that the boy's main difficulties were with two topics, "*solution of linear equations*" and "*factoring and quadratic equations.*" He was inefficient with the former and largely ignorant concerning the latter.

Steps 6–8. He was given specific, appropriate instruction before taking the other form (A) of this algebra test.

Step 9. He scored above the 85th percentile on the other form of the test but still missed a few items. These were quickly resolved.

Step 10. The process was repeated for Algebra II.

Example 2

Step 1. A third grade student was referred to us by his school because he seemed bright, especially so in mathematics. We administered the Revised Stanford-Binet Intelligence Scale to him and found that his IQ was 150. His strengths did appear to be in the non-verbal areas.

From a discussion with his parents and himself, we estimated his level of knowledge of mathematics. Taking his ability, achievement level and age into consideration, we felt that the STEP Series II Mathematics Computation Form 4A and Mathematics Basic Concepts Form 4A would be most appropriate. Level 4 is for upper elementary school students.

Steps 2–4. He was tested and his score on computation was 433, which placed him at the 52nd percentile of 5th graders tested in the spring. On the basic concepts test he achieved a converted score of 437, which placed him at the 59th percentile of 7th graders in spring or the 41st percentile of 8th graders. When given back his paper to work on, he made four more concepts problems correct on the 50 item test and six more computation problems on that 60 item instrument.

Steps 5–7. His weaknesses were determined, and these were worked on.

Step 8. After several months of mentoring, he was given form B of the same STEP tests. This time he scored in the 90th percentile of eighth graders.

Step 9. The missed items were discussed and explained.

Step 10. We went back to Step 3 and did diagnostic testing, using the next higher level of the STEP test. The instructional process was repeated.

Step 10. We then went back to Step 3 again to begin Algebra I. On the Algebra I test he scored at the 53rd percentile of suburban eighth graders having taken algebra for one year. The instructional process was repeated.

Example 3

Step 1. A young girl was brought to us by her parents. She was accelerated one year in grade placement and had taken Algebra I. Her SAT scores were 590 math and 600 verbal. Since she had completed Algebra I and had high SAT scores, we began testing with the Coop Algebra II test.

Steps 2–3. Her score on the Algebra II test was at the 95th percentile of students having already taken Algebra II for a whole year.

Step 4. We proceeded to Step 4 and cleared up any misunderstandings of the student. Afterwards we went back to Step 3 but now testing her with the Coop Algebra III test. There she scored at the 55th percentile of students having completed that course.

Steps 5–7. Using the profile chart and by talking to her, we determined which concepts were not fully understood and then set up an instructional program.

Step 8. After instruction, her score on the other form of the Algebra III test rose to the 95th percentile.

Steps 9–10. The missed points were covered, and we began geometry by going back to Step 3 and repeating the process. In geometry, however, we supplemented instruction with work on proofs. The ability to do proofs is not tested by the standardized achievement test and is not picked up easily. Because learning how to do proofs is so important in geometry, such additional instruction is necessary.

Although the DT-PI model seems appropriate only in an individual setting, it has been successfully used in a group approach, too. For example, during the summer of 1978 SMPY helped 12 of 33 post-seventh-graders of 1-in-1000 math aptitude to learn Algebra I–III, geometry, trigonometry and analytic geometry excellently in 40–48 hours! As beginning eighth graders they were ready to study college-level calculus (Bartkovich & Mezynski, 1981).

In the group setting students are first classified into various subgroups. Students receiving the same examination are tested together. Upon completion, scoring is immediately performed, and any further evaluation that is needed is determined and done. Using the results, an individual program is set up via the mechanisms described in the model. Students working at the same level (but not necessarily on the same topics) are put in the same class with a mentor. Each works at his or her own rate. There is a mentor available for approximately every 5 or 6 students. Sessions can be held every day, twice a week, or even once a week, but for several hours at a time.

CTY now conducts all the fast-paced mathematics classes that were pioneered by SMPY. Every summer they are offered in a residential setting or for commuter students. During the academic year Saturday commuter classes are conducted. Satellite programs in different regions of the country have also been set up. Moreover, other programs across the country have adopted the model, for example, the Talent Identification Project (TIP) at Duke University, Center for Academic Precocity (CAP) at Arizona State University-Tempe, Child Development Research Group at the University of Washington, and the staff of the Center for Talent Development at Northwestern University. Clearly the DT-PI model has been used successfully in diverse settings. It has also been used to teach biology, chemistry and physics. The staff of SMPY feel that the model has been field-tested sufficiently for us to recommend its adoption as a means to teach mathematics and science to intellectually talented students.

Long-term effects of SMPY participation

While it has been demonstrated that students participating in the various SMPY programs or options have benefited initially (Stanley, Keating, & Fox, 1974; Keating, 1976; Eisenberg & George, 1979; Fox, 1974; George & Denham, 1976; Bartkovich & Mezynski, 1981; Mezynski & Stanley, 1980; Mezynski, Stanley, & McCoart, 1983; Durden, 1980), it is important to determine the long-lasting effects. From the beginning, SMPY was intended to be a longitudinal study to investigate the development of intellectually talented students, as Terman did in his classic study, and also to evaluate the long-term effects of SMPY's educational interventions. Through SMPY's longitudinal studies, it has been shown that short-term benefits are also long-term.

The students in SMPY's first three talent searches have been studied approximately five years after initial contact. Their development was traced through high school (Benbow, 1981, 1983). Students who as seventh- or eighth-graders had scored at least 370 verbal or 390 math on the SAT (the mean scores of a national random sample of high school females) were sent an eight-page printed questionnaire. Over 91 percent of 2188 SMPY students participated by completing the survey. The general conclusion of the study was that SMPY students had fulfilled at least a considerable proportion of their potential in high school.

Relative to appropriate comparison groups SMPY students were superior in both ability and achievement, expressed stronger interests in mathematics and the sciences, were accelerated more frequently in their education, and were more highly motivated educationally, as indicated by their desire for advanced degrees from difficult schools. Over 90% were attending college, and approximately 60% of those were planning to major in the sciences. The results suggested strong relationships between mathematical talent of students in grade seven or eight and subsequent course-taking, achievements, interests, and attitudes in high school. SMPY's identification procedure was effective in selecting students in the seventh grade who achieve at a superior level in high school, especially in science and mathematics (Benbow, 1981, 1983). These students are now being surveyed one year after expected college graduation and will be followed-up throughout their adult lives.

In addition to studying the development of mathematically talented students, the longitudinal study provides useful data for evaluating lasting effects of SMPY's various methods in facilitating the education of its students. It was found, for example, that the successful participants in SMPY's first fast-paced precalculus classes achieved much more in high school and college than the equally able students who had not participated. They were also much more accelerated in their education than the non-participants. The former were satisfied with their acceleration, which they felt did not detract from their social and emotional development. Furthermore, there appeared to be no evidence to justify the fear that accelerating the rate of learning produces gaps in knowledge or poor retention (Benbow, Stanley, & Perkins, 1983). Similar results were found for those students who graduated from *college* before age 19 (Stanley & Benbow, 1983a; Benbow & Stanley, 1983a) and the less accelerated students in the follow-ups (Benbow, 1981, 1983). Most of the SMPY students felt that SMPY had helped them at least some, while not detracting from their social-emotional development (Benbow, 1981, 1983). This was true even for the students with whom the staff of SMPY had not had much contact.

Solano and George (1976) presented the initial findings from encouraging students identified by SMPY to take college courses on a part-time basis before entering college full-time. During the first five years of SMPY's existence, "131 students took 277 college courses and earned an overall GPA of 3.59, where 4 = A and 3 = B. . . . Community colleges are a great deal easier for these students than either colleges or universities. These youths experience little social or emotional difficulty in the college classroom" (Solano & George, 1976, p. 274). SMPY's extensive experience since then does not alter the above conclusions, except to urge that highly able students attend the most academically selective college in their locality.

Case Histories

To illustrate how we use curricular flexibility to provide an appropriate education for gifted students, some examples and three case histories will be provided. The three case histories are updated versions of those appearing in Stanley and Benbow (1983b), while the examples are borrowed from Stanley and Benbow (1986).

A seventh grade boy, who had an SAT-M score of 760, asked permission to enter the eighth-grade Algebra I class in February. Since he already had missed more than half the course, his request was denied. To prove his capabilities, he then insisted on being given a standardized test covering the first year of algebra. On this he made a perfect score, which is two points above the 99.5th percentile of national norms for ninth-grade students who have been in that type of class for a complete school year. Upon seeing this achievement, the teacher agreed with the boy that he was indeed ready to join the class. The boy realized, however, that even the Algebra I class would be too elementary for him. Thus, instead, he took a college mathematics course that summer, in which he easily earned a grade of A. Later, as a high-school senior he represented the United States well in the International Mathematical Olympiad contest.

At the end of the sixth grade a student took second-year algebra in summer school without having had first-year algebra; his final grade was A. He continued his accelerated pace of learning mathematics. Thus, by the end of the eighth grade he had earned credit by examination for two semesters of college calculus by correspondence from a major university, again receiving an A as his grade. At age 21 he graduated from a top university with triple majors in mathematics, physics, and humanities.

Another student learned two and one-half years of algebra well by being tutored while in the fifth and sixth grades. He continued, by means of mentoring, to master geometry at a high level. His tutor in geometry was a sixteen-year-old freshman at Johns Hopkins who was simultaneously taking honors advanced calculus (final grade, A), as well as other courses that most nineteen-year-olds would find extremely difficult.

A remarkable six-year-old boy living in California mastered two years of high-school algebra. At age seven he enrolled in a standard high-school geometry course. Since he found it too slow-paced, he decided to complete the book on his own before Christmas, while he also taught himself trigonometry. Before age $7^1/_2$ he had scored at the 99th percentile on standardized tests of Algebra I–III, geometry and trigonometry. His SAT-M score at age 7 was 670, the 91st percentile of college-bound male high-school seniors. This boy, however, is truly not a typical example of a gifted child. He may be the most precocious boy that SMPY has worked with. His main competition is an eight-year-old boy in Australia, who scored 760 (the 99th percentile) on SAT-M, even though he was unaccustomed to taking multiple-choice tests.

Several girls have accelerated their progress in mathematics considerably, though not as much as the boys discussed above [see Fox (1976) for a discussion of this point]. One of them graduated from high school a year early while being the best student in SMPY's second high-level college calculus class. She went on to earn a bachelor's degree in computer engineering from an outstanding university and then a master's degree in computer science and a Master of Business Administration degree.

To further illustrate what highly motivated and highly able young students can accomplish if given the curricular flexibility they need, three case histories will be delineated below. They are updated versions of those found in Stanley and Benbow (1983b).

Case History 1

Colin Farrell Camerer, who was born in December 1959, is the only son in a family of four children. His father, a college graduate, is a sales manager; his mother, a high-school graduate, is an executive secretary. Both parents are highly intelligent as judged from results of standardized testing. As an accelerated eighth-grader in SMPY's January–February 1973 Talent Search, Colin scored 750 on SAT-M and almost as highly on SAT-V. Through SMPY's first fast-paced mathematics class, which began when he had just finished the sixth grade, Colin learned $4^1/_2$ years of precalculus mathematics chiefly on Saturdays, in a total of 14 months. SMPY recommended to him that he accelerate in school, which he was eager to do. Thus, he skipped grades 7, 9, 10 and 12 and then entered Johns Hopkins with sophomore standing through advanced Placement Program (AP) course work and college credits earned while attending the 8th and 11th grades. Despite his acceleration and emphasis on academics, he participated in a wide range of activities. In high school he was on the wrestling and TV quiz teams and participated in student government. At barely 17 years of age, Colin finished his work for the BA degree in quantitative studies at Johns Hopkins at the end of the first semester of the academic year 1976–77 after only five semesters (Stanley & Benbow, 1982b). During his undergraduate years, he was on the Hopkins varsity golf team and was described by a journalist as an **"all-rounder"** (Nevin, 1977). Colin held a variety of jobs while in college, including summer work as an associate editor of a weekly newspaper. In September 1977, while still 17 years old, Colin became a graduate student at the University of Chicago. He remained there, earning his MBA degree at 19 and completing all work for the Ph.D. degree in finance before age 22. In the meanwhile, he resurrected the student newspaper along with a friend. His hobbies include skiing, tennis, golf, horseracing and writing. Several letters written during graduate school indicated that he was very mature for his age. The content and style was similar to that expected of a student well into his twenties. While still 21 years old and with several research publications to his credit, he became an assistant professor of management at Northwestern University and a consultant to businesses. He is now an assistant professor at the Wharton School of Business at the University of Pennsylvania.

When Colin is asked about his acceleration, he feels very satisfied with it. He shudders at the thought of not having been given the curricular flexibility that he so desired and needed. As for his social and emotional development, he does not think that acceleration affected it. He views himself as a natural loner. He would not have socialized more if he had not been accelerated, perhaps less because of the frustrations he surely would have had to deal with.

Case History 2

Chi-Bin Chien is also among the brightest students identified by SMPY. In December 1975, a month after his 10th birthday, he took the SAT and scored 600 on SAT-V and 680 on SAT-M. A year later in SMPY's December 1976 Talent Search, he raised these scores to 710 and 750, respectively. A variety of intelligence test scores indicated an IQ of at least 200. A Chinese-American boy whose father is a professor of physics and whose mother has a master's degree in psychology, Chi-Bin has two younger siblings who are also extremely able and scored above 700 on SAT-M before age 13. Because of his father's persistent efforts he was given special educational opportunities in a private school. It was decided that this was not enough, however. Thus, Chi-Bin received some individual mentoring in mathematics, using the DT-PI model. Through the diagnostic testing, it was discovered that, even though Chi-Bin had taken only Algebra I in the fifth grade, by age 11 he knew Algebra II, Algebra III and plane geometry. Trigonometry and analytic geometry were taught to him in a few weeks. Through consultation with SMPY, it was decided that he should skip several grades while taking college courses on the side and Advanced Placement work. By age 12 Chi-Bin had completed his work for a diploma from an excellent public school in Palo Alto, California and calculus courses at Stanford. In the fall of 1978, while still 12 years old, Chi-Bin entered Johns Hopkins with sophomore standing. He had been accepted at Harvard and Cal Tech as well. In May of 1981 he received his baccalaureate at age 15, with a major in physics, general and departmental honors, the award in physics, a Churchill Scholarship for a year to study at Cambridge University in England, and a 3-year National Science Foundation Graduate Fellowship to work toward his Ph.D. in biophysics at the California Institute of Technology after returning from England. Chi-Bin is presently pursuing his studies at Cal Tech.

Case History 3

A third example is a remarkable girl who entered Johns Hopkins one year early with sophomore standing. In May 1980, near the end of her 11th grade, Nina Morishige, from a small town in Oklahoma, took five AP examinations in one week and scored four 5's and a 4. Thereby, she earned a full year of college credit at Johns Hopkins. Previously, as a tenth-grader she had won the state high school piano competition. Not only is Nina an academic and musical prodigy, she also shows leadership potential. This is evidenced by her having been elected governor of the high school political assembly, Girls' State, in Oklahoma. In September 1980, with a National Merit Scholarship and sophomore class standing, Nina became a full-time student at Johns Hopkins, choosing the University both for its accelerated mathematics program and for the opportunity to pursue piano studies at its Peabody Conservatory. At Hopkins she played the flute and violin, was a member of the women's varsity fencing team, completed her BA degree in mathematics with high honors, including election to Phi Beta Kappa, at age 18. A few months later she earned her master's degree in mathematics. She is probably the youngest American ever to win a Rhodes Scholarship, which provides two years of study at Oxford University. She is studying mathematics and science there and expects to receive her doctorate in mathematics before she returns to the U.S. Nina also won a Churchill Scholarship to Cambridge University for a year. Faced with this choice, she accepted the Rhodes. While studying for her doctorate degree, Nina has traveled all over Europe and Africa to further satisfy her thirst for learning.

These three examples are extreme cases of precocity, achievement and motivation. They illustrate well, however, what highly motivated and precocious students can achieve when given the curricular flexibility they so desperately require. Unfortunately, educators are often biased against acceleration, even though research has shown it to be one of the most viable methods for providing an appropriate education for the gifted (Daurio, 1979; Gallagher, 1975; Pollins, 1983; Robinson, 1983). No study to date has shown that acceleration is detrimental to social and emotional development (ibid.).

These extreme case histories also illustrate well how the various options devised by SMPY can be used together. The less able gifted student would not need as much acceleration and therefore would use fewer of the options or just one. The elegance of the SMPY model is that through its use an individual program can be tailored to meet the needs of each intellectually talented student.

Conclusions

A major conclusion is that academically advanced students need to be identified early and, through curricular flexibility, helped educationally in major ways. Rather than providing special programs within regular schools, it is more practical to allow students to advance to a level of the curriculum that is at their intellectual level. Thus, instead of having teachers of the gifted, we need educational coordinators for the gifted. These coordinators would plan with each student his or her educational program, using available opportunities. Stanley (1980) has also proposed longitudinal teaching teams in each subject area. Thereby, students could advance at their own pace within each

It is apparent that SMPY has encouraged acceleration for gifted students (see Stanley & Benbow, 1982a). Readers may wonder, **"Why hurry?"** One part of the answer is that boredom stifles interest, liking for these subjects and sharpness of thinking in them. Moreover, accelerated youths who reason extremely well mathematically will tend to go much further educationally, in more difficult fields and at more demanding universities, than if they were left age-in-grade (see Nevin, 1977; ***Time,*** 1977). They will tend to stay more directly in the mathematical, engineering and physical sciences and earn outstanding doctorates, master's degrees or baccalaureates before entering the job market at an early age. This enables them to be fully functioning professionals during their peak mental and physical years (see Lehman, 1953), when most of their equally able agemates are still students. Instead of receiving the doctorate at around 30 years of age, they will have it in the early 20's or even the late teens. Both creative contributions and other activities of the "*normal scientist*" (Kuhn, 1970) are likely to be enhanced greatly by the better base laid earlier and by the in-depth pursuit of important special fields.

Finally, Zuckerman (1977) found that a common thread among Nobel Laureates was their systematic, long-term accumulation of educational advantage. Accelerating a student's education would be one such advantage. Data from SMPY's longitudinal study have already shown how acceleration is an advantage that accumulates. Thus, SMPY's most salient finding from working with 85,000 gifted young students over a 13-year period is that school systems need far more curricular flexibility than most of them yet have. The staff of SMPY has extensively tried out various practicable, cost-effective ways to gain such flexibility.

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Appendix: Publishers of Various Tests

College Board Achievement Tests. The College Board, 888 Seventh Avenue, New York, New York 10102.
Cooperative Mathematics Tests. Addison-Wesley Publishing Company, Reading, Massachusetts 01867.
Differential Aptitude Tests. The Psychological Corporation, 304 East 45th Street, New York, New York 10017.
Scholastic Aptitude Test (SAT). The College Board, 888 Seventh Avenue, New York, New York 10102.
School and College Ability Test (SCAT). The College Board, 888 Seventh Avenue, New York, New York 10102.

Discussion Questions

1. Compare SMPY's operational definition of giftedness to Renzulli's concept of giftedness. What advantages or disadvantages result from using these types of definitions to determine giftedness rather than a high I.Q. score alone?

2. SMPY bases its educational programs on three principles of learning as outlined by Robinson. Discuss the effects on education if school systems were to adopt these principles on an overall scale.

3. This chapter outlines twelve educational alternatives for gifted students. What are the advantages or disadvantages of these options for the student? The student's family? The school system?

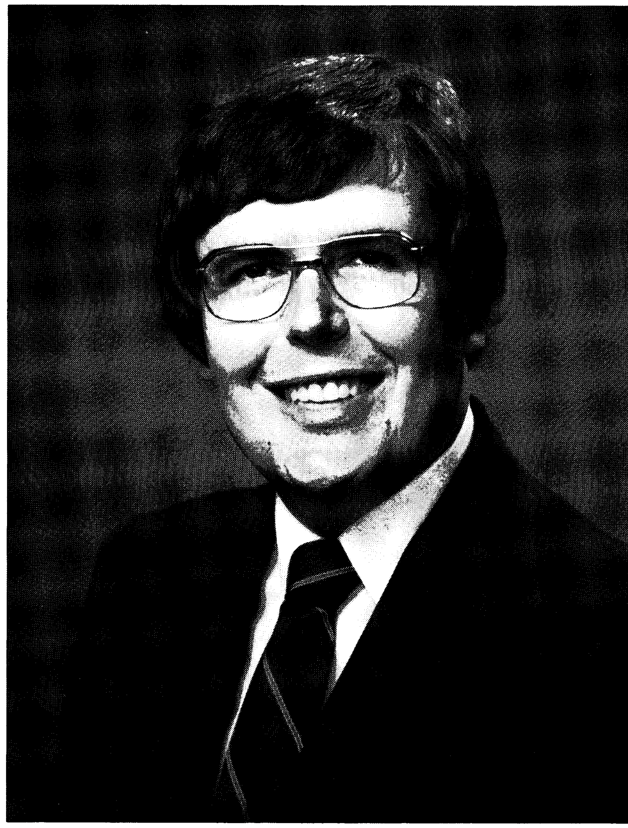
4. SMPY tailors an individual program for each student. Which of the twelve alternatives could be implemented by a school system on a regular basis?

5. SMPY's teaching method is the DT-PI model. What are the advantages or disadvantages of this method versus the teaching methods currently implemented in schools?

6. The DT-PI model has been used successfully for group teaching. How might school systems use this model for teaching both gifted and non-gifted students?

George T. Betts

II



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Dr. Betts was elected to the Executive Board of the National Association for Gifted Children (NAGC) in 1983 and serves as the chair of the Counseling and Guidance Committee of NAGC. He also has authored six books of poetry that were written specifically to deal with the affective development of the individual.

The Autonomous Learner Model for the Gifted and Talented

The Autonomous Learner Model for the Gifted and Talented (K-12) was developed to meet the diversified cognitive, emotional and social needs of gifted and talented students. As the needs of the gifted are being met, they will develop into autonomous learners, with the abilities to be responsible for the development, implementation and evaluation of their own learning.

The model is divided into five major dimensions: (1) Orientation, (2) Individual Development, (3) Enrichment Activities, (4) Seminars and (5) In-Depth Study. The *Orientation Dimension* of the model provides students, teachers, administrators and parents the opportunity to develop a foundation of information concerning the program. Emphasis is placed on understanding the concepts of giftedness, creativity and the development of potential. Activities are also included which provide a clear understanding of the model for the students. The *Individual Development Dimension* provides students with the opportunity to develop the cognitive, emotional, and social skills, concepts and attitudes necessary for life-long learning; in other words, to become autonomous in their learning. The *Enrichment Activities Dimension* of the model provides students with the opportunity to explore the appropriate content which is usually not part of the everyday curriculum. Students are able to begin explorations into their major areas of emphasis, related areas of interest, and new and unique areas. The important task in this dimension is to help the students learn about what resources are available for explorations and future learning. *Seminars* are the fourth dimension of the model. Students in small groups are given the task to research a topic, present it as a seminar to the remainder of the students in the group and to evaluate it by criteria selected and developed by the students. These activities are short-termed and give the students an opportunity to evaluate their own performances in a seminar setting. The fifth dimension of the model is *In-Depth Study*, which is designed to allow the learners to pursue their own areas of interest through the development of long-term small group or individual in-depth study. The learners determine what will be learned, how it will be presented, what will be necessary, what the final product will be and how the entire learning process will be evaluated.

The Autonomous Learner Model For the Gifted and Talented

It is generally accepted that intellectually gifted, creatively gifted and talented children are all in need of special help in developing their gifted potential (Feldhusen & Treffinger, 1980). For many years these ideas have been ignored and programs for the gifted and talented have not been developed.

The major goals of gifted programs are to help gifted and talented students realize their full career potential and to experience a sense of personal fulfillment or self-actualization in maturity (Feldhusen & Treffinger, 1980). Clark (1983) states that gifted youngsters learn very early that their ideas and interests are quite different from their age mates. Once they are able to be together, they will begin to develop their potentials for self-actualization. Gallagher (1975) defines giftedness in the following manner: "The ability to manipulate internally learned symbol systems is perhaps the *sine qua non* of giftedness. It allows the gifted student to learn on his own, to imagine and create new forms and products, without waiting for a teacher or his environment. Such symbol systems thus give the learner autonomy" (pp. 10–11).

The Autonomous Learner Model for the Gifted and Talented (K-12) was developed to meet the diversified cognitive, emotional and social needs of gifted and talented students (Betts & Knapp, 1980). As their needs are met, the gifted will develop into autonomous learners with the abilities to be responsible for the development, implementation and evaluation of their own learning.

When students are involved in gifted programs, they should have an opportunity to pursue their own interests to whatever depth they want (Renzulli, 1977). Becoming an autonomous learner is a difficult task, one which requires new orientations to learning and new development for skills—concepts and attitudes which will be necessary for continued learning. After developing the appropriate skills, concepts and attitudes, students participating in the Autonomous Learner Model (Figure 1) become involved in their own learning with the idea that, through this involvement, they can become independent, self-directed learners.

Rogers (1983) writes about facilitative conditions for learning, feeling free to learn, finding new ways of personal growth, and what needs to be done to humanize the school. He states,

We are, in my view, faced with an entirely new situation in education where the goal of education, if we are to survive, is the facilitation of change and learning. The only man who is educated is the man who has learned how to learn; the man who has learned how to adapt and change; the man who has realized that no knowledge is secure, that only the process of seeking knowledge gives a basis for security; changingness (a reliance on process rather than upon static knowledge) is the only thing that makes any sense as a goal for education in the modern world (p. 120).

Treffinger (1978) defines self-directed learning as responsible autonomy. The problem with this definition is that educators must be concerned with helping students

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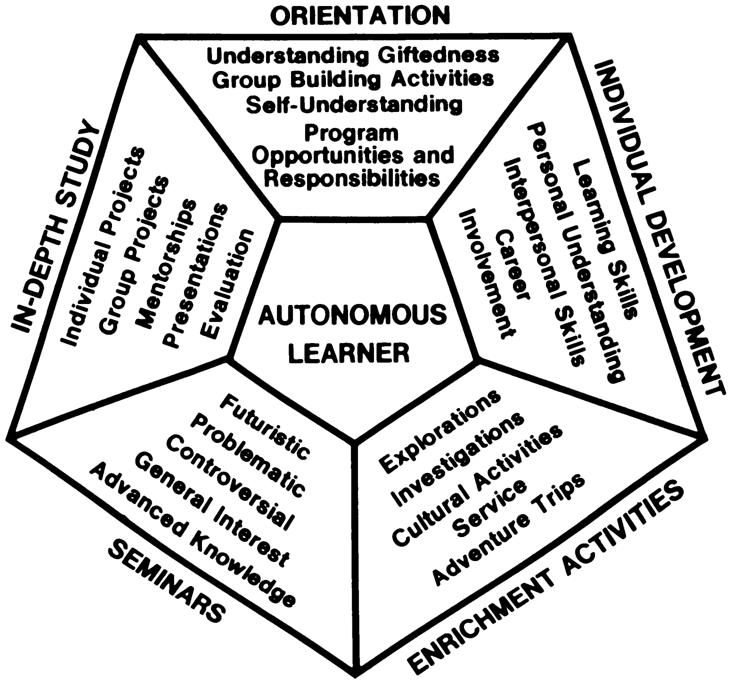

Figure 1. The Autonomous Learner Model.
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learn to make their own decisions, plan their own learning units, participate, and evaluate them at the end of the study. Students do not enter programs for the gifted and automatically become autonomous learners within the first two or three months. The process is difficult and requires a long period of time and the dedication of involved adults. The Autonomous Learner Model was developed for high school students; it is now used at the elementary level as well as the secondary level. Emphasis is placed on meeting the individualized needs of gifted and talented students through the use of activities in the five major dimensions of the model: *Orientation, Individual Development, Enrichment Activities, Seminars* and *In-Depth Studies.*

The **Orientation Dimension** of the model provides students, teachers, administrators and parents the opportunity to develop a foundation of information concerning the program. Emphasis is placed on understanding the concepts of giftedness, creativity and the development of potential. Students learn more about themselves, their abilities and what the program has to offer. Activities are presented to give students an opportunity to work together as a group, to learn about group process and interaction and to learn more about the other people in the program. During the Orientation Dimension of the program, a series of inservice programs are presented for teachers, administrators, parents and involved community resource people. Again, emphasis is placed on the opportunities possible for students, the responsibilities for students and involved personnel and the overall format of the program.

The **Individual Development Dimension** of the model (Figure 2) provides students with the opportunity to develop the cognitive, emotional and social skills, concepts and attitudes necessary for life-long learning; in other words, to become autonomous in their learning.

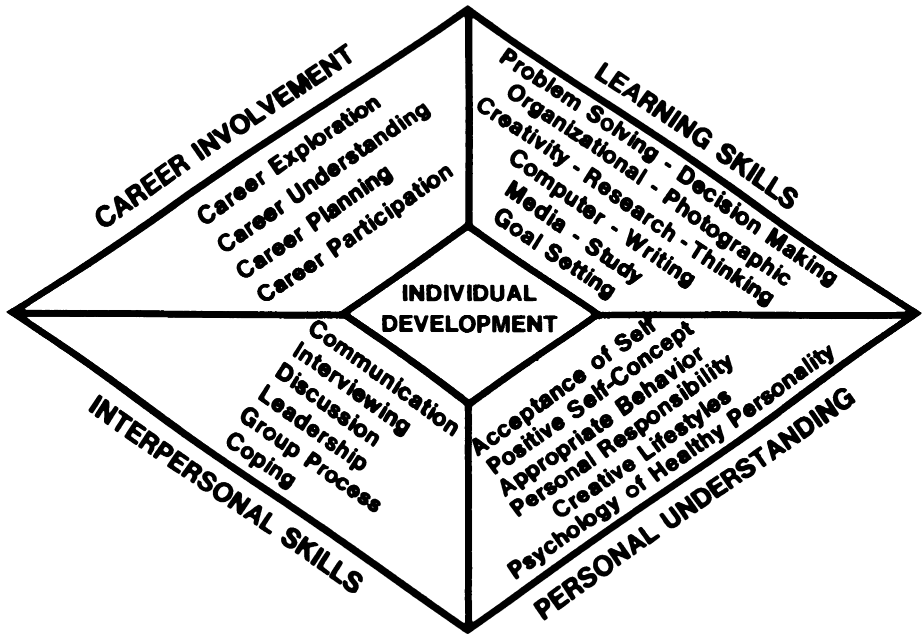

Figure 2. Individual Development.
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The **Enrichment Activities Dimension** of the model was developed to provide students with opportunities to explore content which is usually not part of the everyday curriculum. Most content in the schools is prescribed. Someone beyond the student is deciding what is to be learned, when it is to be learned, and how it is to be learned. Within the Enrichment Activities Dimension, students are able to begin explorations into their major area(s) of emphasis, related areas of interest, and new and unique areas. Students decide what they want to pursue, how it is going to be arranged, and where and when the learning will take place. Gifted and talented students need responsibility in selecting what they are going to study and how they are going to learn.

The **Seminar Dimension** of the model is designed to give students, in small groups of three to five, the opportunity to research a topic, present it as a seminar to the rest of the group and other interested people, and to evaluate it by criteria selected and developed by the students. A seminar is essential because it allows students the opportunity to move from the role of a student to the role of a learner. If students are to become learners, they must have an opportunity for independent individual and group learning, which means having a structure which allows and promotes the development of knowledge by the individuals.

The **In-Depth Study Dimension** of the model allows learners to pursue areas of interest through the development of a long-term small group or individual in-depth study. The learners determine what will be learned, how it will be presented, what help will be necessary, what the final product will be and how the entire learning process will be evaluated. In-Depth Studies are usually continued for a long period of time. Plans are developed by learners, in cooperation with the teacher/facilitator, content specialists, and mentors. The plans are then implemented and completed by the learners, with presentations being made at appropriate times until the completion of the project. A final presentation and evaluation is given to all who are involved and interested.

In summary, the Autonomous Learner Model for the Gifted and Talented is developed to give students an opportunity to become autonomous learners. An autonomous learner, by definition, is "one who solves problems or develops new ideas through a combination of divergent and convergent thinking and functions with minimal external guidance in selected areas of endeavor" (Betts & Knapp, 1980). Within this model, the goals for student/learners include (1) developing more positive self-concepts, (2) comprehending their own giftedness in relationship to self and society, (3) developing the skills appropriate to interact effectively with peers, siblings, parents and other adults, (4) increasing their knowledge in a variety of subject areas, (5) developing their thinking, decision making and problem solving skills, (6) participating in activities selected to facilitate and integrate the cognitive, emotional and social development of the individual, (7) demonstrating responsibility for their own learning in and out of the school setting and (8) becoming responsible, creative, independent learners.

Background and Present Use of the Autonomous Learner Model

Administrators and teachers at Arvada West High School realized by 1973 that the emotional, social and cognitive needs of their students were not being met. Guidance groups of students were formed, and counselors, teachers and administrators met in small groups on an on-going basis to look at possible educational alternatives. A school-within-a-school approach was introduced. The importance of the affective and social domains of the students was being recognized.

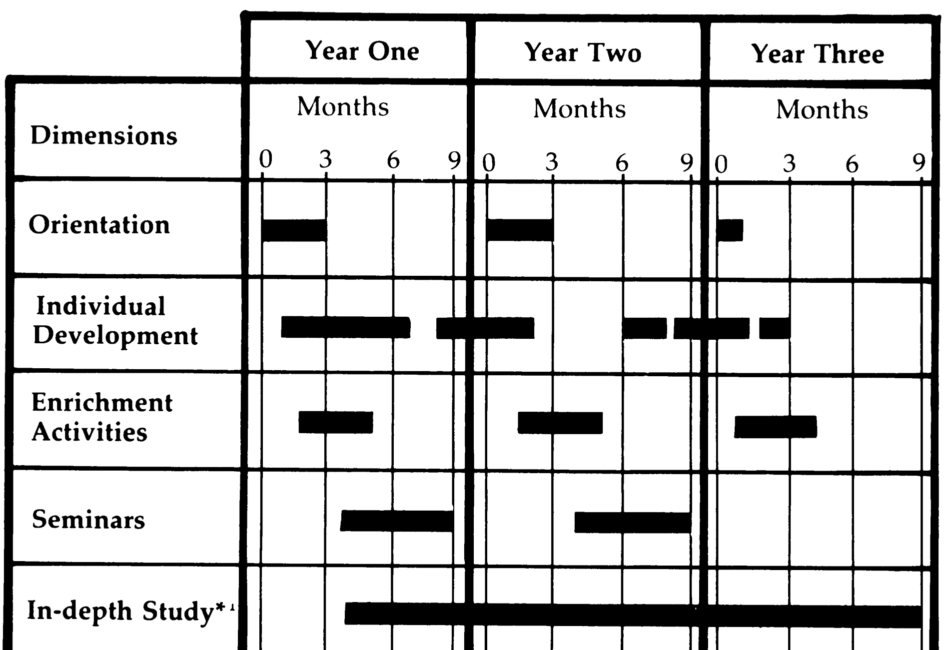
By 1975–76 educators were becoming more aware of a sub-group of students who would be called the "*gifted and talented*." Students who had not been successful at Arvada West were being screened and analyzed to find reasons for the failures within the system. Many of these students were bright, but not motivated in school. At the same time, through the central administration of Jefferson County, the National/State Leadership Training Institute for the Gifted and Talented was contracted to provide a two year series of workshops for administrators and teachers. An awareness of the gifted and talented was being developed both within the school through the needs of the students, and through the district-wide workshops.

Teachers and administrators became committed to excellence in education for all different types of students, including the gifted and talented. A group of seven teachers, led by the principal, formed a task force to study possible prototypes for use with the gifted. Students were involved in this process which included the development of a definition, a rationale and philosophical statement, a program design and a ten year plan for program development. The teachers and administrators received on-going inservice training which developed a foundation for the program.

By 1978 the program was named the "Autonomous Learner Model for the Gifted and Talented." The first students selected for the program graduated in the spring of 1979. Follow-up questionnaires, video tapes and personal contacts with many of the graduates have become a component of the program. An article entitled "*Autonomous Learning and the Gifted: A Secondary Model*," included in Secondary Programs for the Gifted/Talented (Arnold, et al., 1981), describes the model after five years of involvement. One important concept of the Autonomous Learner Model is that students have direct input in the model. The teachers and students would periodically analyze the model's effectiveness. Major changes were made by the students during the first five years of the program. The concept of student ownership is still one of the most successful ingredients of the program. The gifted are capable of participating in the development of their own education.

Although the Autonomous Learner Model was developed on the high school level, it has been modified and is presently used in grades K-12. A scope and sequence lists the skills, concepts and attitudes necessary for the development of students as life-long, independent learners. The model is now being used throughout the United States and Canada. On the elementary level it is presented through a resource room/pullout program approach. Many of the schools that have based their gifted and talented program on the Autonomous Learner Model have students involved two days per week for two-and-a-half hours per day, minimum. The ideal situation occurs when the students use the resource room the rest of the week when they have time for their in-depth study.

Within the middle school, the junior high school and the high school, the Autonomous Learner Model is usually presented to students as an elective course which is offered for a minimum of three years. Students who started the program in the elementary or junior high school now have the opportunity to be in the program for four more years (see Figure 3). If the model cannot be set up as an elective course, the second possibility is to use it as a component of a regular classroom, such as within the language arts, the social studies or the science areas. The regular curriculum is compacted into two to three days per week and the material for the Autonomous Learner Model is covered the remaining days.



*Some students may begin In-depth Study immediately.
[1] After the third year, the majority of time would be concentrated on In-depth study expansion, and out-of-school experiences.

Figure 3. Suggested Timeline for Implementing the Model.
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While the students are involved in the Autonomous Learner Model, they also take required subjects. By the second year of involvement in the program, students may develop an "*In-Depth Study Expansion*." In this way students begin to combine student-based content for the Autonomous Learner course with regular class subjects, such as science, music, social studies or any other area of interest. The students, the teacher/facilitator of the Autonomous Learner Model, and the content specialist (regular classroom teacher) work together and develop an "In-Depth Study Expansion." This plan covers one or more regular classroom topics plus what the student is developing in the Autonomous Learner class.

"*Personal Growth Plans*" are also developed when both the teacher/facilitator and the students believe the appropriate skills and techniques have been learned. The personal growth plan is developed by student, parents, teachers/facilitators, a content specialist (regular classroom teacher/counselor) and community resource people, including mentors. The plan provides a roadmap for possible growth for the next two or three years. Whenever necessary, it can be modified, but basically it is the students' plans for the future: What they will be involved in (school-wide and community-based), how they will be involved and where they will be involved. The goal of the model is to facilitate the growth of the students as independent, self-directed learners, with the development of skills, concepts and positive attitudes within the cognitive, emotional and social domains.

Who Are the Gifted and Talented?

Being able to identify the gifted and talented is a monumental task. One widely used definition for the gifted and talented is that of the United States Office of Education (Education of the Gifted, 1972):

Gifted and talented children are those identified by a professionally qualified person who, by virtue of outstanding abilities, are capable of high performance. These are children who require differentiated educational programs and/or services beyond those normally provided by the regular school program in order to realize their contribution to self and society.

Children capable of high performance include those with demonstrated achievement and/or potential ability in any of the following areas, singly or in combination: (1) General intellectual ability, (2) Specific academic aptitude, (3) Creative or productive thinking, (4) Leadership ability and (5) Visual and performing arts.

The above definition allows for flexibility in deciding who will participate in a program for the gifted and talented. The Autonomous Learner Model is designed to include the following types of gifted and talented students: (1) intellectually gifted, (2) creatively gifted and (3) talented. The intellectually gifted have intellectual abilities superior to other children in the school systems. Scores for these children will be high when looking at achievement and intelligence. They are usually successful in school but are not being totally challenged. The creatively gifted have creative thinking abilities which are superior to other children in the school system. These children are divergent in nature and might not score as high as the intellectually gifted on tests of achievement and intelligence, but will score higher on measurements of creativity than the general population. The talented have developed one specific area in which to excel. The ability is more focused on one area (such as math or music) but they possess a very strong drive or motivation to devour everything about that one area. Participation in the area is consistently outstanding and there is the need for further facilitation and enrichment.

Many programs within the public and private schools which are based upon the Autonomous Learner Model strive to identify students from all three of the groups stated above. Usually though, most districts begin with the intellectually gifted and the creatively gifted. It is the desire of the author to facilitate the use of the Autonomous Learner Model with the talented as well as with the intellectually and creatively gifted.

Other school districts which have adopted the model define the gifted according to Renzulli (1977). He states that the gifted possess three clusters of traits: creativity, above-average (but not necessarily superior) intellectual ability and task commitment. The Renzulli definition of the gifted is compatible with the use of the Autonomous Learner Model. The Autonomous Learner Model is basically an enrichment model which provides students with the opportunity to become self-directed, highly motivated learners.

Dimension One: Orientation

The first dimension of the Autonomous Learner Model is Orientation, which is designed to provide a foundation of information about the education of the gifted for students, teachers, administrators, parents and interested community people. All of the people concerned with the program need, by the end of the Orientation, to be able to answer the following questions: (1) What do the terms "gifted and talented" mean? (2) How does the concept of gifted and talented people relate to the students who have been selected for the program? (3) How were the students selected for the program? (4) What is expected of the students? What are the program opportunities and responsibilities? (5) How will the community be involved in the program? (6) What are the goals and objectives of the program? and (7) What is an autonomous learner?

The Orientation Dimension of the model provides many answers to the above questions. Students have the opportunity to build a basic understanding of giftedness, their own interests and abilities, the Autonomous Learner Model, and the opportunities they still have while they are a part of the program. The Orientation Dimension for the students is divided into four areas: (1) ***Understanding Giftedness***, (2) ***Group Building***, (3) ***Self-Understanding*** and (4) ***Program Opportunities and Responsibilities***.

Understanding Giftedness

Objectives

1. Students will develop an understanding of the term "giftedness."
2. Students will be able to relate the concept of giftedness to their own lives.
3. Students will understand the current approaches to the education of gifted and talented students in the United States today.

Activities

Biographical Sketch. The students each select a famous, eminent person in whom they are interested. The person to be studied, either living now or in the past, is someone the student believes is gifted, a producer, a change agent, a person who has made or is making a significant contribution to society. Time is spent researching the many different aspects of the person, including background about his or her family, peers, abilities, interests, etc. Multiple resources should be used, ranging from books and magazine articles to interviews and letters of inquiry. Whenever possible, an attempt to contact the person directly should be made by the student.

Upon completion of the research, each student presents the findings to the class. Presentations include oral reports, audiovisual presentations and other creative products. The presentations should not be given in one or two days, but should be spread out over two or three weeks.

Eminent People News Conference. After the Biographical Sketch has been completed, the students have the opportunity to role play in front of the class. Class members become members of different news agencies (newspaper reporters, radio and television personalities, magazine editors and reporters and ask questions of the eminent people from the point of view of the different personalities and their news agencies. Questions directed to the famous person can include (but are not limited to) the following: (1) What are your most outstanding achievements? (2) What was your childhood like? (3) What obstacles did you have to overcome? (4) As a result of your work or accomplishments, how will the world be different? (5) What is it like to be you? (6) What do you want to do next? and (7) Are you satisfied with your accomplishments?

After the news conference for each famous person (usually only one or two per day), the students sit together and discuss the assignment, their experience and what conclusions can be reached about gifted people. Different assigned people keep records of the discussions.

Eminent People Open House (or "Night of the Notables"). After completion of the news conferences, students are assigned roles in the development of an Eminent People Open House which is presented to other students, teachers, administrators, parents, school board members and other interested people. This activity becomes a "*celebration*" because it gives the students the opportunity to share their knowledge with an audience by actually becoming the eminent people, complete with wardrobe. The students actually become their people, dress authentically, and take the roles of the eminent people during the open house.

It is best to have the Eminent People Open House in the evening at the school or in a community building which has several rooms. Basically, three rooms are needed for the successful completion of this event. The first room is used to greet guests, which include the parents, teachers, friends and other invited people. Time is spent telling the guests about the open house by giving them instructions about how they should treat the eminent people. Open-ended questions are encouraged but the eminent people should never be asked their names. The guests must seek information to be able to identify the eminent people. Informal discussions take place which help the guests learn the identity of the eminent people. A list of appropriate questions can be given to the guests at this time.

The eminent people, complete in costume, are located in the second room. They are milling around, talking with each other about other issues until the guests are invited into the room. The interaction between the guests and the eminent people lasts approximately an hour. An Open House cannot be complete without refreshments. In the third room, each student presents a learning center about his or her person. These centers are displayed around the room while the center of the room is the location of the refreshments. The refreshments are the favorite food of the eminent people. It is up to the guests to discover which food belongs to which eminent person. One or two of the students complete the evening by giving a brief summary of the activity and thanking the guests for their attendance.

 Guest Presentors. Rarely do gifted students have an opportunity to converse with gifted adults and older gifted students. So much can be gained by talking to gifted adults and older gifted students who share excitement about learning, areas of expertise and their own experiences. The teacher/facilitator observes closely the students' personalities, strengths, potentials and areas of interests and then selects adults from the school and the community who can serve as positive role models. Adults who share the students' interests are usually very effective in relating to them. Information about the guest presentors should be given to the students before the actual interaction. Appropriate questions are brainstormed by the students and given to the adults before the actual meeting.

A diversity of people are invited into the classroom. This allows students the opportunity to compare and contrast different approaches, lifestyles and attitudes toward the development of potential. Guests have included commercial artists, doctors, lawyers, corporate executives, actors, professors, private business people and professional athletes. At least five people should be guest presentors during the Orientation Dimension so that different approaches and attitudes are presented.

Readings. Besides having students experience gifted people, it is necessary for them to read about gifted people, different approaches to living, and problems and triumphs which have occurred for gifted people. Included within this activity are readings from the books, ***On Being Gifted*** (Kruger, 1978), ***Cradles of Eminence*** (Goertzel & Goertzel, 1978) and selected articles which describe gifted individuals, their needs and possible educational approaches.

Discussions are held on each of the books and articles. Questions are written by the students before the discussion and are presented to the teacher/facilitator. An approach which focuses on finding out what we know, what we don't know and what we can learn from the readings is used. Emphasis is placed on the use of critical and creative thinking skills with the material which was read and the questions which were designed for the discussion.

Out of School Interviews. One of the major features of the Autonomous Learner Model is that it gives students the experience of contacting people out of the school building. Many times gifted students need more opportunities to develop their interviewing skills. This activity is developed to allow students time to interview gifted and talented people who live and work in the community. Within two years, the teacher/facilitator of the program should contact individuals in the community and ask if they would be willing to have students interview them about their lives, their jobs and their giftedness.

A list of names, addresses, phone numbers, and different interests, jobs, hobbies and areas of expertise are developed and presented to the students. Each student is responsible for selecting three of the people (usually there are at least 25 people on the list) and calling them to set up an appointment for an interview. Class time is spent talking about interview techniques and having the students role-play interview situations within the classroom. When ready, the students then conduct an interview with each of the people they have selected. A tape recorder can be used if available, or notes can be taken if the student feels more comfortable with this approach.

The purpose of the interview is to find out as much as possible about the person, his interests and hobbies, and his ideas and concepts concerning giftedness and creativity. Emphasis should be placed on how the individual feels he or she is creative and how this helps or hinders life on a daily basis.

At the end of the interview, a summary is completed. The students are then responsible for developing a short (five-minute) presentation for other members of the class on what they have learned about the selected people, their approaches to life and their attitudes toward giftedness and creativity. An informal discussion is held by the teacher/facilitator and the students. A list of final conclusions concerning giftedness and creativity are brainstormed by the group and developed into a list of ideas to be written up and distributed to each of the class members.

Videotapes. Many of the people who speak to classes for the gifted are extremely busy and will be unable to make routine visitations for each class. It is advisable to begin making videotapes of guest speakers when they come to class to talk about their giftedness, abilities and accomplishments. These videotapes can be shared with students when needed. Also, the tapes can be stopped and discussions can be held concerning the major points which were made by the speaker. In addition, the teacher/facilitator can tape documentaries and biographies of famous people which have been broadcast, and show them at appropriate times when the class discussions are centered on eminent people.

In-Class Press Conference (Self and Giftedness). Each student is given the chance to find out more about his personality, abilities, and interests in relation to his giftedness. A press conference is held for any student who wants to volunteer for this activity. One at a time, students are asked questions by the other members of the class. The student being asked the questions can choose to answer the question or can "pass" if the question does not seem appropriate or is too personal. Questions could include (but should not be limited to) the following: (1) What do you see as your strengths? (2) In what areas are you gifted? (3) What challenges do you face in the next year? The next five years? (4) What areas of interest do you want to explore at this time? (5) What obstacle do you face in your life at this time? (6) What has it been like to be interviewed at this press conference? At the end of each press conference, time should be left for a discussion of what happened during the conference. Closure should be completed before moving on to the next person.

Informal Survey (Definitions, Attitudes and Concepts). What do other people believe about creativity, intelligence, giftedness, ability and potential? Students, with the guidance of the teacher/facilitator, develop a questionnaire which will allow them to learn what other people believe about the terms they have been studying. The questionnaire can be used to interview people personally or in writing. Students then brainstorm a list of people of whom they can give the questionnaire. After the completion of the informal survey, students discuss the results and determine the attitude, definitions and concepts that others have about giftedness, creativity and intelligence. The results can be shared through a variety of products if the students so desire; however, some groups will choose not to share.

Mini-Seminars. A mini-seminar gives students the chance to go into more depth on a topic of their choice which is related to the area of understanding giftedness. A topic is selected by the entire group under the direction of the teacher/facilitator. Topics have included brain/mind research, intelligence testing, creativity, super-learning and thinking skills. Small groups of students work on selected components of the seminar. A seminar consists of the following components: (1) presentation of factual information, (2) group discussion and/or activity and (3) closure of the topic.

Three to four days are given for the research, one to two hours for the actual seminar and approximately 30 minutes for the analysis of the seminar content and format. After completing a mini-seminar, students will have gained new organizational and research skills which will be helpful later in their work within the Autonomous Learner Model.

Discussions. Discussions are frequent and informal. New information is being presented to the students and time is needed to digest or internalize the material. Topics are brainstormed by the students whenever applicable. No structured format is used. Students are given the freedom to hold discussions in ways that are beneficial to them.

Closure Activity. At the end of each area (in this case, Understanding Giftedness) the students develop a closure activity which allows them to synthesize all the new information they have received from the activities in which they participated. The teacher should not prescribe, but should allow students to develop the activity. Some groups choose an informal approach while others become extremely involved, completing a product and presentation. Several of the groups develop their own definition of giftedness while other groups develop provocative questions to pursue in the future. The purpose of the closure activity is for students to synthesize the information—not for them to demonstrate the learning for the teacher/facilitator or for the administrators.

Group Building Activities

Objectives

1. Students will comprehend the dynamics of the group process.
2. Students will be able to apply the dynamics of group process to their environment.
3. Students will participate in group building activities.

Activities

Personal Interview. The students are asked to find another student to get to know better through a personal interview. Students move their chairs so that they are able to communicate directly with their partners. A series of questions are given to the pairs of students. Students are allowed a few minutes to review the questions and may eliminate or add any questions which would help them to get to know more about their partners.

One student in each pair begins by asking questions of the second student. The second student can either answer or choose to pass. After answering questions, the questioner summarizes what he has learned about the respondent. The second student then responds to the feedback in a dialogue with the first student. Now it is time for the second student to ask the first student the same questions, although he can add or delete to make the interview more meaningful. The above process is then completed for the second student. After the personal interview, the two students now prepare to introduce their partners to the rest of the group. It is essential that the teacher/facilitator also participate in this activity with the students. Possible questions (start with these, but develop your own): (1) What things do you like about yourself? (2) What are you trying to become more of? (3) What is something about yourself you would like to improve? (4) What is a door you wish were open to you now? (5) How do you express love for others? (6) How can you express or show more love? (7) What is one time in your life which was extremely exciting and successful? (8) What is one thing about yourself you would like to share with me? (9) What is one question you would like me to ask of you?

Retreat. A retreat is held each fall for the students, teacher/facilitators and community resource people. Although many of the activities can be completed in the regular school, it is advantageous to take the students out of school to a lodge, a camp or somewhere different from their regular environment. There are several purposes for the retreat: (1) gifted and talented students benefit from being together as a group. This experience provides time to interact and to form new friendships, (2) activities are planned which provide opportunities for self-awareness, understanding and increased self-esteem and (3) the ability to work as a group member is essential for students in the Autonomous Learner Model.

Group activities are planned to provide participants with situations which allow them to work together to complete tasks as a large group and as a small group. Many different activities can be included at the retreat. Two examples of activities that we have used are **Secret Friends** and **Pass the Gavel**. In Secret Friends, all participants meet at the beginning of the retreat to talk about the activities, responsibilities and time schedule. Each person is given a small piece of paper on which to write his or her name and return it to the leader. The leader puts the name into a hat and each person then picks out a name. This person becomes the other person's secret friend. For the entire retreat, students are to be kind to their secret friend. In other words, people should make the retreat a little better by doing small favors, making things, or just talking and being with the secret friend. Everything must be done in such a way that people will not guess the identity of their secret friend. At the end of the retreat the group is brought together and students have a chance to guess the identity of their secret friend. In this way each person will know who it was who made the retreat a little nicer for them.

Pass the Gavel is used at the end of the retreat. The leader of the group has a gavel. To begin the activity, he passes the gavel to the person on his left. As long as that person has a gavel, he is the only person who may speak. The person can talk about his feelings about the retreat, his perceptions of the other people or feelings about the group in general. If the person so chooses, he can "pass." When finished, the person passes the gavel to the next person. Ultimately the gavel will return to the leader who now has the chance to share his feelings and to bring closure to the retreat.

It is essential to have students be responsible for the development and implementation of the retreat. This requires them to plan the location, means of transportation and agenda. Most retreats begin at a lodge on Friday afternoon and end Saturday afternoon. Students must raise the money necessary for the retreat and are responsible for purchasing the food. Small groups are organized to develop the agenda, to plan menus and to actually prepare meals for the other people. Additional groups are responsible for the clean-up after the meals and the necessary housekeeping of the lodge. All of these tasks could be done by adults, but it is best to give these responsibilities to the students.

Starve-Your-Vulture Campaign. Based on the book entitled ***Vultures*** (Simon, 1978), this activity helps students to learn about positive self-concepts, positive and negative behavior and attitudes towards developing a positive environment for growth. According to Simon, when people are born, they do not possess a "vulture," but by the time they are five or six years old, they begin to develop a vulture. Some people have a very small vulture while others have a large one. A vulture is described to the students in detail, with recognition of their ugly beaks and the fact that they are not a clean bird—not exactly the type of bird you would want as a household pet. But most people do not realize that many people have a vulture living in their stomachs. A vulture lives on two types of food: "*self put-downs*" and "*put-downs by others*." Whenever you put yourself down or others put you down, your vulture becomes larger and your self-esteem is reduced. In other words, vultures have a negative effect on you and should be starved so that you can continue to grow and develop.

Students are presented with the vulture story and then participate in a "*starve-your-vulture campaign*." Signs are made, stories about the vulture are presented to others and statistics are kept on how many times they feed or begin to starve their vultures. The result is that students become more aware of positive and negative behavior and what they can do to become healthier.

Temperature Readings. Virginia Satir uses this technique to help people learn more about themselves and others. Satir is a world-renowned family therapist who specializes in teaching people how to communicate more effectively with each other. Temperature readings are shared with the group each time they meet at the beginning of the session. Each person has a certain emotional temperature which describes how the person is feeling at a certain time. The scale for the temperature rating is from 1 to 10. A rating of "1" indicates that the person does not feel good about the day and what is happening; life is difficult, everything seems to be going wrong. A "5" life is better than a "1." Everything is okay, but not exciting. When a person is rated a "10" life is an adventure, an exciting happening; the person feels good about what is happening and wants to tell everyone how exciting life is at that time.

Each person in the group is asked to rate his emotional temperature and is given the opportunity to communicate why that rating was chosen. One after another, each person shares until it is time for the teacher/facilitator to share her rating and to summarize the activity. This experience is used to let students know more about themselves and about the others in the group. We respond differently to people if they are a "1" rather than a "10." This activity helps build rapport, general acceptance and understanding of the people in the group.

Closure Activity (Group Problem-Solving). Within the Orientation Dimension of the Autonomous Learner Model, each group works together to use a group process and creative problem-solving skills in the development of a project. As a group, students choose the activity they want to pursue which would benefit their group, the school or the community. After brainstorming ways of completing the task, the group is then given time to become involved in the task and the completion of the project. Projects have included setting up a health program within a school; developing a better food system for the students; organizing a Saturday conference, complete with activities and speakers; and recommending strategies for improving the traffic conditions in a community.

Self-Understanding

Objectives

1. Students will develop a better understanding of self and their interests, aptitudes and areas of strength.
2. Students will develop a more positive self-concept and self-esteem.

Activities

Review of Identification Information. Many students are confused about why they have been selected to be in a program for the gifted and talented. This activity allows them to know the definition of gifted and talented which is used for the program, the identification procedures which were followed and the information which was received to select them for the program. It is essential for the gifted and talented to understand basic information concerning the program, including identification, tests, questionnaires and final procedures.

Nourishing and Toxic Behavior. A list of behaviors are presented to the students. They are asked to read each statement and then to evaluate it as either toxic or nourishing. After each student completes the entire list of behaviors, the group then evaluates the list of behaviors together, discusses the behaviors which were presented and the idea of nourishing and toxic behaviors. This activity helps students to become more aware of their behavior and how it affects other people. The list of behaviors can include but should not be limited to the following: (1) a person becomes defensive because he doesn't receive the job for which he applied, (2) a person withdraws from people because she is afraid others will laugh at her, (3) a person cries for another person because of a problem the other person has faced, (4) a person asks the other person what is wrong because she knows her friend is upset about something, (5) a student tells the teacher that one of the classmates was cheating on a test, and (6) a mother scolds her son when she is embarrassed because the son was not behaving at the store. After using these statements and others you have added, be sure to give the students opportunities to write their own statements and then to discuss them to see if the behavior is either nourishing or toxic.

Learning Style Inventories. Teachers must look at the learning styles of gifted students in the classroom. One of the best ways to understand students and to have them understand themselves is to use an appropriate learning style inventory. ***Learning Styles Inventory: A Measure of Student Preference for Instructional Techniques*** (Renzulli & Smith, 1978) is used. The results can be very effective when helping a student to develop learning strategies for the program.

Students and Learners: The Transition. A mini-lecture, given by the teacher/facilitator, is presented to students about the differences between a student and a learner, and about the process or transition which will take place for the student in the Autonomous Learner Model. Students are asked to brainstorm the different roles of a student and a learner and then to look at themselves to see where they are and what they can do to become learners. The idea of becoming a self-directed, life-long learner is the goal of this model and is again presented to the students.

Selected Journals. Most assignments in which students are asked to keep a daily journal usually fail after the third or fourth week because students will only keep journals when they are involved and excited about events, people and feelings about themselves and their friends. In our model, the teacher/facilitator shares the journal he or she is keeping and then explains about different types of journals (descriptive of people, places, events, feelings, etc.) and the importance of keeping a journal. Students discuss journals and journal-writing and then decide individually if they want to keep a journal. Usually the journal is private and is not asked for by the teacher/facilitator. The journal can be shared by the students if they choose, but journals are written by students, for themselves.

Closure Activity. At the end of each area (in this case, Self-Understanding), students develop a closure activity which allows them to synthesize the new information they have received from the activities in which they participated. Do not prescribe this activity, but allow students the opportunity to develop the activity. They may choose to have each student develop a project which would help them synthesize the new information about self with what they already knew and to present this project to the rest of the group. In other words, the students would complete a project entitled, "*Where I*

Am Now." Another option would be to have students write letters to themselves and to have the letters sent to them by the teacher/facilitator six months later. The letter gives the students a look at where they have been, what they were like and the growth they have experienced.

Program Opportunities and Responsibilities

Objectives

1. Students will understand the Autonomous Learner Model for the Gifted and Talented.
2. Students will develop a "Student/Learner Growth Plan" in relation to the activities and special events of the school.

Activities

Presentation of the Autonomous Learner Model. The teacher/facilitator develops a presentation on the Autonomous Learner Model which is given to the students, other school staff, interested parents and available community resource people. A packet of material on the model is also given to them. Students ask questions about the model and then have the opportunity to develop activities for the different areas within the five dimensions. In small groups, the students give mini-presentations on the model and the activities they would like to complete. It is extremely important that students have input into the curriculum for the Autonomous Learner Model.

Program Search and Self-Integration. The teacher/facilitator is responsible for developing a "program search" to be used in the school. The entire school staff (in small groups, such as grade levels or subject areas) meet together, under the direction of the teacher/facilitator, to brainstorm all activities which are now available in their areas for gifted and talented students. The students and the teacher/facilitator also complete a "program search" in the community. Community people are sought who can be speakers, resource people and possible mentors. The results of the school search and the community search are compiled and presented to the students. Each student then begins to select appropriate activities based on interest and ability.

Life-Long Learning Approaches. Gifted students need to be exposed to the concept of life-long learning. The teacher leads a discussion about this concept and has the students brainstorm key features to becoming a life-long learner. Adults who are identified as life-long learners are then invited to the class to talk about what they are doing and what they did to become life-long learners. Students are then asked to outline the types of activities, skills, concepts and attitudes they will need to become life-long learners.

Guest Speakers. The teacher/facilitator selects teachers within the school (content specialists) and community resource people (advisors and mentors) to speak to the students about their work and how the students can work with them. An effort is made to bring in people who have the same interests as the students.

Investigation of Seminars and In-Depth Studies. Although this is still the Orientation Dimension of the model, students (individually or in small groups) must begin to look at topics which may become Seminars and In-Depth Studies. A short period of time (2–3 days) should be given for exploration. The final activity is an oral report to the class regarding which topics they researched for possible Seminars and In-Depth Studies. Some students might be ready to begin an In-Depth Study at this time.

Closure Activity (Student/Learner Growth Plan). The moment has arrived when students are ready for the opportunity to develop a student/learner growth plan to be used in the Autonomous Learner Model. The "*personal growth plan*" should contain the following: (1) *Activities* (including Individual Development, Enrichment Activities, Seminars and In-Depth Studies), (2) *Resource People* (including Content Specialists, Advisors, Resource People and Mentors), (3) *In-School Participation* (including Advanced Courses, Enriched Courses, Extra-curricular Activities, Special Events and In-Depth Study Expansions), (4) *Out-of-School Participation* (including Career Explorations and Participations, Explorations and Investigations, Adventure Trips and In-Depth Studies) and (5) *Skills, concepts and attitudes necessary to become life-long learners.*

Dimension Two: Individual Development

The second dimension of the Autonomous Learner Model is Individual Development (see Figure 2), which is designed to give students the appropriate skills, concepts and attitudes for life-long learning—in other words, to help them become autonomous learners. At the beginning of involvement in the model, the students are seen as being in the role of "*students*" during Orientation and Individual Development. During Enrichment Activities, the third dimension, students are seen as "*student/learners*," and as "*learners*" in Seminars and In-Depth Study, the fourth and fifth dimensions of the model.

Individual Development provides the opportunities to develop the skills, concepts and attitudes necessary to move from student to student/learner. These skills are related to the cognitive, emotional and social needs of the individual. The activities in this dimension are determined by the strengths and skills of the teacher/facilitators and are not prescribed as much as they are in other dimensions. A total involvement of all of the areas and skills in this dimension will take two to three years to complete. Work in this dimension is never completed, as new and different skills, concepts and attitudes will be added as the teacher/facilitators learn more about this approach from their experiences. The Enrichment Activities Dimension is divided into four basic areas: (1) ***Learning Skills***, (2) ***Personal Understanding***, (3) ***Interpersonal Skills*** and (4) ***Career Involvement.***

Learning Skills

Objectives

1. Students will understand the importance of developing skills, concepts and attitudes for life-long learning.
2. Students will participate in activities developed to provide the skills, concepts and attitudes for life-long learning.
3. Students will demonstrate the skills, concepts and attitudes which have been presented in the area.

Activities

Teacher/Facilitator Preparation. At this time in the use of the Autonomous Learner Model, the teacher/facilitator decides which skills are going to be presented at the beginning of this area. Complete units are developed on the areas which are selected from the following: (1) Problem Solving Skills, (2) Organization Skills, (3) Creativity Skills, (4) Thinking Skills, (5) Writing Skills, (6) Decision-Making Skills, (7) Goal-Setting Skills, (8) Photographic Skills, (9) Research Skills, (10) Computer Skills, (11) Study Skills and (12) Additional Skills designed by the teacher/facilitator and the students.

A unit is developed for each area stated above. Not all of the areas can be covered during the first year, so it is the decision of the teacher/facilitators as to which units will be covered first. This decision is based upon the needs and abilities of the students, the strengths of the teacher/facilitator and the availability of materials for each unit. Throughout the entire program, it is recommended that all of the areas will be introduced to the students. Learning Skills activities which the author believes are essential at the beginning of this dimension are included below.

Problem Solving Skills. An area which is essential for the cognitive, emotional and social development of the individual is problem solving skills. The *Future Problem Solving Program*, developed by E. Paul Torrance, provides students with the opportunities to develop problem solving skills while looking closely at the problems that are faced in our world. Students are formed into groups of four and can compete in state and national competitions. A seven-step process is introduced to the students and used to develop solutions to the problem presented. For materials related to Future Problem Solving and for information concerning the competition, contact: Dr. Anne Crabbe, Director, Future Problem Solving Program, St. Andrews College, Laurinburg, NC 28352. Telephone (919) 276-8361.

Creativity. Students must learn how to think creatively. They must learn how to generate new ideas, how to look at something from a different point of view, how to elaborate and build on a new idea and how to develop ideas that are original and unique. In other words, it is essential to teach students about fluency, flexibility, elaboration and originality in relation to thinking creatively. Students must know how to think divergently to solve problems and to develop new ideas.

Creative Thinking and Problem Solving in Gifted Education is a book written by John F. Feldhusen and Donald J. Treffinger. Included in this book are activities and materials which can be used to enhance the creative thinking and problem solving abilities of the students. Chapter Four, "Method of Teaching Creativity and Problem Solving," is particularly useful at this time. Activities can be developed and used directly. Chapter Six, "Reviews of Instructional Materials and Books for Teaching Creativity and Problem Solving," will be extremely beneficial to the students and to teacher/facilitators.

Closure Activities. At the end of this area (if it is ever thoroughly completed), the students are asked to read a book written by Roger von Oech, ***A Whack on the Side of the Head: How to Unlock Your Mind for Innovation***, which is essential reading for the students and the teacher/facilitators. After the reading is completed, group discussions are held and the following questions are discussed: (1) What is creativity? (2) What is creative problem solving? (3) In what ways am I creative? (4) What is it that blocks my creativity? (5) How can I become more creative? and (6) How can we, in this group, become more creative?

Personal Understanding

Objectives

1. Students will comprehend the concepts and attitudes necessary for life-long learning.
2. Students will participate in activities developed to provide the necessary concepts and attitudes for life-long learning.

3. Students will demonstrate the concepts and attitudes which have been presented in the area.

Activities

Teacher/Facilitator Preparation. At this time in the use of the Autonomous Learner Model, the teacher/facilitator decides which concepts and attitudes in this area will be presented. Complete units are developed in the areas which are selected from the following: (1) Acceptance of Self, (2) Positive Self-Concept, (3) Appropriate Behavior, (4) Personal Responsibility, (5) Creative Lifestyles and (6) Psychology of Healthy Personality. A unit is developed for each of these areas. Not all of the areas can be covered during the first year, so it is the decision of the teacher/facilitator as to which units will be covered first. Throughout the entire program, it is recommended that all of the areas be introduced to the students. Additional activities in Personal Understanding which the author believes are essential at the beginning of this dimension are included below.

Acceptance of Self. An essential component of personal growth is acceptance of "*self*," becoming aware of one's own strengths and weaknesses, joys and sorrows, students need to develop better self-understanding which can lead to self-acceptance. *Journeys Into Self*, a structured exercise in self-exploration, was developed by the author specifically for gifted and talented students. Each student is given three to four of the *Journeys Into Self* booklets each year, approximately two to three months apart. After completion of the open-ended questions contained in the booklet, the teacher/facilitator collects them and keeps them until the time of a conference when the students and the teacher/facilitator will sit down and discuss similarities and differences between the responses on the same questions. With adult guidance, this activity can have a strong impact on the individual's ability to accept self.

Appropriate Behavior. "*What is the right thing to do?*" "*Will people accept me if I am honest with them?*" "*Why won't you let me be myself?*" These are all questions which need to be explored in this area on an ongoing basis. The technique of role-playing is essential in this exploration. Many times students do not know the difference between appropriate and inappropriate behavior. Role-playing will give them opportunities to discover the difference. For example, students can role-play a group of students who are unhappy with the school and how it operates, and who want to talk to the principal. It is important that they approach him and talk directly with him in an appropriate manner. Students are then asked to role-play different situations in which they behave in appropriate and inappropriate ways. The group then discusses the role-playing situation and gives suggestions on improvement.

Creative Lifestyles. It is essential that students look toward the future to see what they want to be and what occupations they want to pursue as adults. But it is also extremely important to have them begin to explore the concept of creative lifestyles. Students are asked to research the different lifestyles they would like to pursue. They are asked questions such as: "*What kind of a job format would you like?*" "*What kind of house do you want?*" "*What amount of income do you need?*" and "*What kind of lifestyle do you want to pursue?*"

After the research is completed, discussions are held on the answers. The group then decides who they know whom they believe lead *creative lifestyles* similar to a lifestyle they would like to pursue. These people are invited into class to talk about their lifestyles, how they were developed and what advice they would have for the students.

Closure Activity. Students are asked to develop a closure activity which will allow them to synthesize all the information they have received from the activities in which they have participated. This activity will be different for each group.

Interpersonal Skills

Objectives

1. Students will understand the importance of developing interpersonal skills necessary for life-long learning.
2. Students will participate in activities developed to provide the interpersonal skills necessary for life-long learning.
3. Students will demonstrate the interpersonal skills which have been presented in this area.

Activities

Teacher/Facilitator Preparation. At this time in the use of the Autonomous Learner Model, the teacher/facilitator determines which interpersonal skills in this area will be presented. Complete units are developed in areas selected from the following: (1) Communication Skills, (2) Interviewing Skills, (3) Discussion Skills, (4) Leadership Skills, (5) Group Process Skills and (6) Coping Skills. A unit is developed for each of these areas. Not all of the areas can be covered during the first year, so it is the decision of the teacher/facilitator which units will be covered first. Throughout the entire program, it is recommended that all areas be introduced to the students. Interpersonal Skills activities which the author believes are essential at the beginning of this dimension are included below.

Communication Skills. The ability to listen attentively to another individual, the ability to send your message clearly and the ability to provide appropriate feedback are skills which can be learned, developed and enhanced. Each person needs to understand how to send and receive messages. Students are introduced to the concepts of reflective listening and congruent sending. Reflective listening is a skill which helps the individual listen for another person's message; to listen beyond the words and hear what is being said. After hearing what has been said, the listener is able to verbalize and rephrase the message. Congruent sending involves being able to send messages which are congruent with a person's feelings, values and current emotional state. This involves non-verbal as well as verbal communication.

After the introduction and discussion of these concepts, students observe two students role-playing a situation and observe them using reflective listening and congruent sending. Students are then divided into dyads and given an opportunity to experiment with the use of these skills. This activity of observing people involved with reflective listening and congruent sending is ongoing throughout the program.

Interviewing Skills. Interviewing skills are necessary for people who want to be independent, self-directed learners. Students are introduced to the importance of these skills. Discussions are held to determine what interviewing skills are and how they can be developed. Students use role-playing to interview each other, followed by group critiques. The following points are covered in reference to interviewing skills: (1) the development of background information on the person being interviewed, (2) the development of clear and precise questions, (3) the importance of feeding back what is being said at appropriate times to clarify the message and (5) the importance of "timing" within the interview.

After the completion of role-playing, students are asked to select a topic area in which they would like to interview people to learn their ideas and attitudes. After the topic is selected, appropriate, clear and precise questions are developed. The interviewer is then asked to interview people in the following age groups: under 10, 11–20, 21–30, 31–50, 51–70, and 70 and over.

After the completion of the interview, each person compiles the information gathered and prepares an oral report to share with the other members of the program. The report contains four sections: (1) What was learned about the topic, (2) What was learned about interviewing, (3) What was learned about people and (4) What was learned about yourself in the situation. The reports are informally shared with the group and a discussion follows on the importance of interviewing skills for the development of life-long learning.

Coping Skills. *"How do I learn to deal with the frustrations of being gifted?" "Why can't people accept me as I am?" "What if I don't get straight A's this semester?"* All of these questions and many more will be heard by the teacher/facilitator during the program. Gifted students need time to discuss those issues and problems which are of great concern to them. A voluntary *"Coping Group"* should be developed to allow the students to talk about themselves, their peers, their parents and their world. This group should meet once every other week at the beginning. Students are invited to attend, but attendance is not required. In the beginning the group would be informal, but specific topics could be addressed if the group so desires. A coping group is essential for appropriate discussion of problems as well as for developing skills to deal with problems and conflicts in the future.

Closure Activity. At the end of this area (although the *Coping Group* should continue), students are asked to develop a closure activity which will allow them to synthesize all of the new skills they have developed from the activities in which they have participated. This activity will be different for each group.

Career Involvement

Objectives

1. Students will comprehend the importance of careers and career explorations.
2. Students will explore the careers of their choice.
3. Students will complete a Career Participation.

Activities

Career Exploration. The Career Involvement Area of the Individual Development Dimension is developed so that students may know about and become involved with a diversity of careers while they are still in school. Through the help of school counselors (if available), a unit is presented concerning the world of careers. This unit will vary according to the personnel and materials available at each school.

Students are asked to begin thinking about areas they would like to explore. Student interest in specific careers is determined by a brainstorming session. As a result of the brainstorming, the teacher/facilitator selects the most popular career fields and invites representatives from these fields to speak to the students. Questions are brainstormed by the students for guests who come and speak about their careers. This information will continue to develop as students learn more about different careers available to them.

Career Participation. After several months of involvement in the area of career exploration, students now become more directly involved with careers. Students are asked to select career areas in which they would actually like to participate. After the selection of three to four areas, the students and the teacher/facilitator work together to find locations where the students can spend approximately 20 to 50 hours in actual participation. Students work directly with the people at each location. A final conference with the career people, the student and the teacher/facilitator is held to answer questions and to bring closure to each career participation.

Closure Activity. At the end of this area, the students are asked to develop a closure activity which will allow them to synthesize all of the new information they have gained about careers. This activity will be different for each group.

Dimension Three: Enrichment Activities

The third dimension of the Autonomous Learner Model is Enrichment Activities. Emphasis is placed on helping the student/learners to become more aware of what is "out there" to be learned. Most of what is taught in school can be labeled "*prescribed content.*" Someone, usually somewhat removed from the classroom, decides what is to be taught, when it is taught and even how it will be taught. The purpose of this dimension is to introduce the student/learner to the concept of "*student-based content,*" to give them the opportunity to decide what they want to study. Some student/learners will automatically know what they want to pursue, while others will need direction and guidance in learning possible methods of defining areas of student-based content.

In the Autonomous Learner Model, there are three types of student-based content. The first is "*Passion Area Content,*" which is based on those areas the students love, the areas which are "devoured." Many student/learners already know their passion areas and now need opportunities to go more in-depth in their learning. Other student/learners will need to examine many different areas before feeling comfortable with labeling an area as Passion Area Content. The second type of student-based content is called "*Related Passion Areas.*" Many times the student/learners have not adequately explored areas which are related to the passion areas. Through experiences in this dimension, the student/learners will become aware and begin to pursue the Related Passion Areas. The third type of student-based content is the "*New and Unrelated Areas.*" While the student/learners are continually involved in Passion Areas and Related Passion Areas, it is essential for them to continue to explore and discover new and unrelated areas of content which might possibly lead to the discovery of new Passion Areas.

After the content is selected by the student/learners, it is essential that they have opportunities to study topics in more depth, although most people are not yet ready for a formal in-depth study. The areas of Exploration and Investigation provide experiences in which the student/learners can apply the skills, concepts and attitudes learned during the Individual Development Dimension to content areas of their choosing.

The Enrichment Activities Dimension provides opportunities for student/learners to define and pursue those content areas which are extremely relevant to them. This is done through the Enrichment Activities: (1) ***Explorations***, (2) ***Investigations***, (3) ***Cultural Activities***, (4) ***Service*** and (5) ***Adventure Trips***.

Explorations

Objectives

1. Student/learners will demonstrate the ability to select a topic which is meaningful to them.
2. Student/learners will successfully complete a group and an individual exploration.
3. Student/learners will report back to other class members what was learned and how it was learned.

Activities

A Group Exploration. The purpose of this activity is to give students an experience in which they must define a topic, explore that topic and report their findings to the entire group. Conclusions are then brainstormed regarding Explorations and the benefits of this approach for the student/learners. By now, class members are comfortable with each other, understand the goals of this approach to the education of the gifted, have learned new skills, concepts and attitudes necessary for individual learning and are now ready to pursue selected student-based content areas. The group decides upon one content area to be explored by the entire group. The content area should be broad enough to give the group members flexibility in what they will study and how they will pursue the exploration. Examples of a content area for a group exploration would be "*Computers and Technology*," "*Rock and Roll*," "*The World Today*," and "*Careers for Today and Tomorrow*." Each person, including the teacher/facilitator, is then given three days to go out and find different sources of information and to learn as much as possible about the selected topic. At the end of the three days, in a group setting, each person is given the opportunity to share what has been learned and where the information has been discovered. The main emphasis of this exploration lies in discovering where information can be found. A list is made which shows where each person found his or her information, and discussion is held to demonstrate the importance of using many different sources to find information.

Individual Explorations. After the successful completion of the group exploration, each student/learner becomes involved in an "Individual Exploration." The Individual Exploration is very similar to an In-Depth Study, although it is of shorter duration and does not require the same commitment, dedication, skill or expertise. Working closely with the teacher/facilitator, each student/learner commits to three to five individual explorations which are usually three to five days in length. At this time, emphasis is still on the retrieval of information through multiple resources rather than on the completion of a product or an in-depth study. At the end of each exploration, each student/learner shares what was learned and how the material was learned. Emphasis of the discussion is placed on the use of many different materials, including human resources.

Closure Activity. At the conclusion of this area, the student/learners develop a closure activity which allows them to synthesize all the new information they have received from their group and individual explorations. Final conclusions concerning approaches to becoming an autonomous learner are discussed with the entire group.

Investigations

Objectives

1. Student/learners will comprehend the process of an investigation.
2. Student/learners will successfully complete an investigation.

Activities

Investigation Proposal. A topic will be selected, a proposal format followed and an Investigation Proposal will be completed by the student/learner and submitted for approval to the teacher/facilitator. The Investigation Proposal will include the following: (1) Title of Investigation, (2) Brief Description, (3) Objectives, (4) Specific Activities (to meet the above objectives), (5) Time Line, (6) Resources (material and human), (7) Mini-Product Description, (8) Presentation and Appropriate Audience and (9) Evaluation (including criteria).

Investigations. After the completion and acceptance of the Investigation Proposal, each student/learner is ready to participate in an Investigation. The Investigation is completed over a specific period of time, which has been pre-arranged with the teacher/facilitator. Any meaningful changes in the proposal can be made at any time (up until a week before it is due). Meetings with the teacher/facilitator are held weekly to discuss the progress of the Investigation. The final presentation is announced ahead of time so that the appropriate people can attend. The audience might include other teachers, administrators, parents, other students and community resource people.

Closure Activity. Student/learners, the teacher/facilitator and other interested personnel close the investigation activity in the following manner: (1) describe the process of an Investigation, (2) compare an Exploration, an Investigation and an In-Depth Study, (3) discuss all of the problems faced in the Investigation and what could be done to eliminate them, and (4) discuss how this investigation could be improved.

Cultural Activities

Objectives

1. Student/learners will comprehend the definition of a "cultural activity."
2. Student/learners will plan, participate in and evaluate a "cultural activity."

Activities

Cultural Activities. Many times students do not have (or take) an opportunity to learn more about the cultural aspects of their community. Cultural Activities allow them the chance to find out more about ongoing activities and one-time events. These activities take place after school, at night or on weekends. Three other students must attend each event with the student/learner. A short proposal is approved by the teacher/facilitator before the actual event and a summary paper is turned in at the end of each event.

Activities can include, but are not limited to, visits to museums, plays, concerts, debates, historical events and art displays. It is not enough just to attend the event; the student/learners must make arrangements in advance to go behind the scenes to get more clarification on how the entire event is set up and developed. The insight which comes from a thorough analysis is invaluable for future involvement in the program.

Closure Activity. After completion of at least three Cultural Activities, the members of the program meet and brainstorm one more event which can be attended by all. This usually happens near the end of a grading period and is a way to provide closure for the entire program. A luncheon or dinner is usually included to make the activity more festive. It is important that the teacher/facilitator also attend as many events as possible.

Service

Objectives

1. Student/learners will comprehend the concept of service to the community.
2. Student/learners will participate in "service opportunities."

Activities

Humanitarianism. An important concept within the Autonomous Learner Model is to provide experiences which will help students understand themselves and their relationship to other people. This activity is developed so that students may know more about the concept of humanitarianism and the humanitarians who have served people, both directly and indirectly. Each student/learner selects a person he or she believes is a humanitarian and completes research on that person. Students then share their research with the rest of the group and brainstorm common characteristics of people who are able to serve others. This list will be used throughout this area and throughout the model.

Actual Service. During the school year each student/learner is required to complete a service unit within the program. After the activity of Humanitarianism is completed, the group brainstorms different projects in which they could actively serve people. A total of 20 hours is required on the elementary level while the junior high level is 30 hours and the high school level is 40 hours per year. Possible projects would include working with the elderly, raising food and money for shut-ins, working through an agency such as the Red Cross or the Salvation Army or working one-to-one with a person with particular needs. The project must be accepted by the teacher/facilitator before the actual work begins.

Closure Activity. At the conclusion of this area, the student/learners develop a group closure activity which demonstrates the basic concepts of the area of service. Many times students will develop and serve a dinner to shut-ins or give a specific service to a group or an individual.

Adventure Trips

Objectives

1. Student/learners will plan an Adventure Trip.
2. Student/learners will develop the pre-trip activities.
3. Student/learners will participate in and evaluate the Adventure Trip.

Activities

Where Do We Go From Here? All interested student/learners, interested parents and the teacher/facilitator meet together during the first month of each school year to decide if they want to participate in an Adventure Trip, which is an opportunity for those involved in the program to plan a trip, go on the trip and then complete activities after the trip has ended. During the first meetings, the group answers the following questions: (1) Do we want to go on an Adventure Trip? (2) What is the purpose? (3) Why do we want to go? (4) What do we hope to gain from this experience? and (5) What do we want to learn before and during the Adventure Trip?

The Adventure Trip is divided into three components. The first is preplanning. During this stage students decide what they want to study, where they want to go and what they will need to do to get there. The teacher/facilitator guides but does not direct. The main responsibility for the trip is given to the student/learners. Planning begins in the autumn, and the trip usually takes place during the spring.

On the Road Again. After all planning has been completed, the group begins the trip. Usually there is a one-to-five ratio between adults and student/learners. Trips last between three and ten days. Student/learners are responsible for decisions unless there is a situation which might involve danger, in which case the group leader would take over the responsibility. Adventure Trips have included studying geology and archaeology at the Grand Canyon, exploring the cultural aspects of San Francisco, becoming involved with a business in a major city and backpacking trips to national parks.

Closure Activity. After the group's return, discussions are held to debrief the trip. Topics would focus on academic as well as group process aspects of the trip. The information gained from these discussions can be useful to each individual and the entire group.

Dimension Four: Seminars

By the time the students have reached Seminars, the fourth dimension of the Autonomous Learner Model, emphasis is placed on production of ideas and projects. Students have moved from the status of students and are now viewed as learners. A learner is more independent, more adequately prepared to learn with less direction from outside sources. A learner understands the process of learning, the importance of skills, concepts and attitudes for the learning, and the dedication which is required to become autonomous.

A Seminar is a short-term project for learners to pursue in small groups of three to five members. Learners are divided into groups, asked to research and select a suitable topic, given time to prepare the Seminar and actually present the Seminar to other members of the program as well as to other interested school and community people. Presentation of the Seminar to other members of the program is divided into three components: presentation of factual information, discussion and/or activity, and closure.

Objectives

1. Learners will comprehend the basic format of a Seminar.
2. Learners will develop and present a Seminar.
3. Learners will evaluate the effectiveness of their Seminar.

Activities

Seminar Preparation. When this dimension of the model is presented to the learners, they are divided into groups of three to five members. Students are asked to develop a seminar using the following format as a guide. Seminars are divided into the following categories from which learners will select a category and then brainstorm possible seminars: *Futuristic* (dealing with topics in the future and techniques necessary for "future learning"), *Controversial* (dealing with topics which are controversial in nature such as the role of government in our lives, capital punishment and prayer in schools), *Problematic* (representing problems the learners face in their own communities as well as national and international problems), *General Interest* (of general interest to learners, but not necessarily futuristic, controversial or problematic in nature) and

Advanced Knowledge (investigation of an area which may be of interest to only a few people in the program).

Learners who choose an Advanced Knowledge Seminar should not be penalized for selecting a topic which is understood by only a few. The audience might include only those who understand and have a basic knowledge of the area to be presented, or who are interested in learning more about it. After the selection of a topic, learners are given a specific amount of time (usually five to seven days) to investigate the area. A seminar worksheet form is used to give structure to the process.

The Actual Seminar. Learners negotiate with the teacher/facilitator to determine how much time is needed and what facilities and school resources are needed. Learners then prepare the appropriate advertisement for the Seminar, which is presented to the interested audience. The actual Seminar is divided into three components: (1) *Presentation of Factual Information*, (2) *Discussion and/or Group Activity* and (3) *Closure*.

The first component, Presentation of Factual Information, uses lectures, films, guest speakers or other formats for the learners to present general information to their audience. This provides a basic understanding of the topic so that new ideas and information can be developed throughout the remaining components of the Seminar. The second component, Discussion and/or Group Activity, involves the audience in the process of the learning through group discussion of the topic or group activity. The last component, Closure, is accomplished by the learners who have now completed the Seminar Dimension. The learners bring about closure through a discussion of what has been learned.

Closure Activity. At the end of the presentation, all learners and the teacher/facilitator discuss the concept of a Seminar, the effectiveness of those presented and the possible enhancement of future Seminars.

Dimension Five: In-Depth Study

The main goal for each learner who participates in the model is the attainment of autonomous learning skills. The Orientation Dimension develops the foundation for the model, while the Individual Development Dimension provides the skills, concepts and attitudes for life-long learning. The Enrichment Activities Dimension provides learners with involvement in student-based content, while the Seminars give them actual participation in short-term projects based on their interests.

All of the above dimensions are usually necessary before learners begin an In-Depth Study, although there will always be a few learners who have the skills necessary to automatically begin an In-Depth Study after the conclusion of the Orientation Dimension. The In-Depth Study Dimension is developed to allow each learner to define a *passion area* to be studied in depth. Learners are responsible for defining the study, developing a plan of action, actually participating in the study and evaluating it after completion.

Objectives

1. Learners will select a topic of their choice for an In-Depth Study.
2. Learners will design a learning plan for the In-Depth Study.
3. Learners will participate in the In-Depth Study.
4. Learners will evaluate the entire learning experience.

Activities

The Moment of Truth. Learners have been involved in the Autonomous Learner Model since the beginning of the Orientation Dimension. It is now time for them to select a topic, develop a learning plan, participate in the In-Depth Study and complete an evaluation of the entire learning process. Using the basic format which was presented in the Enrichment Activities Dimension, learners will develop an In-Depth Study contract. The proposal includes the following: (1) *Individual or Group Project*, (2) *Mentorship*, (3) *Presentation* and (4) *Evaluation*.

Learners have the choice of working together or alone on their project. It is extremely important that this choice be available for the learner, since they know more about their abilities, learning styles and individual preferences toward an In-Depth Study.

By this time it is essential for learners to be involved with a mentor. A search is begun during Individual Development for the learners to determine what they want in a mentor and how they will work with a mentor. Training sessions are held with mentors to define the roles of both learners and mentors. It is also important that the learners make *progress presentations* during the final two weeks of each grading period even if the In-Depth Study is going to last two to three years. Presentations are limited to 15 minutes and are given to other learners, the mentor, the teacher/facilitator and other interested school and community personnel.

The concept of the autonomous learning experience is based on the learner's ability to develop new ideas and projects with minimal guidance. In order to successfully reach this goal, proficiency must be developed in learning how to evaluate the progress, the product and the growth made as a result of the In-Depth Study. Each learner determines the criteria to be used in evaluating the In-Depth Study, including criteria for the product. With the aid of the teacher/facilitator, the learner then designs an evaluation instrument which will be used by the learner, the mentor and the teacher/facilitator. These people evaluate the learner separately and then meet together to discuss the process and the product of the In-Depth Study.

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Discussion Questions

1 Describe the basic dimensions of the Autonomous Learner Model. What should be accomplished by the teacher and the students in each of the dimensions?

2 What are the overall goals of the Autonomous Learner Model? How do they compare with the overall goals of your district for the gifted and talented?

3 What type of teacher should be a "facilitator" in the Autonomous Learner Model?

4 How would you develop the Autonomous Learner Model in a school district from a K-12 perspective?

5 Compare and contrast the Autonomous Learner Model and the Enrichment Triad Model.

6 If you are currently a classroom teacher, what are you already doing for the gifted and talented that would fit into the Autonomous Learner Model? What are you not doing that would need to be added if you adopted the Autonomous Learner Model for your district?

7 Describe what is needed to help a student in your program move from the role of a "student" to the role of a "learner." What changes are needed for you as the teacher?

8 What aspects of your own personal life can be seen in the Autonomous Learner Model? How can these be enriched for you personally?

Barbara Clark

III

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Dr. Clark is a Trustee and Director of the Center for Educational Excellence for Gifted and Highly Able Learners (CEEGHAL) and directs their New Age School Project each summer. She serves on the Board of Directors of the National Association for Gifted Children, and the California Association for the Gifted. She has been named to the Advisory Boards of the Gifted Children's Association, Los Angeles and the Professional Advocates for Gifted Education, Wichita State University, Wichita, Kansas.

Dr. Clark has presented major addresses and workshops at conferences and in school districts throughout the United States, in Canada, Mexico, and South Africa. Her current interest is the development of the Integrative Education Model which uses brain/mind research as the basis for optimizing teaching and learning.

Summary

The Integrative Education Model

The Integrative Education Model, a model for developing programs, curriculum and strategies, is based on the synthesis of the four major functions of the human brain. By combining the thinking function (both the linear, rational and the spatial, gestalt), the physical sensing function, the feeling or emotional function, and the intuitive function, learners have powerful access to their potential. This model has a strong rationale in human brain research, the organization of the brain and its highly associative, integrative nature. The evolution of the model began with the work of Plato, Froebel and Dewey, and continues to be validated in the classrooms of the New Age School *(NAS)* and those of the NAS faculty.

Within the structure of the Integrative Education Model, learners of all levels of ability and interest can be served. Because of its decentralized and personalized organization and its concern for total brain function, giftedness—regardless of how it is expressed—can be nurtured and enhanced. Components of the model include: *the responsive learning environment, relaxation and tension reduction, movement and physical encoding, empowering language and behavior, choice and perceived control, complex and challenging cognitive activity, and intuition and integration*. Research and implementation is ongoing in classrooms with children of a wide range of ages and abilities. While the New Age School has provided the initial formative data collection, a variety of classroom settings are being utilized to continue the development and validation of the model and currently a project developing a demonstration school for the model is underway at an elementary school within the Los Angeles City Unified School system.

The Integrative Education Model

Most of the traditional program structures used with gifted learners have focused on the cognitive area of the intellect and have provided curricular strategies to enhance the growth of cognition. However, within the past two decades, findings have been reported from a variety of disciplines that dramatically affect concepts of teaching and learning. Intelligence can no longer be defined as only a rational, analytic process. For over thirty years intelligence has been known to be interactive (Hunt, 1961); now it is found to be integrative. Intelligence requires not just the use of the rational, analytic thinking function, but also the more spatial, holistic processes of the brain, and the integration of the emotional, the physical/sensing, and the intuitive thinking functions as well. While these functions can be regarded separately, it is the integration of these functions that creates high levels of intelligence and the optimal development of human potential. This is the basis for the Integrative Education Model.

Rationale

Validation for the emphasis on integration of functions can be found in the current thinking regarding physical reality and in the organization of the brain itself. Many important thinkers are engaged in a reconceptualization of reality structures, leading us from notions of fragmentation, separable and discreet entities, hierarchies, and dichotomies toward the concepts of connectedness, oneness, and indivisible wholeness. Such views are being expressed in all areas of the scientific community by physicists, neurobiologists, physiologists, as well as by philosophers, systems theorists, psychologists and educators. By examining a few of these ideas, we can see the importance of understanding the development of intelligence and the concepts of learning and teaching.

Early in the 1900's, Albert Einstein attempted to communicate two very amazing ideas. In his first paper, published in 1905, he outlined his special theory of relativity, proposing that time and space were not two separate and absolute realities, but were joined in a single entity, time-space, which was the creation of the human mind. In his second paper, published the same year, he discussed electromagnetic radiation and subatomic particles called "*quanta*" and in the discussion suggested that we are not composed of, nor surrounded by, solid matter, but rather are all basically a form of energy. The universe was no longer a fixed entity to understand, but had become a construct of the human mind and changed according to the nature and situation of the human observer. Mind and matter had become one (Einstein & Infield, 1961).

David Bohm (1980), an English physicist and mathematician and a protege of Einstein, and Karl Pribram (1977), a neurophysiologist and respected researcher from Stanford University, ask that reality cease to be thought of as being made up of independent fragments, but instead be viewed as ***holographic,*** as one major attribute of a hologram is its ability to capture in each segment of the system the complete information of the entire system. For example, each cell of the human body has within its chromosome structure all of the genetic information for the entire body. In a photographic hologram each area of the holographic negative, if given a coherent light source, can reproduce the entire image. In the case of the cell, a chemical referent is needed,

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and for the image, a coherent light source is necessary. The notion of a holographic universe expresses a belief in oneness and in total integration.

> *The notion that all these fragments are separately existent is evidently an illusion, and this illusion cannot do other than lead to endless conflict and confusion. Indeed, the attempt to live according to the notion that the fragments are really separate is, in essence, what has led to the growing series of extremely urgent crises that is confronting us today.* (Bohm, 1980, pp.1,2)

Among the crises Bohm mentions is the widespread and pervasive distinctions made between races, national or family origins, professions, socio-economic statuses, etc. His ideas require that the view of self and the universe be seen as deeply and totally connected.

Fritjof Capra (1982), a physicist at the *Lawrence Berkeley Radiation Laboratory*, expands on these ideas and finds in his pursuit of the atomic and subatomic world that the universe is interdependent and involved in cyclical change. Seemingly separate objects thought to exist in the world are in reality patterns in an inseparable cosmic process, which are intrinsically dynamic, continually changing into one another, holistic and ecological. His views focus again on the human being as part of the universal hologram. Humans, by interpreting what they experience, create their reality. Capra sees this view of reality affecting all forms of social organizations and institutions.

One of the complex systems affected by these theories is the human brain. These researchers conclude that the brain itself operates as a hologram, and that it interprets in a holographic way the larger hologram, the universe. This means that the brain is far more complex than now imagined and that it operates in dimensions as yet unknown. For educators, acceptance of such theories will lead to teaching methods that create harmony, coherence and connectedness, and to the recognition that human limits are presently unknown.

While more centered on the brain as the mediating system, the theory proposed by William Gray (Ferguson, 1982), a Massachusetts psychiatrist, also has important implications for human learning. "Feelings," he states, "may be the organizers of the mind and personality. Finely tuned emotions may form the basis of all we know" (p. 1). According to this new theory, feelings form the underlying structure of thought, with emotion serving as the key to memory, recognition and the generation of new ideas. Humans, Gray believes, are more intelligent than other species because they have a richer supply of emotional nuances available to them. This results from the larger human forebrain and the more extensive connections between the frontal lobe and the limbic system. Gray states,

> *I had important confirmation in Einstein's repeated statement that ideas come to him first in the form of vague and diffuse bodily sensations that gradually refined themselves into exact and reproducable feeling-tones. Only when this process was completed could Einstein mathematically define the new concept.* (p. 4)

Paul LaViolette (Ferguson, 1982), a systems theorist, combined many of the current theories to explain how the brain physically processes new ideas. "Mental events—sensation, perceptions, feelings, emotions—are encoded and processed by the brain as if they were AM/FM neuroelectric waveforms" (p. 1). The encoded waveforms are then amplified into thoughts moving between the limbic and cortical systems. A high degree of intelligence then means a higher degree of caring.

According to both Gray and LaViolette, the brain uses feelings to structure information. Even though abstract information may be difficult to recall because it is cut off from feelings, often the rational cognitive learning mode is most highly valued. Ironically, the efficiency of learning is prevented by ignoring feelings. Learning is much easier and more efficient, Gray contends, if emotion and cognition are integrated.

Jerre Levy (1980), *University of Chicago* psychologist, finds that the brain operates at optimal levels only when emotional as well as cognitive systems are challenged, thus allowing physical and intuitive involvement. Motivation is a result of highly integrated brain action.

The physical structure, organization and function of the brain provides further validation for an emphasis on integrating brain functions. Early in the 1960's a brain research team from the *University of California at Berkeley*, Rosensweig (1966) and Krech (1969, 1970), found that the environment had a significant affect on the physiology of the brain. Since then the Berkeley team and other researchers throughout the world have investigated the extent of that impact. Some physiological changes resulting from environmental stimulation include an increase in dendritic growth, indicating higher levels of intelligence and more complex patterns of thought; a change in the biochemistry of the neural cell, which allows for a more powerful exchange of neural impulses resulting in accelerated thought processing; and an increase in the production of neuroglial cells, which provide nutrients and support the functioning of the brain.

The process of learning can be changed by increasing the strength and the speed of transmission within the brain. Changes in teaching and learning procedures can promote growth of dendritic branching and an increase in glial cells, brain activities that indicate advanced and accelerated development. Enhancing the environment brings about changes in children at the cellular level, not just in their behavior. In this way gifted children become biologically different from average learners, not at birth, but as a result of using and developing the wondrous, complex structure with which they were born.

The human brain is organized into three systems with radically different structures and chemistry. This hierarchy of three-brains-in-one may be called the triune brain (MacLean, 1978). This organization presents some important considerations: two of the three brains have no system for verbal communication; since the integration of total brain function results in human intelligence, a test that measures primarily verbal communication as its sampling of intelligence may be seen as limited. The three systems are:

1. *The reptilian brain.* The simplest and oldest brain system, this provides autonomic function, the neural pathway for many higher brain centers, motor control, and communication links between the rest of the brain and the cerebellum. It houses the reticular formation that is the physical basis for consciousness and plays a major role in the state of being awake and alert.

2. *The old mammalian brain or limbic system.* This houses the biochemical centers activated by the emotions of the learner and enhances or inhibits memory; affects many diverse emotions such as pleasure, joy, anxiety, rage and sentimentality; and alters the attention span.

3. *The new mammalian brain.* Also known as the neocortex, or cerebrum, this is where sensory data are processed, decisions made and action initiated. The neocortex includes the functions of language and speech, and provides for reception, storage and retrieval of information. The most recently evolved area of the neocortex, the prefrontal cortex, provides for behaviors associated with planning, insight, empathy, introspection, and other bases for intuitive thought (MacLean, 1978). The prefrontal is engaged in firming up intention, deciding on action, and regulating a human being's most complex behaviors (Restak, 1979). It is, in fact, the area that energizes and regulates all other parts; it houses purpose.

The reptilian brain comprises the brain stem; surrounding it is the larger, newer limbic system; and above and around the mammalian brain is the cerebrum or neocortex, the largest brain, made up of the newest, most sophisticated structures. Under stress this largest, most complex system begins shutting down, turning over more and more functions to the limbic system brain. While rote learning can be continued, higher and more complex learning is inhibited (Hart, 1981). The Integrative Education Model was created to provide a program model and curricular approach for the development of these total brain processes.

In order to better understand learning and the development of intelligence, we need also to look at the asymmetry of the brain hemispheres, and examine the idea that each hemisphere of the brain specializes in a particular type of function. This specialized functioning points to the necessity for different types of educational experience if the potential each person possesses is to be realized. Schools have concentrated on the cognitive, left brain processes of learning while ignoring, and, in some cases, actually suppressing any use of the more holistic right brain function.

Although it seems that the entire brain is capable of performing all the activities exhibited by any of its divisions, each hemisphere does, under normal conditions, assume specific duties (Pribram, 1977). The left hemisphere is most responsible for linear, sequential, analytic, rational thinking; the right for thought of a metaphoric, spatial, holistic nature. Rather than viewing a person as right-brained or left-brained, we would be more accurate to speak of one hemisphere leading the other during certain tasks. The goal would be to have the appropriate hemisphere lead in a given situation, as the ability to use the strategies from both hemispheres is ideal.

The separate functions of the hemispheres, therefore, must not be overemphasized. The obvious need for integration is apparent even in the structure of the brain itself. According to brain research, mammalian sensory systems must be used in facilitating environments if normal development is to occur (Blakemore, 1974). Haggard (1957) found that early focus on rational cognitive (left-brain) performance can give children more competitive, hostile attitudes toward their peers and disdain for adults. The human requires both hemispheres to function in close integration, allowing us to understand both the computation and the conceptualization of mathematics, the structure and the melody of music, the syntax and the poetry of language. "*The existence of so complex a cabling system as the corpus callosum must mean, it is important to stress again, that the interaction of the hemispheres is a vital human function*" (Sagan, 1977, p. 175). There are more neural connectors between the hemispheres of the brain through the corpus callosum than between the brain and any other part of the body. The human being is biologically structured to integrate functions.

The Evolution of the Integrative Education Model: A Personal View

In the late 1960's my attention was drawn to the brain research of the Berkeley team and their inquiry into environmental impact on the brain. This research provided me with an explanation for how giftedness occurs and clues to the appropriate use of human potential. At this point I began to research early learning and attempted to turn laboratory brain study into educational practice. Much of the information I gathered during that period showed me the importance of early, sensitive and critical periods and supported the view of a dynamic intelligence (Dunn, 1969).

When, in the early 1970's, the brain/mind research suggested significant differences between the old learning theories and new findings, I was intrigued. As a result of technological advances in laboratory equipment, the human brain could now be studied without disrupting function; lower animals were no longer the only source of data.

The complexity of the human brain that the new research found required different conditions for optimizing learning than was thought to be true under older more limited data collection techniques. The first condition that drew my interest was the claim that the human brain functions more effectively and at a higher level when stress is reduced. Indeed, anxiety created biochemistry in the limbic area that, in fact, shut down higher centers of the brain (Krech, 1969; Martindale, 1975; Lozanov, 1977; Restak, 1979).

This finding led me to a new perspective of my teaching and my classroom environment. I sought to discover what created tension and anxiety in the classroom and what I could change to help my students. I found that the environment played a far more significant role in supporting the learning process than I had previously imagined. As Diamond (1976) was experimenting with color in her brain research laboratory at Berkeley, I experimented with the environment of my university classroom. As Lozanov (1977) used tension reduction techniques to optimize learning in his clinic in Bulgaria, I taught tension reduction to my graduate students. The results were exciting. Motivation improved, interaction increased, and the quality and quantity of the products of learning grew impressively.

The area of brain research that held the most interest for me was the investigation of the controversy between those who believed brain function to be in specific areas which could be mapped and those who held that brain function was referred and non-specific in nature. It was intriguing because both sides of the investigation seemed to be right, paralleling the debate regarding the nature of creativity, where at least four points of view were amassing data separately.

The answer to these and similar questions, which were producing contradictory results, seemed to lie in viewing the issues as connected, holistic, somehow broadly unified. This had been true for Carl Jung (1933) as he sought the explanation for the differing expressions of human function. Now, as the structure of the brain/mind system was revealed, it became apparent that just as Jung had theorized that human function was organized into thinking, feeling, physical sensing and intuitive processes, there was a biological basis within the brain and its organization that supported a similar pattern. Such functions, it became evident, could not reach their optimum levels separately, but only as each integrated into the whole. It was the ***integration of function*** that optimized total function. Dichotomies did not exist. The human brain showed itself to be both specific and non-specific, the major part of its mass being involved in association and composed of associative tissue. As the physicists were claiming, reality was not either/or; it was and/also.

From this insight and with the validation of data from many diverse disciplines, I found that a model of education, of learning and teaching, could be constructed. I felt a need to reflect this more holistic view, as thinkers from the past and current researchers again and again showed evidence of the interactive nature of reality. This was the beginning of Integrative Education, the model which relies on Jung's four function theory and is based in the human brain's four function organization.

The Integrative Education Model

In every subject area the Integrative Education Model combines the experiences of cognition with experiences in feelings or emotions, intuition and physical sensing. Through this Model each function of the brain is allowed to support the others, resulting in a very coherent, powerful learning experience.

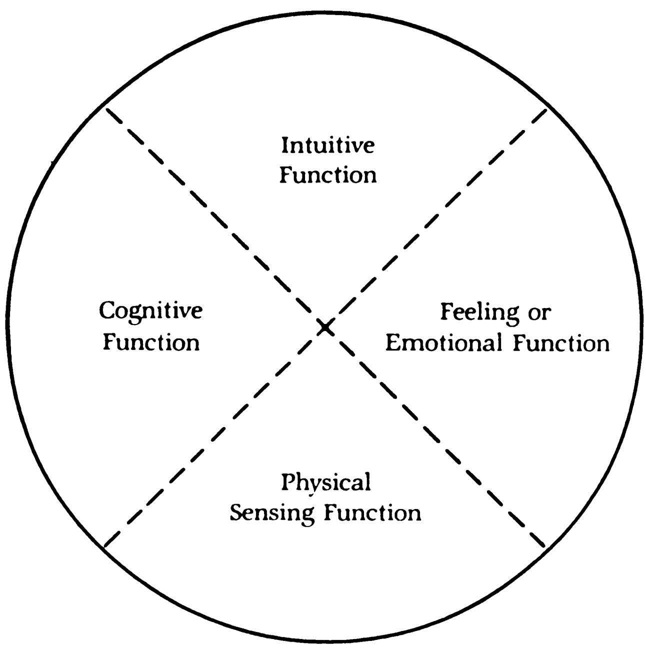

Figure 1. Integrative Education: A Model for Developing Human Potential.
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The Four Functions of Integrative Education

The Thinking Function (Cognitive)

This function includes the analytic, problem solving, sequential, evaluative specialization of the left cortical hemisphere of the brain, as well as the more spatially oriented, gestalt specialization of the right cortical hemisphere. Gifted learners find this function enhanced by their accelerated synaptic activity and the increased density of their dendrites. This allows them to establish complex network of thought more easily. The biochemical changes that result from stimulating environments are also expressed in the advanced capacity to generalize, to conceptualize, to reason abstractly, and to problem-solve that is found in gifted learners.

The Feeling or Emotional Function (Affective)

This is the function that is expressed in emotions and feelings and, while affecting every part of the brain/mind system, it is primarily regulated from the limbic area by biochemical mechanisms housed there. This function more than supports cognitive processes; it does, in fact, provide the gateway to enhance or inhibit higher cognitive function. To provide for optimal learning, a program must include opportunities to integrate emotional growth.

The Physical Function (Sensing)

This function includes movement, physical encoding, sight, hearing, smell, taste and touch. Access to the world is through the physical senses, and the level of intellectual ability, even a person's view of reality, will depend on how the brain organizes and processes this information. It is known that gifted learners have a heightened ability to bring in information from their environment and process this information in ways that expand their view of reality. They may recognize their value through rational cognitive ability alone, and they may focus more and more energy toward the pursuit of cognitive excellence. They may ignore their physical growth and development. Although there is an awareness of the above-average physical development of many gifted children, it must also be noticed that many of these children value and share physical pursuits far less than cognitive endeavors. It is common for gifted learners to develop a Cartesian split, which, if unrecognized and left to intensify, can limit the cognitive growth they so value. Integration of the body and the mind becomes an essential part of an integrative program.

The Intuitive Function (Insightful, Creative)

According to Jung, intuition "*does not denote something contrary to reason, but something outside the providence of reason*" (Jung, 1933, p. 454). He considered intuition vital to understanding. This function, which each person has, but uses in varying degrees, represents a different way of knowing. This ability is in use when it is felt that something is known, but it cannot be told how it was known. It is a sense of total understanding, of directly and immediately gaining a concept in its whole, living existence, and is in part the result of a high level of synthesis of all of the brain functions. People often repress and devaluate the intuitive function because it does not operate in the rational manner western minds have been taught to expect. Activating intuition gives a person a sense of completeness, of true integration. This powerful tool can lead to a better understanding of concepts and people.

Capra (1975) states that rational knowing is useless if not accompanied and enhanced by intuitive knowing. He equates intuition with new creative insights:

> *These insights tend to come suddenly and, characteristically, not when sitting at a desk working out the equations, but when relaxing in the bath, during a walk in the woods, on the beach, etc. During these periods of relaxation which follow concentrated intellectual activity, the intuitive mind seems to take over and can produce the sudden clarifying insights which give so much joy and delight to scientific research.* (p. 31)

Those working to include the development of intuition in the educational setting believe that the ability to concentrate, to work at complex tasks with unusual clarity, results from the intuitive function. Identified now as a part of the function of the prefrontal cortex, intuition becomes a part of the planning, future thinking and insight so necessary to the intelligent person.

By use of integrative education and strategies incorporating this construct, students can expect to make impressive gains in areas of cognition, self-concept and social-emotional development. Among the cognitive gains will be accelerated learning, higher levels of retention and recall, and higher interest in content. They can also improve self-esteem, find pleasure in learning, and improve interpersonal relations and teacher-student rapport (Bordan & Schuster, 1976; Galyean, 1977–80; Galyean, 1978–81; Galyean 1979; Lozanov, 1977; Prichard & Taylor, 1980; Samples, 1975).

The Integrative Education Model, while employing all of the modifications traditionally mentioned in gifted programming, including ability grouping, acceleration and enrichment, does not focus solely on cognitive learning. Rather, the Model combines previously used structures with the new brain/mind information, resulting in a dynamic incorporation of learning experiences.

Learners of all levels of ability and interest can be served within the Integrative Education Model, because of its decentralized and personalized organization. Its concern for total brain function allows giftedness, regardless of how it is expressed, to be nurtured and enhanced. The Model has been successfully implemented in a variety of settings including self-contained elementary and secondary classes, both homogeneously and heterogeneously grouped, resource room settings and a special-school setting.

It is important to include in the curricula such diverse elements as guided imagery, dreams, mind/body integrative activities and activities nurturing intuitive development. Diversity in process and individualization of instruction must be offered if the integration necessary for optimal development is to be affected.

There are some direct implications from the new brain/mind data for change in the classroom:

Instead of:	*The New Data Demand:*
A focus on logical, rational thought as the center of educational experiences	A focus on an integration of all human functions, including the logical, rational thought; the important avenues of sensing; the emotional, feeling functions; and the power of intuitive knowing. This focus assures the use of the whole brain and optimizes the learner's ability to learn. This approach is known as the Integrative Education Model.
Using external tension for motivation and control	The use of relaxation and tension-reduction to develop higher levels of learning, i.e. whole brain learning, as relaxation has been found to be the first step in thinking and synchronizing brain function.
Using the classroom environment as the container for the learning process	The use of the environment as an important learning tool with color, sound, light, etc., contributing to the learning process. This environment includes, not just the classroom, but the community and surrounding areas as well.
A focus on group work	A focus on individual learning needs, styles and processes in small group or individual instruction, as each individual was found to learn differently for physiological, psychological and emotional reasons.

A focus on set curriculum given to all	A focus on responsiveness to the interest and ability of each learner's choice as a powerful motivator in developing the curriculum. This need results from the influence of the limbic system (the emotional trigger of the brain) on the ability of the brain to function optimally.
Knowledge of content being the only necessary tool of the teacher and learner	That content be communicated by cooperative processes and interactions of the teacher and learner as both hemispheres of the brain must be involved for optimal learning to occur.
A focus on known facts being transferred from authorities to learner	Encouragement of new ways of viewing facts, eliciting new questions and presentations of, as yet, unresolved issues which allow the learner to use higher cortical function.
A focus on controlling the student	A focus on empowering the student to be responsible for self, e.g. use of the inner locus of control which includes preparing the student for learning through relaxation and anxiety reduction; discovering and changing negative attitudes and preconceptions regarding self and the learning experience; awareness of the suggestive impact of teacher words and attitudes; and teaching students about their learning resources and how to use them.

The Seven Components of Integrative Education

The Integrative Education Model can be described through seven major components. While parts of the Model can be used effectively without all components in place, the most effective use will include all seven. These may be called the seven keys to optimizing learning.

1 The Responsive Learning Environment. This component requires educators and parents to develop supportive attitudes toward learning and gifted education. Skills of assessing, planning and implementing individualized programs become important. The environment expands in meaning and usefulness. The roots of this organizational plan are buried deeply in the work of Plato, Socrates, Froebel, Pestalozzi, Dewey, Montessori, Piaget and other innovative educators, and strives for a unique learning experience for each individual. Participation is seen as necessary to learning, and involvement is encouraged to insure the assimilation of concepts. While the responsive learning environment has a different format for each group of learners, there are some basic characteristics:

1. There is an open, respectful and cooperative relationship among teachers, students and parents that includes planning, implementing and evaluating the learning experience.
2. The environment is more like a laboratory or workshop, rich in materials, with simultaneous access to many learning activities. The emphasis is on experimentation and involvement.
3. The curriculum is flexible and integrative. The needs and interests of the student provide the base from which the curriculum develops.

4. There is a minimum of total group lessons, with most instruction occurring in small groups or between individuals. Groups can be formed by teachers or students and will center around needs or interests.
5. The student is an active participant in the learning process. Movement, decision-making, self-directed learning, invention and inquiry are encouraged both inside and outside the classroom. Students may work alone, with a partner or in groups. Peer teaching is important.
6. Assessment, contracting and evaluation are all used as tools to aid in the growth of the student. Frequent conferences keep student, teacher and parents informed of progress and provide guidance for future planning.
7. Cognitive, affective, physical and intuitive activities are all valued parts of the classroom experience.
8. The atmosphere is one of trust, acceptance and respect.

The responsive learning environment is highly structured and presents a complex learning organization to the student. This environment has the ability to meet all learners at their present level of cognitive, social-emotional, physical and intuitive development and to help them to move from that point.

In a recent study directed by Bloom (1982), it was found that of those persons studied who had achieved exceptional accomplishment of international note, their early instruction and a large part of the later instruction in their field of accomplishment was individualized. This was one of the identified differences between the instruction offered to the exceptionally accomplished and that found in the traditional schooling experience.

Individualization can be defined as a way of organizing learning experiences so that the rate, content, schedule, experiences and depth of exploration available to all students stem from their assessed achievement and interests. Different programs have varying degrees of individualization. Individual teacher diagnosis and prescriptive instruction individualize the level and pace of instruction. When, in addition, the student becomes involved in the selection of goals, the instruction becomes more personalized. Self-directed or independent study needs to have all of the previously mentioned provisions as well as self-selection of learning activities and materials. Total individualization allows teacher and student to assess and select goals, learning materials, activities and instructional techniques cooperatively. It also allows the student to self-pace, self-level and self-evaluate, using the teacher as a consultant and resource. In this way, students can take advantage of their unique learning styles to enhance their learning process.

In this learning environment, gifted students can pursue interests in depth with a minimum of time limitations. They are no longer singled out, but they can be grouped flexibly with other students as their learning needs demand, or they can work individually whenever it is more appropriate. The gifted learner can function as a teacher, a challenged student, a researcher, an apprentice, a resident expert or a learning manager. The classroom becomes more of a laboratory for learning and is more closely related to the real world. In fact, students may often find projects and inquiries in which they can be more profitably engaged outside the classroom in the larger community. A large body of literature is available under any of its identifiers to aid in the understanding of the format and structure of this type of organization.

Basically then, the environment must be planned to provide at least three conditions if it is to take advantage of the new data on learning. First, the environment must provide for differences in learning style, pace and level to be accommodated. Brain data indicates that such differences are evident in all learners; when the acceleration and complexity found in gifted learners is considered, the differences can be extreme. The second condition which can be supported by the environment is that of motivation. Motivation is, in part, the result of participation, shared responsibility and choice in the learning process. These factors can be supported by the environment. A third condition involves challenge and stimulation, both of which are necessary for optimal learning and both of which can become a part of an appropriately planned environment.

The physical environment. The learning setting can facilitate or inhibit the learning program. The environment has far more impact than we previously assumed; it affects even the energy the student has to expend on learning goals.

To best use the responsive learning environment, the teacher must first develop a decentralized setting. The classroom needs sufficient "*people space*." So many educational settings are overfilled with desks, tables, chairs and equipment, that space for people to move about, to group flexibly, to manipulate materials and to actively participate in their own learning is restricted.

Gifted individuals often have the ability to integrate and synthesize information from many disciplines, to develop new concepts or to enhance their understanding. In an open environment, the opportunity for this type of synthesis is available and even encouraged. Imagine a classroom with many activity areas, quiet, comfortable reading and study areas, and discussion areas available to students and teacher/student groups. It has conference areas as well as large group areas. Space is provided by a greater use of floor and table surfaces, with movement facilitated by a minimum of desks and chairs. The walls display alternative activities and materials for self-directed study. Closets and cupboard doors provide media centers, and the use of many ways of learning is evident. At the beginning of the year, teacher-initiated activities and materials dominate; by the end of the year, the environment will be representative of all the learners within. Gifted learners can structure this type of physical space to meet their unique abilities and levels of inquiry.

Movement in and out of the classroom to the library or other learning centers is not inhibited, and special grouping for specific interests is not uncommon. Pursuing any interest, however unusual, is not seen as odd by the other learners in this individualized setting. No one is asked to wait for the group to catch up or to do busy work to pass the time. Individual contracts and projects make it possible to learn at your own pace. The need the gifted learners often feel to pursue a subject in depth, to branch out into other related fields or to stay with one inquiry for long periods of time are met without inhibiting the needs of others. There is adequate opportunity for the gifted to share their accomplishments by constructing a learning center to instruct others, conducting a seminar for other interested students or meeting with a mentor for the challenge of expert advice and criticism. If the gifted student's needs cannot be met within the classroom, outside resources can be made available and arrangements made for field trips or apprenticeship programs. While these may also be arranged in a traditional classroom, the novelty of such arrangements and the exit from the classroom make reentry a social problem for the gifted student. The richness of materials and opportunities make the responsive learning environment a place where gifted individuals can meet their unique needs on a full-time basis.

Now that the space in the classroom is being considered, think a moment about light and color. Ismael (1973) suggests that soft lighting makes people less self-conscious and more receptive, that a new sense of ease in teaching and communicating, increased interaction and cooperation among students results from its use. Ott (1973) found that natural light or full spectrum light is important to the proper use of human energy. Fluorescent light omits the needed ultraviolet rays, and pink fluorescent light increases irritability, hyper-aggressiveness and negative feelings.

Color can be used for a variety of purposes. Heline (1969) reports that reds, oranges and yellows stimulate, invigorate and energize; while greens, blues and violets are restful, soothing and calming. By using color in relationship to the activity you are desirous of implementing, you may enhance the result.

In summary, the physical environment must accommodate flexible grouping, space for a variety of materials and content-based books and include appropriate color, sound and texture to support the learning process. While Integrative Education can take place without the support of the responsive learning environment, the use of such an environment will make the job of the teacher and the learner much easier, more efficient and far more effective.

The social-emotional environment. In an environment where each student is considered a unique individual, the atypical needs of the gifted student cause no one to feel out of place. Self-concept can be developed in a realistic perspective with every person valued for those qualities he or she possesses. Accomplishments can be shared, and the value of the contributions of others can be experienced. Gifted students can gain recognition without seeming to dominate. They learn responsibility through the many opportunities provided them for accepting responsibility for their personal goals. Gifted students strengthen their inner locus of control by continuous encounters with the intrinsic values in learning from their own interest or from real need.

Gifted youngsters have a need to seek out their intellectual peer group. They accomplish this easily when older and younger children can work together in a classroom with flexible grouping and freedom of movement. Any problems encountered in living together as a group can be resolved by the group to give a natural setting for the development of leadership skills.

The first step in developing an environment that can promote social-emotional growth is the establishment of trust. Such an environment does not just happen; it is deliberately planned. There must be time allotted for experiencing and building trust. In classrooms that have used the Integrative Education Model, the structure has included use of language and behavior that allows students to feel competent, activities that are more cooperative than competitive, and time for building positive interpersonal interactions.

While it does take time to plan and carry out activities that build positive interpersonal interactions, the range of positive outcomes of these activities is extensive and ongoing. A pattern that seems to work well is to begin and end each day or secondary school period with an activity or discussion that attends to this need. The activity can be as simple as a short relaxation together at the beginning and an evaluation circle at the end of the period. At the beginning of the year more time may be allotted so that students are given the rationale and consequences of these activities and can develop skills and understandings of their importance to the learning process. Occasionally, blocks of time can be used to develop communication skills, the group trust circle and classroom agreements. These and other useful activities can be found in the next section and in resources developed by Stevens, 1971; Ott, 1973; Simon, 1974; Hendricks &

Wills, 1975; Sisk, 1975; Canfield & Wells, 1976; Hendricks & Roberts, 1977; and Clark, 1983.

2 Relaxation and Tension Reduction. Traditionally, Western culture has not valued relaxation; as a consequence, tension-related diseases dominate the illnesses of human bodies. If the integration of mind and body is to succeed, relaxation techniques must be learned to allow the body to cooperate with the mind's energy. At least six systems of relaxation are available: Autogenics (Schultz & Luthe, 1959), hypnotic suggestion, biofeedback, Progressive Relaxation (Jacobson, 1957), Yoga breathing, and meditation. Students would gain by exposure to several methods so that they might choose the one that works best for them.

While Autogenics and Progressive Relaxation both have a particular methodology, they use the basic concept of tension awareness followed by relaxation. For example, a teacher might say, "Close your right hand into a fist. Hold your arm perpendicular to the body, and push out as you tighten your fist. Continue until you feel discomfort, then suddenly let go completely, relaxing all of the arm and hand muscles. Now relax the arm one level further. Again further. Still further." This process can be used throughout the body.

Physical environment, too, can play an important part in facilitating or inhibiting the reduction of tension. Use of calming music and colors can aid in reducing anxiety and tension. Also, order in a classroom is meaningful and especially appreciated by many gifted children who are unusually sensitive to their environments.

In my pursuit of effective ways to reduce tension in my classroom, I found that examinations which were given routinely at midterm and during final week were quite tension-producing and created an interruption in the learning curve. I was aware that choice reduced anxiety by placing the student more in charge of the learning experience, so I began by offering a choice of the type of test the student could take: objective, subjective, student-written or teacher-written. Giving choice did help reduce the tension; however, I later discovered that what I really wanted was to evaluate the learning. Examination was only one possible way of evaluating; I could also collect data. Once I began this process the numbers of data collection methods which were valuable in evaluating student performance made examination less important. The response from the students was most favorable, and the quantity and quality of their products increased.

There are many avenues to creating a learning environment that reduces tension to better learning levels. It only requires that the teacher consider the importance of relaxation and tension-reduction. While the brain research verifies its importance to the learning process, it is the professional educator who can best decide how to interpret these results in his or her classroom.

3 Movement and Physical Encoding. One of the most curious observations made by brain researchers is that physical movement is important to learning. A child's movement is quite natural until entering school, where there is less and less opportunity to integrate movement and physical sensing into the learning experience. Among the few disciplines that retain this important aspect of learning are the arts and the physical sciences. Laboratories are used for physics and chemistry, but not in mathematics or history. Why? Though some efforts have been made by sociology and psychology teachers to incorporate real life involvement, the teaching process has relied on students sitting at desks listening to a lecture or watching a demonstration in order to develop knowledge of the area being taught.

If we are to better educate students, then we must acknowledge the importance of movement. The purposeful change of place, position or posture as part of the learning process, and physical encoding—the learning process which uses the physical body to transfer information from the abstract or symbolic level to a more concrete level—are integral to this movement, and can produce more precise learning with a higher rate of retention. Encoding techniques might consist of the use of rhythms, role-playing, physically manipulating materials and the creation of simulations of actual events.

Simulation develops cognitive abilities and understanding by using affective involvement and physical movement. Simulation is the process of exploring a problem or idea by simulating or recreating the events within the classroom. It requires active participation on the part of the learner. The outcomes are decided by this participation. It has the advantages of bringing out a high degree of motivation; leading the learner to inquiry and research; using the skills of decision making, communication, persuasion and resource allocation; integrating curriculum areas; developing a deeper level of understanding; changing attitudes; and enhancing personal growth. A number of companies develop and sell simulation activity programs; however, they can also be structured and run by teachers and students. The following resources will aid in the development of simulations: Boocock & Schild (1968); Sisk's ***Teaching Gifted Children***; Taylor & Walford (1972); Zuckerman & Horn (1973); and Seidner (1976). Some of the organizations producing simulations are *Project SIMILE, Western Behavioral Science Institute; Science Research Associates, Inc.*; and *Wiff 'n Proof.*

Movement can be incorporated to enhance any discipline. Here is an example of movement used in a high school biology class which resulted in physical encoding that increased the understanding and retention of a rather abstract concept. The following lesson has been developed and successfully implemented by Tobias Manzanares.

Phagocytosis

Purpose: To develop an understanding of the body's immune system through an integrative activity, and to reinforce the terminology used in the unit on the circulatory system.

Time involved: One fifty-minute class period.

Materials needed: Handout of a drawing of the process of phagocytosis; classroom or outdoor area representing the human body.

Procedure:

Step 1. Students should record in their notebooks the diagram showing phagocytosis and should note the following:

a. Many white blood cells are capable of phagocytizing, or eating, large numbers of invading microorganisms.

b. Specialized cells in the liquid-filled spaces of your tissues are also capable of phagocytizing invading organisms, and are most effective in the specific region of a skin wound.

c. If the infection moves into the body from the region of entrance, phagocytic cells circulating in the vascular system will ingest the invaders. Additional phagocytic cells are found in the liver and spleen, should the infection reach the blood stream.

Step 2. Share with the class, so that everyone will be able to participate as either a part of a white blood cell or as a triad member representing an invading cell. Ask for volunteers to make three triads. Members of these triads can decide whether to be a virus or a bacterium.

Step 3. The remainder of the class links arms to form a closed circle representing a white blood cell. This group selects a member to act as the nucleus.

Step 4. Instruct the invading triads to leave the room momentarily, and when they return to remember that they are invading the body *(the room)* through a wound, scratch, or any other method they may choose to describe. (Example: Giardia lambia is a protozoan that enters the body through contaminated drinking water.)

Step 5. Instruct the remaining group *(white blood cell)* that they are charged with the responsibility of protecting the body by ingesting and thus destroying the invading organisms.

Step 6. As the invading triads *(arms linked)* enter the room *(body)*, instruct them to move at the speed of a microorganism *(very slowly)*. Instruct the nucleus of the white blood cell to direct the action of the cell in the very best style and wisdom of a nucleus.

Step 7. Allow three to five minutes for the phagocyte to phagocytize. As an invading triad is ingested, instruct them to become part of the larger phagocyte by linking arms with that group.

Step 8. Stop the activity momentarily *(after ingestion)* to have the group focus on their feelings by asking the following questions: To the phagocyte, "How did you feel as you attacked and ingested an invader? Did you have a sense of power? Did you feel a sense of responsibility? Success?" To the invading triads, "Did you feel a sense of exclusion relative to the bigger group? Did you feel differently about becoming part of the larger cell? What kinds of feelings were experienced upon penetration of the body?"

Step 9. Have the class return to their seats and write a metaphor about their immune system.

Step 10. Conduct a guided imagery to raise the students' awareness of their ability to assist their body's immune system. (Clark, 1983, pp. 309 & 310)

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4 **Empowering Language and Behavior.** Empowering language and behavior, according to Sparling (1984), are verbal, nonverbal and overt physical responses which result in the perception of any one or all of the following: competence, support, closeness, appreciation and having received helpful feedback. There is a sense of having had a profitable positive interchange.

Empowering language becomes an important part of classroom communication between teachers, between student and teacher and between students. It needs to be discussed and modeled. Students who are given opportunities to work in an environment where enabling language is valued become more responsible, more motivated and exhibit a positive self-concept. All of these characteristics can be shown to correlate positively with academic achievement (Aspy, 1969; Aspy & Bahler, 1975; Brookover, 1969; Purkey, 1970).

One of the functions of the brain is to identify meaningful patterns from the random input provided by the environment; it does this effectively and efficiently (Hart, 1983). In discussing the concepts of empowering and debilitating language, Sparling (1984) asks us to consider the implications of this brain function for the learner:

> *What meaningful patterns may students create for themselves out of a constant, long-range, random barrage of debilitating verbal and nonverbal classroom input? Among the meaningful patterns these students identify are going to be many negative ones about school, teachers, themselves, their competence and their future expectations. In contrast, patterns identified out of constant, long-range, random, empowering input will include more positive ones about school, teachers, themselves and their future expectations.* (p. 19)

Sparling suggests that there are two sources of debilitating language in a classroom: outside input from teachers, other adults and other students; and internal input—the dialogue that occurs in the student's thoughts. These patterns of communication can severely limit the student's motivation and achievement. To identify examples of empowering language it is useful to be aware of the following characteristics. When ***empowering language*** is used a person feels:

accepted as a person, even though his or her behavior may be unacceptable;
competent;
cared about;
that the situation is not hopeless;
that improvement is possible.

Conversely, when ***debilitating language*** is used a person feels:

like a bad person;
depressed;
hopeless;
worthless;
wrong and incompetent;
disliked by the teacher.

A more productive alternative pattern can be seen in the following interaction: A student was sitting slumped in a chair staring into space. In front of him was a word sheet with a matching puzzle developed from his reading words. When the teacher asked what the problem was, the student responded, "I can't do these old problems." "Oh," the teacher replied, "I feel like that sometimes. But look, what is this?" she asked with a tone of discovery, pointing to a two-letter-word she was sure the child knew. The child looked with some curiosity, "It's *to*." "Exactly," said the teacher, "What about this one?" The child began paying more attention as the teacher commented, "You may be better at this than you thought." The teacher left the child working, occasionally returning to reestablish a positive attitude. The teacher was practicing empowering language and allowing the student to replace his debilitating dialogue with more empowering inner speech. What this teacher did was to catch the student doing something right and make him aware of it (Sparling, 1984).

Sparling provided other guides for changing debilitating inner speech which include the following: use of "I" centered messages; avoidance of words like should, shouldn't, must, must not, always and never; phrasing things positively; providing personal examples of learning errors; avoiding praise for easy work; avoiding the giving of excessive help; allowing self-evaluation; and teaching strategies to increase empowering language and decrease debilitating language.

Other types of empowering language and behavior include: use of physical and verbal affirmation, humor, reflective questions and constructive, specific, task-related feedback. Errors are used and valued as learning experiences. Students are helped to identify personal goals and find ways to link them to school goals. Learning strategies are taught to help students achieve their goals.

Empowering language and behavior become a part of the entire learning experience. Attitudes toward school and self become more positive. The risk taking that is required in creativity and the highest levels of cognitive production is made possible. The results of attention to this component of the Integrative Education Model carry over into all phases of the students' world and enrich their life experiences.

5 **Choice and Perceived Control.** Values provide the purpose for a person's life. Research shows that without a clear set of values, students can become unmotivated, lacking in direction, and the results may be unprincipled, confused and even delinquent behavior (Raths, Harmin & Simon, 1966). Often young people have no useful process or guidance in establishing the values by which they can live. They may be expected to accept the values of others as their own without examination or personal affirmation. The result is, too often, rebellion against the values of others or the rejection of all values. Far better would be the guided examination of values; the evolution of a personal value system. As individual guides to living, values evolve and mature as experiences evolve and people mature through them. The concern is not with the particular value outcomes of any person's experience, but rather with the process used to develop values. It is important that our values work effectively and lead us to a satisfying, actualizing life.

Valuing begins with the awareness of what values are now held. Helping students to clarify their own values and to be aware of the values of others is the first step. In the learning process teachers must encourage discussion of open-ended problems and positions on controversial issues. Students are encouraged to listen carefully to each position or solution expressed by others with the mind set that allows them to become aware of the value differences and defer evaluation of these differences. By setting up these kinds of discussion groups in a trust environment the teacher can help students become aware of other values and notice the wide range possible. With this awareness students can begin to clarify more precisely the values they feel are most appropriate for them in their lives and develop an understanding of the values of others. Resources such as Simon, Howe and Kirschenbaum (1972) will give the teacher activities to use in guiding this clarification.

Often students need guidance in determining which values they can support. The skills of decision-making now become most useful. In her work, Sparling (1984) has developed a technique she calls ***"The Valuing Experience"*** which allows a student to experience appropriate and inappropriate values so that they can choose and personally commit to the action that they believe is most meaningful to them. The outcome of the experience is to allow the teacher to reduce the amount of time spent as a controlling agent and increase the amount of time spent as an influencing agent, a guide. It further allows the student to be guided while remaining independent, in charge, retaining the perception of control. This is important to the maintenance of an inner locus of control, a term used to identify the successful attribute of self-initiation found in many gifted youngsters.

The Valuing Experience makes students aware of their current behavior in relation to their personal goals and the feelings that result from that behavior. It then allows the student to experience alternative behaviors and the accompanying feelings. Through this process, it is expected that the student will place more value on the behavior that is accompanied by the most satisfaction. Inappropriate behaviors can then be understood in relation to the dissatisfaction they cause.

As an example, assume that the interfering behavior is interrupting. Using *The Valuing Experience,* the following steps are used:

1. The teacher engages the class in dyads in which they are instructed to share with another person a meaningful event while the other person is instructed to interrupt frequently.
2. The teacher changes roles so that each member of the dyad shares the experience of being interrupted.
3. Through discussion, the teacher focuses the students on the feelings they experienced when they were interrupted.

The second part of the experience again uses the dyad with the teacher requesting that the alternative behavior be used, and the students are directed to repeat the process, this time becoming active listeners. Again, at the conclusion of the experience, the total group is focused on their feelings. After engaging in both behaviors, a discussion is held evaluating the experience and eliciting a personal commitment to the behavior the student found most satisfying. Having used this model in classrooms at a variety of age levels I can verify the positive results experienced by both the teachers and the students involved.

During the past decade an impressive number of researchers in projects throughout the country have found that choice and the resulting perception of control are motivational variables that significantly affect children's academic achievement as well as their self-concept (Arlin & Whitley, 1978; Barnett & Kaiser, 1978; Calsyn, 1973; Matheny & Edwards, 1974; Thomas, 1980; Stipek & Weisz, 1981; Wang & Stiles, 1976). Interestingly it is not just the choice or control that is allowed children that makes the difference, but their perception of that choice. The possibilities for choice may be in the program, but unless children clearly see those alternatives and believe that they can really make a choice that will be acceptable, the positive effect will be missing.

One of the attributes of gifted learners is their early development of an internal locus of control. This means that they often do things for the pure pleasure of it. They can get very excited about learning new information, and they derive much satisfaction from discovering the solution to a problem. The term *"locus of control"* is used to express the idea that the perceived control can be located either within the child (as when a choice is made from the child's interest) or externally (as when a reward is given for making the choice). This is where gifted children show themselves to be characteristically different from the average learner. Gifted children are found to have more inner locus of control at a younger age than do average learners. It is one of the notable differences that needs to be considered when educational experiences are planned for the gifted. It is important to note that success in later life is in direct correlation to how much inner locus of control the individual has developed. This perception of responsibility for and control over one's life is the single most important condition for success, achievement, and a sense of well-being (Allen, Giat & Cherney, 1974; Bar-Tal, Kfir, Bar-Zohar & Chen, 1980; Dweck & Goetz, 1978; Lao, 1970; Morrison & McIntyre, 1971; Phares, 1975).

Schools use external rewards—such as grades, prizes, gold stars, special privileges, threats and punishments—without considering whether the child is intrinsically motivated or not. It has been established that the more the environment, either home or school, provides external controls, the greater will be the loss of the inner locus (Deci, 1975). Source of motivation is just what those who work with the gifted must notice. Lepper, Greene, and Nisbett (1973), and Greene (1974), have found that, for children who have intrinsic motivation, an external reward system can be devastating. The child will no longer work for the joy of it or notice the satisfaction of accomplishment, but will focus on the learning task as a means to a different goal, the reward. Once the reward stops being offered, the task ceases to be worthwhile. For gifted learners this is most important. Not only do they have more inner control available earlier, they are more sensitive to the demands of the environment. They can, in fact, lose more of their perceived power faster than will the average learner. It, therefore, becomes important to plan an environment that builds inner locus and heightens the perception of choice. For gifted students, development of intrinsic motivation and internal locus of control are important goals to help them function positively in society and find personal satisfaction in whatever they choose to do.

Successful experiences are not enough. If children succeed, but believe that they were given that success, it does not add to the perceived power. Likewise, failure can be viewed as positive if children believe that by their own effort success would be possible. The world must be seen as able to be acted upon; it must not be viewed as a place where the child is helpless and everything just happens to him or her. This perception is established very early, within the first two months of life. It is this perception that is one of the triggering mechanisms for developing higher levels of intelligence (Andrews & Debus, 1978; De Charms, 1976; Gordon, 1977).

How then can an environment be planned that works for the gifted child and increases a sense of perceived control? Here are some suggestions:

1. One critical factor is the structure of the program. It must be a complex structure that attempts to give every child alternatives at an appropriate level of choice. A flexible, responsive structure is important at home as well.
2. Incorporate lessons in how to make *good* choices and develop *responsible* choices. Children need a lot of practice in choosing.
3. The choices must be real; any that are presented must be equally acceptable to the teacher, and there must not be a hidden preference.
4. The situations for choice must come with a procedure for child-developed alternatives to be considered whenever possible.
5. Teachers must believe that children can and should make the major part of the decisions about their learning experience. Teachers may provide the organizers, the resources, and the structure to help the child be effective.
6. Children need specific skills to make good choices: development of alternative thinking patterns, ability to build personal power through relaxation and tension-reduction, imagery, intuitive strategies, and the ability to see and evaluate consequences.
7. Teachers must believe that each child has inherent dignity and can be helped to see that in self and others. Such experiences need to be built into a school day.
8. One of the primary responsibilities of a faculty is to model effective interpersonal relationships and personal power.

Schools need to be organized with flexibility and a structure that provides alternatives. Teachers need to see themselves as the resources for ever widening, child-initiated choice. Comfort with ambiguity and novel, open-ended situations is tremendously important. The behavior of all children is significantly influenced by their perceived locus of control. Success, achievement, and well-being come with personal power and the perception of inner control. Helping children develop their power is up to parent and teacher alike. For gifted children it is a matter of survival.

Gifted students will often function in society as change agents, innovators and reconstructionists. It is believed that societal problem solvers will come from this group. By being exposed to many ways of viewing problems, students may find better solutions. Give students experiences that allow them to become aware of bias in thinking—to recognize the difference between belief and fact; to see that each conflicting viewpoint may be valid; to see the importance of sources of information; to experience the importance of cooperation and consensus in group action; and to seek many alternatives before deciding on solutions.

If teachers want to help students make decisions on their own, they must present them with only the alternatives for which they can understand the consequences. If they cannot, they are not really making a choice. By beginning there and gradually increasing the number and complexity of the alternatives, students will gain confidence in their abilities and become better decision-makers (Jellison & Harvey, 1976).

6 Complex and Challenging Cognitive Activity. One of the components of the Integrative Education Model that has been given the most attention by program planners for gifted learners is the concern for the development of complex and challenging cognitive activities. There have been many models developed to aid in meeting this concern.

The following models and the models found in this book have presented the field with a variety of clues and a number of conceptualizations of the learning process that have influenced the development of curriculum in gifted education.

The Taxonomy of Educational Objectives: Cognitive Domain (Bloom, 1956). Bloom presents and clarifies a taxonomy of learning that allows educators to see the importance of presenting learning at many levels if they are to meet the needs of a variety of learners. While both the average and the gifted learner need to have learning presented at the levels of knowledge and comprehension, gifted learners are well equipped to pursue learning at the upper levels of application, analysis, synthesis and evaluation. Though all learners could profit from opportunities to work at the more advanced levels, the gifted must have such opportunities to use the very ability they have developed. Brain researchers remind us that there is no choice: the brain must continue to be stimulated or it will lose its capability. The fact that the majority of classrooms have been found to present learning experiences only at the lower levels is of concern for average learners, but a far more serious situation for the gifted learner. The awareness of and the use of all the levels of learning that Bloom and his committee identified are important in every classroom.

Structure of Intellect (*SOI*, Guilford, 1967). Another major organizer in gifted education is the SOI Model. The model provided psychology with a multifactor view of intelligence to replace the single factor view previously used. The division of intellectual abilities into three dimensions—contents, operations and products—and their subdivision gives this model the means to show interrelationships between human abilities. Some educators, especially Meeker (1969), extend the use of the SOI Model to serve as a basis for a diagnostic-prescriptive tool in the teaching of thinking skills. By using the model for curriculum development, Meeker believes that educators can meet the educational needs of each child more adequately.

Inquiry (Bruner, 1960; Suchman, 1961, 1962). That any discipline could be taught at any age if the basic structure of the discipline were communicated in ways the child could understand was strongly believed by Bruner. He urged educators to address themselves to the process of learning, e.g. to present science as the scientist would learn it. One educator who developed a strategy for doing just that was Suchman, who developed an inquiry model from his understanding of the scientific model of thinking. While it may oversimplify human thought by leaving out important areas, it is quite useful in teaching many important processes. Suchman's program gives students practice in solving problems by establishing the properties of all objects or systems involved in the problem, finding which objects or systems are relevant to the problem, and discovering how they function in the solution. Sessions are designed to help students learn to formulate and test their own theories and to become aware of their own learning processes. The outcomes lead not so much to new answers, and never to right or wrong answers, but to new and more productive questions.

Instrumental Enrichment (Feuerstein, 1978). A somewhat different view of the learning process is embodied in the work of psychologist Reuven Feuerstein. The theory includes the following theoretical aspects:

1. *Structural Cognitive Modifiability.* Feuerstein (1978) describes this concept as, "... the unique capacity of human beings to change or modify the structure of their cognitive functioning in order to adapt to changing demands of life situations" (p. 1.1). Cognitive changes can be considered structural when they are self-perpetuating, of an autonomous and self-regulatory nature and when they show permanence. The basic assumption is that human beings are open systems, accessible to change throughout their life span.
2. *Mediated Learning Experience (MLE).* Although much learning is through direct experience, the belief is expressed that most of the structural changes that occur in human cognition are the result of *MLE.* Characteristically these experiences are intentional, have the quality of transcendence, have meaning for the learner, mediate behavior, and mediate a feeling of competence.
3. *Learning Potential.* It is believed that almost all persons have a great deal more capacity for thought and intelligent behavior than is often manifest through their current behavior. Assessment of this potential requires a dynamic assessment of the process of learning rather than a sampling of the effects of previously learned material, e.g. instead of asking "How much does a person know?" the question becomes, "How can the person learn?"

The learning process devised by Feuerstein moves the student from passive dependence to autonomous, independent learning. This outcome, along with the underlying assumptions reflected in the theoretical aspects of Instrumental Enrichment, make this model a valuable one for introducing complexity and cognitive challenge to gifted learners.

While the above mentioned models and all of those explored in this book have provided guides for development of curricula for gifted learners, there remains a most important concern. Current brain data indicate that the use of cognition can no longer include only the rational, linear aspects—the specialization of only half of our cortical function. To use even this specialization optimally, the integration of the other cortical specialization, the spatial, gestalt, is needed. Of even more concern is the theoretic construct which encourages only one of four brain functions to be developed. Cognition, even in its expanded definition, only involves the function of the cortex, leaving the supporting functions of the brain stem (physical sensing) and the midbrain, limbic area function (feelings), as well as the highest level function of the prefrontal cortex (intuition), completely out of the learning process. Integration of all functions will most effectively allow the development of the human potential. Challenging gifted learners is best accomplished in the integrative mode.

By including all the models now available, the planning for education of gifted learners has an excellent starting point, a cadre of valuable tools from which to proceed. By expanding the concept of learning to include all human functions, we can better plan for effective and meaningful learning experiences.

A limit to be noted in providing quality education exists within the present educational system. To present complexity, to truly challenge gifted learners who may be two to eight years ahead of their age-mates in content and conceptual development, is most difficult within a system that presents and values age-grouped learning experiences. The cross-grading, flexible and complex structure and integrated curriculum suggested by the Integrative Education Model is one way of restructuring to better challenge the gifted learner.

7 Intuition and Integration. This last component of the Integrative Education Model contains both an area of brain function and a total brain process. It is discussed as a separate component because of the importance of intuition and integration in the learning process and because it is the least known area of human function. As mentioned at the beginning of the chapter, the brain is organized in a highly integrated way. Most of its area is composed of associative tissue and the overriding mode of functioning is integrative. Biologically the brain system is designed for high levels of synthesis. As educators learn more about these processes and include them in educational experiences, learning will become more effective, more efficient and the students more motivated and successful.

Intuition. The intuitive function has been the least recognized by educators. While the use of intuition can be shown to enhance the development of our other functions, until recently there had been no concern for its development. Attitudes toward intuition seem to be changing. With the biological validation of differing brain functions, a new effort is being made to bring the right brain with its more holistic, integrative, inventive ways of knowing into the learning process to provide a more balanced education. Breakthroughs in brain research and physics have caused reconsiderations of the very nature of reality. New information on the uses and nurture of human energy, meditation, personal space, fantasy, imagery and dreams has much to offer educational programs for human learning. If, as Barbara Brown (1974) insists, all learning is subconscious, intuitive abilities need to be developed.

Nervousness, fear and tension block even learned knowledge; the first step to releasing intuitive ability is to reduce tension (Assagioli, 1973; Roberts & Clark, 1976). Huxley (1962) also believes that intuitive ability can be developed. He views our cognitive ability as a conscious, active power and our intuitive ability as a complementary, receptive power. He states, "Both kinds of training are absolutely indispensable. If you neglect either you'll never grow into a fully human being" (p. 255).

Intuition is always available to us. There seem to be many reasons to develop this function. Clark (1977) gives us these three basic steps to developing our intuitive abilities: quiet the mind, focus attention, use a receptive attitude. These steps are very simple, but unless teachers allow time for them regularly, practice them and value the outcomes, they will not be developed. An attitude or a belief system is what is most needed, not just a one-time exercise or strategy.

Important components in developing intuitive ability are fantasy and imagery. Singer (1975) believes that fantasy may be the foundation for serenity and purpose in our lives. It plays a basic role in healthy development. He found that those who had trouble using fantasy to enrich their lives, or as a substitute for aggression, had serious problems. Children whose games are lacking in fantasy have trouble recalling facts and integrating events. In adolescence, these children are dependent on the external environment and may engage in antisocial, delinquent and aggressive acts as a result of their inability to internalize humanistic attitudes. As adults their problems increase and "their inner experiences seem less insistent than even the most irrelevant physical fact of their immediate environment" (Singer, 1976, p. 34). Alcoholism, obesity and drug abuse may be the consequences of such an impoverished inner life.

It is easy to nurture the growth of fantasy. Reading to children with sound effects and voice changes, making up plays, finishing open-ended stories and playing pretending games all provide opportunities for such development. Children need a climate that encourages the sharing of fantasies and allows them to become the basis for books, reports, poems and journals.

Fantasy journeys can also be helpful. When guided, these can provide understandings in subject areas not available from factual reading. A high school teacher reported using fantasy as a tool for teaching history. After relaxing, the students were asked to go back in their imagination to the 1860's. They were told to see, taste, smell and hear all that they could. After a time, the students were returned to the present and asked to write down everything they could remember. After compiling all the experiences into a class journal, the students were instructed to validate as much as they could by using library resources, texts, journals and diaries written in that period. The results were an exciting learning experience that will long be remembered by the students.

Electronics teachers can send their students as electrons through an entire circuit. Science teachers can guide their students, who imagine themselves to be red blood cells, through the circulatory system. To read more about fantasy journeys and imagery, refer to Samples (1976, 1977); Hendricks & Roberts (1977); Galyean (1983); and Bagley & Hess (1982).

Integration. The integration of the intellectual process of the brain/mind system is supported by a number of activities, strategies and tools that can be taught. While some of these tools have been discussed earlier in the chapter they will be mentioned again to emphasize their importance to the learning process.

1. *Relaxation.* Teaching techniques which can be used to reduce tension allows more interaction between the cortical hemispheres and better integration of their specializations. Becoming relaxed allows a student to gain access to higher centers of the brain/mind system and to produce biochemical support within the brain for the learning process. The brain does not function well under conditions of high anxiety. The processing of data is slowed until the pressure is removed (Hart, 1978; Restak, 1979).

2. *Centering.* The gifted can use another approach called centering. Useful not only for physical endeavors, but equally effective for intellectual and emotional balance, centering is the ability to relax, focus energy and move with a person's natural rhythm. Nearly all human activity improves when movement or action is from a centered position, as opposed to a fragmented or tense stance. Centering allows the integration of mind and body that results in synergistic thinking. It is exciting to have the feeling of being fully available, of discovering that solutions exist for problems not consciously being processed. The concept of centering can be defined as the balanced interaction of the mind and the body that allows access to total human function. Resources for centering activities can be found in Hendricks & Wills (1975); Hendricks & Roberts (1977); and Galyean (1983).

3. *Imagery.* This strategy, as mentioned earlier in the chapter, is a very valuable tool that triggers one of the highest intellectual processes: that of intuition, a process considered to be unique to the human brain/mind system. Imagery is an activity of the pre-frontal cortex and involves the integrative use of the total brain/mind system.

4. *Verbal and physical affirmation.* Affirmation is the process of positively focusing on capability, one's own or another's. This can be done verbally by comments such as, "I can do that," to one's self or "I really appreciate the patience you showed just now," to another. Physical action can create another kind of affirmation, such as centering and consciously balancing oneself before a difficult task is begun or a smile and appreciative pat for another. Such affirmations have been shown to be important to the earliest physical and intellectual growth of humans and are clearly involved in emotional well-

being throughout life. Such actions seem to create their effect by stimulating the limbic area of the brain.
5. *Positive energy.* This tool refers to the effect on the human brain/mind system created by the environment. It can be shown that negative feelings and conditions weaken the system, whereas, positive feelings and conditions can strengthen it. Again, the effect is created from the action of the limbic system and its biochemical output to the higher centers of the brain.
6. *Complex and challenging cognitive experiences.* Students are encouraged to take responsibility for seeking appropriate challenges in view of the axiom from brain researchers that says of the brain, "Use it or lose it." Such experiences can be shown to lead to an expansion of the neural structure resulting in accelerated and complex thought processing and more effective use of the entire brain/mind system.
7. *Intuitive ability.* Awareness of and involvement with techniques that can enhance this ability are important to optimizing learning.

In summary, there are seven components of the Integrative Education Model: the responsive learning environment; relaxation and tension-reduction; movement and physical encoding; empowering language and behavior; choice and perceived control; complex and challenging cognitive activities; and intuition and integration. These seven allow a view of the Model from several vantage points. Included are the physical and emotional setting, the attitudes and communication skills of teachers and learners, brain compatible strategies and techniques, and an overriding demand for integration of function. From these components come tools that can be taught to students to enhance their effectiveness in the learning setting.

This presentation has discussed the reasons for and data supporting the Integrative Education Model, and the components necessary for its implementation. The next section of this chapter will include classroom experiences with the Model and how use of the Model affects the learning process.

Research and Implementation

In the Spring of 1979, a new class convened at *California State University, Los Angeles,* which brought together current Master's candidates and former graduates from the area of gifted education. In this advanced studies course the students explored the implications of current brain research and the new theoretic constructs of reality for education of the gifted. At the end of the quarter the group was not willing to bring closure to their inquiry and continued meeting informally throughout the following summer and into the next academic year. By late fall it had been decided that it would be important to try out the teaching strategies being proposed with gifted children in an environment which would allow both teachers and students total support in a setting which could be organized without the limits found in more traditional educational structures. In June, 1980, the first session of the *New Age School (NAS)*, a six week summer project for gifted and highly able learners, sponsored by Cal State Los Angeles and staffed by the group of Master degree graduates, was held.

During the past years, the experience has been repeated each summer, resulting in the evolvement of the Integrative Education Model and its components. Structures and strategies were modified to more closely meet the goals of the Model and the needs of the children. This process is continuing, with each summer adding a new dimension of examination and discovery. The evaluation of the Model is ongoing, as members of the New Age faculty take the ideas developed during the summer back into their classrooms to use during their regular academic year assignment.

The faculty has been joined by over sixty other M.A. program graduates who comprise an umbrella organization, the *Center for Educational Excellence for Gifted and Highly Able Learners (CEEGHAL)*. This group arranges in-service programs for their own enrichment and conducts in-service programs for interested educators throughout the country. They have given sessions on the New Age program at many national conferences. The group also conducts a brain research conference in the spring to update educators on the latest information on learning, and to raise money for scholarships for the summer NAS Project. The Project remains tuition supported, with research on the Model a joint venture of all participating faculty.

In conjunction with the six week summer NAS Project, a training institute is held on site where graduate students in gifted education can take classes toward their degree and participate in the excitement of the New Age School Project. It is in this setting and in the regular classrooms of this faculty that the Integrative Education Model has evolved and in which its merits are being assessed. In addition, through visits to the summer NAS Project by interested educators from around the world, the structure and strategies are being implemented in diverse classrooms in this country and abroad. Many exciting reports have come from this informal dissemination process. Because of this genesis, the formative data collection of the Model will be described in three subsections: Integrative Education in the New Age School, Integrative Education in a Variety of School Settings, and Future Considerations. It is hoped that with this background, implementation of integrative concepts may be clarified and encouraged.

Integrative Education at the New Age School

With the freedom to structure a learning environment as effectively as the group could imagine, the task became one of clarifying and operationalizing long held dreams. Whatever was believed to be important to optimizing learning and could be shown to have a reasonable theoretic basis could be included. The limits were only the limits of the creators. There were, of course, funding constraints; however, the most difficult limitations to overcome were the old familiar patterns of teaching and learning that held all these creators subtly in their bounds. To devise methodology to fit educational beliefs that had not previously been experienced was not an easy task. The goal was to implement all of the conditions and systems described in the components of the Integrative Education Model. The first place to start was with the environment and the structure of the school, the administration and the curriculum.

To give more flexibility and choice to the students, a cross-age grouping was devised. After several alternative patterns were explored, the current pattern of grouping was adopted: Toddlers, ages 2 to 3 years; Early Age, ages 3 to 6 years; Cross Age, ages 6 to 16. Each unit is organized in parallel structures with a decentralized plan appropriate to the age group involved. All units have faculty teaching teams. The NAS faculty is committed to the concept of team teaching wherever possible as it provides maximum opportunities for choice and enriched experiences for teachers and students alike.

The Administration

The administration of the school has evolved into a participatory, shared management model which is very like one suggested by Capra (1982). It was interesting to find this suggested system of organization just a few months after the NAS management system was in place. Capra provided excellent validation. He states that throughout nature the tendency is for living systems to form multileveled structures with levels that differ in complexity. At each level the systems are integrated, self-organizing wholes which consist of smaller parts and, at the same time, are actually parts of larger wholes. Every subsystem can be identified as an autonomous independent system while also being a component or dependent part of a whole. Capra shows that such multileveled systems have been found to evolve more rapidly and have a much better chance of survival than hierarchies or non-stratified systems. "At each level there is a dynamic balance between self-assertive and integrative tendencies and all holons *(author's note: a holon can be defined as an autonomous system that is at the same time a component of a larger system)* act as interfaces and relay stations between system levels" (pp. 281, 282). This suggests a far more workable model of organization for schools using integrative learning than the more usual hierarchical model, which is defined as a fairly rigid system of domination and control in which orders are transmitted from the top down. In contrast, a multileveled organization allows transactions between all levels, ascending as well as descending. The important aspect of such a system is not the transfer of control, but rather the organization of complexity. In the New Age School the levels are represented by the students, the classes, the teachers, the teams, the director and the trustees. Each level operates independently as well as with support and interaction with all other levels. There is consensus decision-making and shared responsibility at each level. Management is shared by the groups at each level and operates by consensus. The result is an educational structure that enhances the worth of each individual and can easily utilize the unique talents of all who are a part of the system at every level.

The Toddler Program

This program includes parents as a daily part of the teaching team. The classroom is developed into centers with activities that address each area of brain function. Spaces and activities are designed for small group, large group and individual instruction. Process skills are of major concern and content is far ranging, including student interests as well as experiences that will prepare these little ones for school skills. The curriculum ranges from singing to pre-reading, from communication skills to animal care. While there are many teacher-designed materials and learning experiences, flexibility is built in to assure that student interests are also included. This program meets one and a half hours daily with a half hour of instruction for parents provided.

The Early Age Program

This program continues the format of decentralization with a more complex structure and wider range of experiences. This classroom is arranged into learning stations with time given to directed learning and also to free exploration. The environment is colorful and presents a variety of areas of learning. Again, spaces and activities are presented to accommodate large groups, small groups and individual instruction. The focus is the development of student independence and responsibility. The curriculum offerings include math, science, reading, art, music and other subjects in which the teacher or the children have an interest, e.g. calligraphy, Japanese language lessons, archeology and wood construction. The lessons offered focus each week on a different theme. Themes that have been used are careers, animals, rainbows, likeness/difference, the human body, etc.

Children in the Early Age classroom develop their independence skills, responsibility and self-esteem by learning to operate successfully in an environment that allows choice, variety and challenge. Each child receives a *"choice ticket"* which gives the child a procedure for choosing the offering of most interest. Each teacher signs the child's ticket for the amount of time the child is with that learning experience. By reviewing the tickets each day the teacher can tell the activities in which the child is most involved and what ones need to be included to balance the child's experience. All of the brain functions are built into each lesson at each learning station. Gradually, as the children grow in their skills, they are supported to take more responsibility and to have more control of their own learning. This program meets mornings from 8:30 a.m. to 12:30 p.m.

The Cross Age Program

This program parallels the structure of the other two programs. However, the choices are now wider and are among several laboratory settings, each staffed by different faculty teams. Following is a sample of the choices:

- a science lab, such as biology, neurophysiology or physics;
- a writing lab, which could include writing and producing plays, novels and poetry, learning the art of illustrating and calligraphy, making paper and developing the skills of the critic;
- wilderness classes where the children learn to live in nature and understand the role of humans in the natural ecology. This study culminates in a four day trip to the High Sierras or to a nearby island in the Pacific Ocean.
- a math lab that allows students to pursue a wide variety of uses of math at their own level and pace.

All offerings include experiences that integrate the four brain functions and each lab is decentralized with a variety of levels of activity available. Youngsters between the ages of 6 and 16 are free to choose any offering they wish to pursue. This wide age range allows the teachers to group flexibly, depending on learning needs, and allows students to move at their own pace. The faculty has found that the students enjoy the mixing of ages, and there seem to be many benefits to such a cross-age structure.

The Cross Age Program meets from 8:30 a.m. to 2:30 p.m. each day with the following daily structure: 8:30 to 9:00 Community and Families—First Community, a meeting of all the children 6 to 16 years in the auditorium where announcements are made, a thought for the day is discussed, a brain teaser is presented (and the solution to the one given the day before is presented by the children) and a group relaxation activity is conducted. From this cohesive beginning, the group then separates into Families, i.e. age alike groups. These groups spend fifteen minutes to a half hour building social-emotional and communication skills, discussing personal experiences, and learning skills to develop strong, positive self-concepts.

From 9:00 to 10:00, Session I provides the students with their first academic class which they choose from the many labs offered. At 10:00 the students reconvene in families until 10:20 for sharing. After a break, Session II, from 10:45 to 11:45, allows the students another academic choice. From 11:45 to 12:00 the students again meet together with an opportunity for scheduled students to share their expertise with the family group. Lunch is from 12:00 to 12:40. From 12:40 to 1:00 the students are involved in thinking skill-building games and experiments. Session III is from 1:00 to 2:15 and includes art, music, drama, and wilderness classes. The students end their day in their family grouping, talk about events of the day and join together for a closing activity. The plan for the week is as follows:

Monday—the two morning sessions provide "one shot" experiences. Students are presented with a wide range of activities which will be available only one time, such as a workshop with a visiting novelist, an open science lab with a visiting heart surgeon, a craft class in soap carving, a music composition class with a professional composer, a class in creating computer games, etc.

Tuesday, Wednesday and *Thursday*—academic choices that follow a six week format.

Friday—trip day. All students who wish may attend field trips designed to involve the community in the learning experience. The botany class may go on a trip to a nature reserve, the drama class might attend a dress rehearsal of the Music Center Repertory Company, or the math class might visit a session of the Stock Exchange in the financial district. Many special events involve the entire population of the school, including many parents. There are overnights at a beach or mountain campsite, four day trips into the High Sierras for the wilderness class, parent night, and a play day. By the last day, the students, faculty and parents are a cohesive, caring community of learners. In six short weeks much change and much learning has occurred. Most important, however, is how much the students have grown. The philosophy and structure of this learning experience supports growth.

As the faculty focuses on integration of function and the intuitive, affective, physical and cognitive growth of the students, there is an unusual amount of positive change. The New Age School Project provides a supportive environment that allows this integrative philosophy to become a part of every activity and every experience. Several years ago a research team from a nearby *University of California* campus concluded that one of the strengths of the program was the loving environment that resulted from this focus. All who have attended or visited NAS consistently and have compared the experience to other group experiences, make the following observations:

- the students are more relaxed; more at ease with themselves and others.
- they are more caring and respectful of each other and of the faculty.
- they are more creative, try more unusual solutions, and engage in more alternative and higher level cognitive activities.
- they initiate more learning activities and are more enthusiastic about their learning.
- they are more highly motivated toward learning.
- they are more independent and responsible.

Individual students have shown dramatic change. Several years ago, a 12-year-old boy who refused to talk came to the program for the summer. His mother assured the faculty that Larry was highly gifted, but had for the past two years refused to talk at school. As a result he had been placed in the learning handicapped program where he continued to remain speechless and uncooperative. She was most concerned and asked if NAS would help. The faculty agreed to try.

About the third day of the program, the students and faculty were together in the Community meeting discussing a quotation regarding the difference between an educated person and a learned person. Larry raised his hand to share his ideas. He stood and began to tell the group that an educated person was like a person who was in a box, and who knew the floor, the walls and the ceiling of the box very well. A learned person also knew all about the box, and, in addition, could go outside the box. This person knew about the whole universe and understood about how people were connected to the universe and were a part of it. Larry suddenly stopped and looked around him. There was a look of real fear on his face. As he looked at the other students, he saw faces turned toward him in interest, listening. He relaxed, smiled and continued his thought. After the Community was over, as the students moved off to their first session, Larry stopped directly in front of me. He took hold of my shoulders, looked me in the eyes and said, "This school is going to be alright."

From that time on, Larry shared freely and enthusiastically with the faculty and other students alike. Later, it was revealed that years before, when Larry had been "expounding" on his ideas in a class, the teacher had informed him that he was again being irrelevant, and if he could not stay on the topic, he was to "shut up." For the next few years similar events happened over and over; different words, different teachers, but the same message, "Sit down and shut up. What you have to say isn't important." So he did; he stopped talking at school. At NAS he found students like himself, who also had questions and unusual ideas, and he found the opportunity to share with them. He discovered a safe place and he grew. There are others, many others, who have come to the NAS Program who were, as one student said, "not flourishing" in their regular school setting. Over and over this environment, this structure, this model, has allowed growth and a renewal of the excitement of learning.

In the years to follow, more emphasis will be placed on the collection of summative and evaluative data. To this time, formative data collection has been the major focus. As more evaluation is made to determine which of the components are more powerful for the students and which of the faculty behaviors are most essential, more will be learned about what is necessary to create optimal learning. For now, all that has been developed is used. The student's experience includes all seven components of the model in the proportion each faculty member finds appropriate to each learning experience. What is now observed is exciting; future investigation seems most promising.

Integrative Education in a Variety of School Settings

Faculty members at the NAS Project teach during the academic year in classrooms from pre-school to senior high school and in a variety of cultural and socio-economic settings. All are using the Integrative Education Model adapted to their individual circumstances. The variety of implementations has been necessarily extensive. It has become increasingly evident that the attitude and belief system of the teacher is most critical to the implementation. While limits imposed by the administration, the community or a variety of circumstances do exist, the attitudes and beliefs of the teacher continue to make opportunities for optimizing learning possible.

In one senior high school, in a barrio community of Los Angeles, a biology teacher who had taught at NAS found his students having difficulty passing tests even though they seemed to understand the concepts being tested. He had gradually been introducing integrative techniques throughout the year, and the students were familiar with all seven of the components. He had originated the lesson on Phagocytosis mentioned earlier in the chapter. He decided to use integrative techniques in the testing experience.

As he passed the examination papers to the students, he placed them face down on the desks. He then asked the students to close their eyes and relax. They were to imagine themsleves turning the exam paper over and reading the questions. He suggested that they notice that there were many questions asking for just the information that they had studied and to be aware of how pleased they felt. He asked them to imagine writing the answers to each question, knowing that these were the correct answers. As he led them through the imagery of test taking, he continuously reminded them of their ability to be successful and repeatedly drew their attention to the positive feelings they were experiencing. He then asked them to open their eyes, turn their paper over and begin. At the mid-point of the exam, he had them stand and massage the shoulders of the students near to them and then return to the test, refreshed and less tense. The results were very rewarding. Many students raised their exam results one grade level, some as much as two grade levels. As he continued providing these experiences during exam periods, he found the students' success rate increasing. He had found a very useful way to incorporate integrative education.

Again, evaluation of the Model in these school settings on a more formal basis has now begun. From informal reports, the results should prove most interesting.

Future Considerations

From the current basic research data on human learning, a model has been developed. The directions seem quite positive and the changes indicated quite important. The experience of implementing these ideas and the Integrative Education Model components in the supportive environment of the New Age School Project has been exciting and productive. As the data collection continues to reveal how and why these changes allow the results now being observed, more will be learned to aid in optimizing learning for all students, especially those with special needs that are not now being met in regular classroom settings. There are many variables, many questions as yet unanswered. Research into brain development and human learning has just begun. It is obvious that the vast potential of human beings, with their amazing complexity, will reveal presently unknown vistas of possibility, and unknown quantities of ability and quality of thought. What is known can be used to begin a quest for more optimal learning experiences for students of all levels of ability. For the gifted and highly able student, such a quest is essential, and it must begin now. This is the purpose of the Integrative Education Model: a beginning point for all concerned with the future of education; a synthesis of all we have known, reaching toward what we have yet to learn; a move toward the creation of more individuals whom we may call learned.

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Discussion Questions

1 The Integrative Education Model *(IEM)* was developed to provide an educational response to several important paradigm shifts occurring in other disciplines. What are those shifts and how do they serve as a basis for IEM?

2 From the view of the new data, discuss the relationship of the following:
a. The emotions to intelligence and optimal learning.
b. The availability of sufficient challenge and complexity to the entire brain system and optimal levels of brain operation.
c. Motivation to integrated brain function.
d. Stimulation from the environment to physical structural changes in the brain and levels of intelligence.
e. The three brain systems to the four areas of brain function.
f. Hemisphericity to integration of cortical function.
g. Anxiety and tension to quality of brain function and retention.
h. Specific areas of function to associative areas of the cortex.

3 The IEM is based on the integration of the cognitive, affective, physical and intuitive functions of the brain. Define each function including its relationship to learning and to the area of function within the human brain.

4 Can it be said that IEM is an inclusive model appropriate for all learners? Why or why not?

5 There are seven components of IEM. Outline them and give the major characteristics, assumptions and provisions of each.

6 In what ways does the IEM use the findings from physiology, psychology and neurobiology to support learning and teaching?

7 Although IEM can be used in a regular classroom, what features make it important for gifted learners?

Jerry Ann Clifford

IV

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Summary

The Learning Enrichment Service (LES): A Participatory Model for Gifted Adolescents

The Learning Enrichment Service (LES) provides a schoolwide support system for better meeting the enrichment needs of gifted adolescents, the school and the community. With its theoretical base in ***The Enrichment Triad Model*** (Renzulli, 1977) and ***The Revolving Door Identification Model*** (Renzulli, Reis & Smith, 1981), LES provides secondary educators and administrators with a comprehensive means of coordinating and facilitating enrichment programming in and beyond the regular classroom.

LES is administered by a *resource team* that facilitates the coordination of and communication between enrichment programs within the schools—for teachers of specialized enrichment programming, parents, students and community enrichment contacts. The resource team performs five key services: (1) Using a broad-based definition of giftedness, the team helps the staff identify and *screen* the 15-20% of the school population that forms the enrichment talent pool (ETP); (2) The team acts as a *training* service, facilitating enrichment activities for teachers and students in and beyond the regular classroom; (3) It encourages *networking*, linking students to school and community resources and enabling them to explore in-depth career and academic interests through these resources; (4) The team provides *counseling*, aiding students and staff in planning, developing, implementing, monitoring and evaluating special programs and (5) The team creates an *information exchange* as it identifies its people and print resources and designates them as part of the information bank—a computerized data bank accessible to all learners.

LES offers teachers and their gifted students the opportunity to make every classroom an enrichment classroom where students can pursue specific learning options beyond the regular program. It lets gifted adolescents experience the benefits of both regular classroom-based enrichment activities and specialized withdrawal enrichment programs.

The Learning Enrichment Service (LES): A Participatory Model for Gifted Adolescents

The Learning Enrichment Service *(LES)* is a multi-service, research-based model designed to more effectively meet the developmental needs of gifted adolescents and their teachers (Clifford, Runions & Smyth, 1984, 1985; Runions & Smyth, 1985). By creating a systematic framework for the support and monitoring of independent learning through enrichment across the curriculum, LES acts as a resource network for gifted adolescents and their teachers in both regular classrooms and specialized programs. LES employs the Triad/RDIM approach to identification of giftedness (Renzulli, 1978; Renzulli, Reis & Smith, 1981) and creates participant ownership through greater student, staff, parent and community involvement in enrichment programming. As a participatory model, LES describes and prescribes the involvement of all its participants in the taking of responsibility for the initiation, implementation and evaluation of their participation.

LES provides secondary educators and administrators with a management system for coordinating and facilitating enrichment programming (Figure 1). LES is administered by a *Resource Team* which provides five services: **Screening, Training, Networking, Counseling** and **Information Exchanging** to four learning environments: **Enrichment Talent Pool, Regular Classrooms, Community Resource Pool** and **Specialized Programs.** Through the provision of these five services, LES presents a systematic approach to enrichment: Screening the students in an introductory process to determine interests, strengths and needs; Training teachers, students and community contacts to identify and utilize enrichment opportunities and independent learning strategies; Networking community and school resources; Counseling in response to needs, interests and learning styles; facilitating Information Exchange to encourage interaction and interdependence in the learning experience by creating opportunities for ability and interest groups and learning partners. Through these five services, a holistic support system is created which can be used by all participants, in part or as a whole.

LES offers teachers and their gifted students the opportunity to make every classroom an enrichment classroom where students can pursue specific learning options within and beyond the regular program. It enables gifted adolescents to experience the benefits of regular classroom-based enrichment, specialized withdrawal enrichment and community-based enrichment programming. As a communitywide support system, LES recognizes and builds on existing community resources and encourages parents, community members and practicing professionals to become more involved in school programs and to become effective resources in the education of gifted adolescents.

Acting as a schoolwide and communitywide support system for enrichment programming, LES recognizes and *does not replace* the pre-existing opportunities for enrichment found in the regular classroom, specialized programs and community-based programs.

The three sections of this chapter will describe and analyze the LES model. The first section will detail the model itself, its theoretical and practical foundations and its components. The second section will outline the three step implementation process. The third section will set out evaluation strategies and suggest directions for further research.

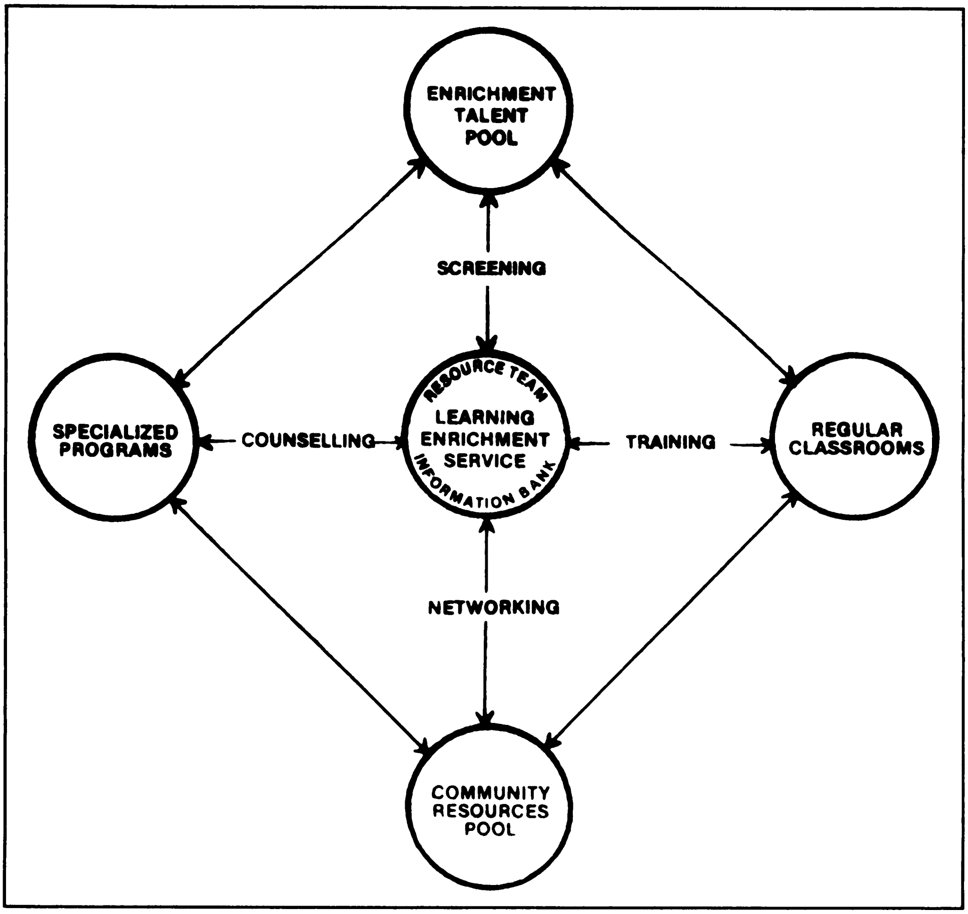

Figure 1. Learning Enrichment Service Model

Foundations of LES

For a model to be meaningful, it must address both the needs of its participants and the realities of the social and political context of education. It must have a solid theoretical research base to show from where it developed and a clear, practical implementation process to show what it can achieve. LES identifies and addresses the needs of gifted adolescents, teachers, administrators, parents and members of the community who are the participants in the secondary school learning process. LES comes at a time in Ontario's history when secondary education is being transformed by the special education legislation (Bill 82, 1980) and by the restructuring of the secondary school diploma (OSIS, 1984). LES recognizes and facilitates this change. The creators of LES—three secondary school teachers—have been influenced by developments in the field of gifted and talented, the ongoing research at the Ontario Institute for Studies in Education (O.I.S.E.) and their own experience as classroom teachers. Through research, interviews and field tests, they have developed a model which is well-grounded in theory and supported by a practice which encourages viable and variable implementation.

The authors' primary aim in designing LES is to better meet the needs of gifted adolescents. Current research in the fields of gifted education and adolescent psychology emphasize that gifted adolescents are first and foremost adolescents, searching for personal identity and social acceptance (Erikson, 1968; Elkind, 1984). The critical questioning by the gifted often intensifies their search and their need for social acceptance and underlines the fact that *"gifted"* is the adjective and *"adolescent"* is the noun.

In their research, the authors found that many gifted adolescents have come to view secondary school as a rite of passage to be endured rather than enjoyed. The students commented that, to become meaningful to them, schools must offer options that recognize and support their abilities and efforts to take more responsibility for their own learning. Students stated that they wanted more options within the regular classroom and a broader participation in specialized programs. They were particularly interested in enrichment options within the regular classroom where they could interact with their social peers while pursuing options that are meaningful, realistic and available for credit (Runions, 1984). In short, the gifted adolescents (*identified* or *unidentified*) and the *underachiever,* need to have options made available which will give them the opportunity, when ready, to develop the skills for independent and interdependent learning.

Interviews with teachers of both regular and specialized programs identified significant needs. The teachers in the regular program not only want to learn more about and do more for gifted students, but also want recognition for what they already do. They expressed a need for a support system to minimize additional workload and time commitment. Teachers of specialized programs needed more effective screening of the students admitted to these programs. They needed to ensure that skills acquired in these programs were transferred to the regular classroom. All teachers commented that changes in educational legislation and fiscal cutbacks have seriously eroded the growth of innovative, specialized programs and have undermined teacher motivation to further develop enrichment programming in and beyond the regular classroom.

Administrators interviewed expressed the need for programs that yield responsible and legitimate results. The more effective monitoring of independent learning projects, the closer liaison with the elementary school enrichment students as they move from grade eight to nine, the protection of existing enrichment programming threatened by declining enrollment and the more effective anticipation of and response to the future needs of the gifted students emerged as key administrative issues and concerns.

Administrators are often the first to respond to the concerns of the parents. Parents expect, because of mandated enrichment, differentiated programs for their gifted children that will change their children's attitude and performance in school. Some parents also want the opportunity to share their skills and talents as resources, not only with their own children, but also with other children. As members of the community of which the school is a part, parents and their business, professional and personal associates want to ensure that the educational system is effective and efficient in its use of both fiscal and human resources. Because of the critical prevailing attitude toward secondary schools, the community wants to do its best to ensure that it has, in fact, the best schools for its children and that it has a part in their excellence.

While the participant needs are important, the political and social realities often prescribe the course of a model's development. Ontario's political climate is creating higher expectations for differentiating programming for gifted adolescents (Smyth, 1984).

Bill 82, the 1980 Amendment of the Education Act, required that each Ontario school board provide, by September 1, 1985, differentiated learning experiences for the gifted through the development and implementation of programs extending from kindergarten through grade 12. This new legislation presents a significant challenge to Ontario secondary schools. Many secondary school communities are neither supportive of nor responsive to this mandated change because they feel it will create more work for teachers for a few students. The task is further complicated by the fact that few program models exist to effectively serve the needs of the gifted adolescents and their teachers.

The advent of OSIS (Ontario Schools/Intermediate-Senior 1984) and the revised graduation diploma requirements also present significant challenges and changes for educators. OSIS reduces the number of years of secondary school from 5 to 4 while increasing the number of credits required for a diploma. A credit is defined as 120 hours of work; students take 8 credits per academic year. OSIS presents many options to acquire modular (or partial) credits through independent learning and community-based programming which offer new opportunities for gifted learners.

The support document, *The Gifted Learner*, charts a systematic approach to the differentiation of program by content, process, product and evaluation in depth, breadth, pace and kind through co-learning (Figure 2). In such a learning partnership, the gifted adolescent is recognized as an equal partner in the initiation, planning, implementation and evaluation of the learning experience. Unfortunately, the higher expectations created by these two major revisions in educational law have come at a time of lower budgets and staff cutbacks, requiring teachers and school boards to make more creative use of their fiscal and personnel resources.

Responding to these needs and realities, the authors draw upon research in the field of gifted and talented education; the research and studies at the University of Toronto's Ontario Institute for Studies in Education (O.I.S.E.) and their practical experiences as teachers of regular classrooms, specialized programs and community-based courses to develop a participatory model.

In the field of gifted and talented, the authors draw from the research of Renzulli (1978) and Clark (1983). Renzulli's behavioral definition of giftedness is most significant to the adolescent years. In this period of high cognitive growth, gifted behavior may emerge where it may not have been visible before. Clark's studies of integrative learning address the important issue of adolescents' affective growth around independence and interdependence during this sensitive and creative developmental stage.

A number of research studies at O.I.S.E. have introduced useful theories and techniques to aid the authors in the development of the model: organizational development (Greenfield, 1973, 1979); innovative change (Fullan, et al. 1972, 1977; Eastabrook & Fullan, 1977); evaluation (Ryan & Greenfield, 1975, 1976; Davie et al., 1979); independent learning (Tough, 1979, 1982; Griffin, 1978, 1983); experientially based alternatives (Levin & Simon 1973, 1974, 1977); needs based research (Abbey-Livingston & Abbey, 1982); qualitative techniques (West, 1976, 1977) and adult learning principles (Brundage & MacKeracher, 1980; Herman, 1982).

The authors have a variety of experiences teaching at the elementary, secondary and post-secondary levels. They have worked with gifted adolescents in regular classrooms, specialized enrichment programs, specialized schools and alternative experientially-based programs (Runions, 1980, 1983) in both the private and public school system. Their shared experiences with gifted adolescents, and their interaction with their

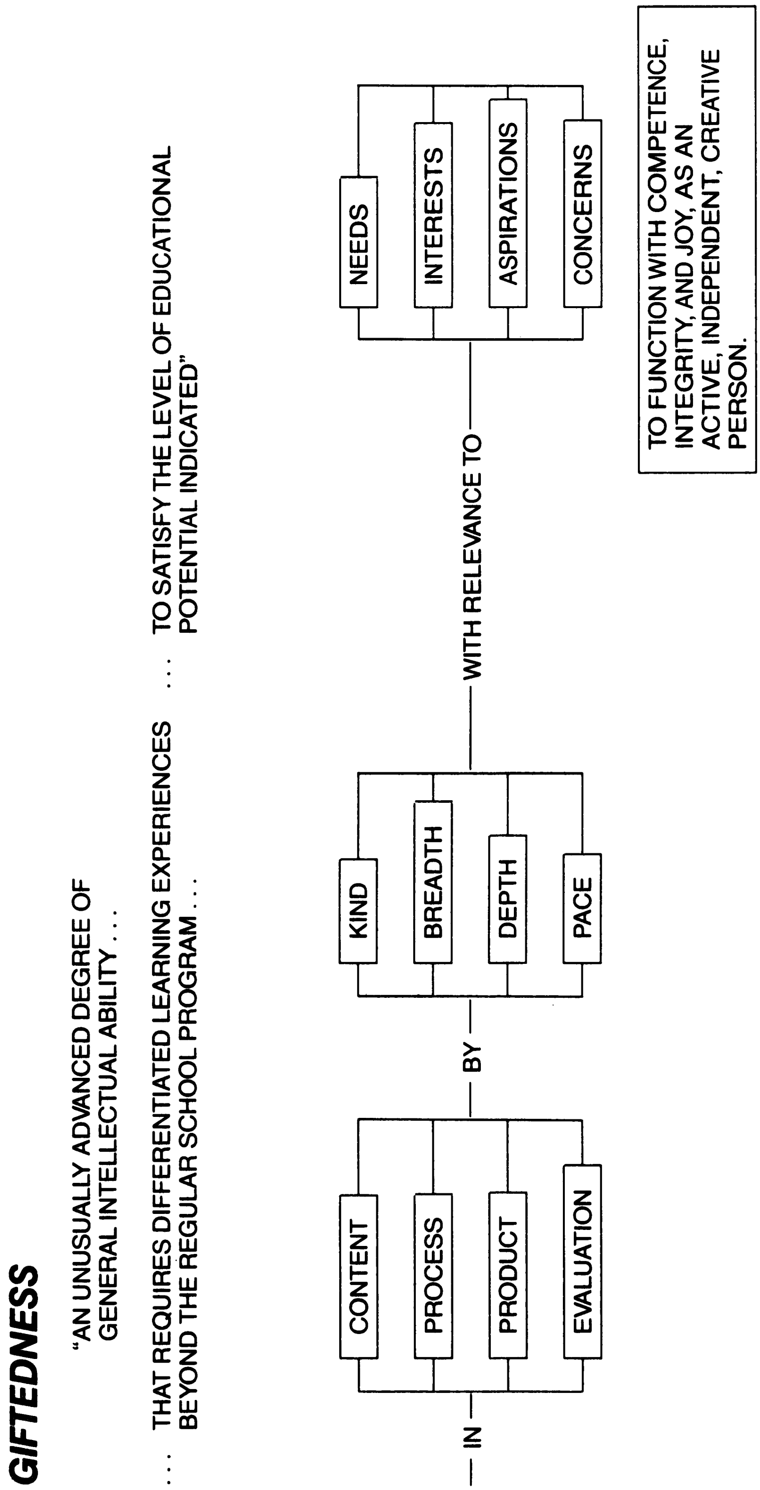

Figure 2. Giftedness
The Gifted Learner (Draft, July, 1984). Ontario: Ministry of Education.

fellow teachers on staff, in university courses and in-service training workshops, have led them to focus on two major issues:

- how to support gifted adolescents who are taking more responsibility for their own learning and the learning of others
- how to support the personnel in the learning environments of gifted adolescents—regular classrooms, specialized programs and the community—in recognizing and responding to this initiative.

To address these issues, the authors conducted an investigation of current programming for gifted adolescents.

Current programming for gifted adolescents falls into two categories: enrichment options within the regular classroom, and withdrawal enrichment programs. In-class enrichment is the response of an individual teacher to the needs of gifted students in heterogeneous classes. Although it provides some differences in program and the opportunity to interact with social peers of all degrees of ability and with their teachers in a unique way, current in-class enrichment is sporadic. It gives little recognition to the teacher's extra commitment of time and energy, and for the student's pursuit of excellence, little recognition is given other than marks.

The demand for a more consistent, administratively simple and identifiable *gifted* program has led to specialized withdrawal programming. These specialized withdrawal enrichment options such as resource room pull-out programs, independent study, advanced placement classes, cognitive development courses and community career exploration programs create opportunities for gifted students to interact with their intellectual peers. However, current withdrawal programs limit the participation of students, staff and community and often label the chosen few. More significantly, interaction between gifted adolescents and their social peers is limited, and the promise of "something better" too frequently becomes just "more of the same."

In-class enrichment and specialized withdrawal enrichment programs often coexist but have limited interaction. Consequently, there is little cooperation; more often, there is competition for people and print resources, for administrative support, for budget, for staff allocation and for students.

In short, there is a need for a comprehensive means of integrating, throughout the school, the mutually supportive enrichment activities found in both the regular classroom and specialized withdrawal enrichment programs. Through the creation of a multi-service support system, administered by a Resource Team, LES meets this need.

The **Resource Team** is the key to the operation of LES. It facilitates the coordination of and communication between enrichment programs within the schools for teachers of specialized enrichment programming, parents, students and community enrichment contacts. The resource team performs five key services:

1. Using a broadbased definition of giftedness, the team helps the staff identify and screen the 15-20% of the school population that forms the enrichment talent pool (ETP). All staff members can recommend students to the ETP according to their individual performance and learning strengths with subjects.
2. The team acts as a training service, facilitating enrichment activities for teachers and students in and beyond the regular classroom.

3. It encourages networking, linking students to school and community resources and enabling them to explore in depth career and academic interests through the cooperative use of these resources.
4. The team provides counseling, aiding students and staff in planning, developing, implementing, monitoring and evaluating special programs.
5. The team creates an information exchange as it identifies its people and print resources and designates them as part of an information data bank accessible to all learners.

Because it originates in a broad research base, addresses the needs of its participants and responds to the sociopolitical realities of education, LES is a participatory model. Ownership is the key to its success. Ownership is a philosophical and practical acceptance of and support for any concept or program. To create ownership for a schoolwide and communitywide resource network for gifted adolescents is a difficult task (Reis, 1983). While the promise of ownership raises the expectations for meaningful involvement of those who wish to participate, the realization of these expectations is complicated by the differing expectations of the participants (Greenfield, 1973). Consequently, for LES to meaningfully involve all its participants and create broad-based ownership, it must be cognizant of and responsive to these expectations during implementation and operations.

Implementing LES

The true test of a theory is in its practice (Argyris & Schon, 1974). For a theory to become a practice, there must be a perceived need for the change suggested by the theory (Fullan, 1982); a willingness to effect change and a supportive framework to facilitate this change (Sarason, 1982). By involving all the participants in the three steps of the implementation—Invitation, Endorsement and Operations—LES transforms change theory into practice and creates opportunities for participant ownership (Figure 3).

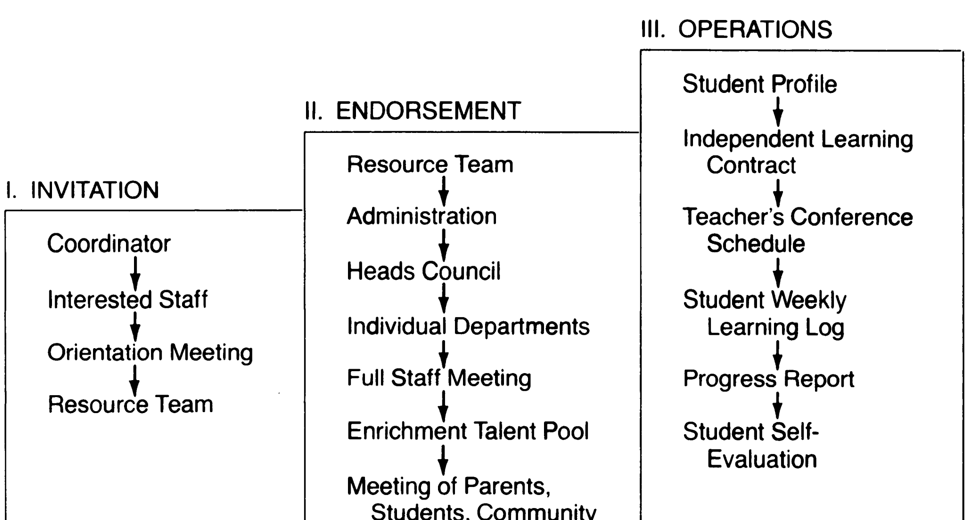

Figure 3. Steps in the Implementation of LES

Step 1: Invitation—Developing the Resource Team

Ownership begins with the creation of the Resource Team which is the key to the operation of the model. The Resource Team is created by the coordinator—the individual who has the administrative support and responsibility for managing the gifted program within the school. The coordinator should be familiar with current research and theory in gifted education, the concepts of Triad/Revolving Door (Renzulli, Reis & Smith, 1981), the principles of networking (Ferguson, 1980; Lipnack & Stamps, 1982; Sarason & Lorentz, 1979; Smith & Wagner, 1980) and adult learning (Brundage & MacKeracher, 1980; Tough, 1979). The coordinator creates the Resource Team by screening the staff, both formally and informally, and identifying those individuals currently working with or interested in working with gifted adolescents. Success begins with supporters (Levin & Simon, 1974). These teachers are personally invited to attend an orientation meeting. To ensure that all interested staff have been contacted, invitations are placed in the weekly bulletin, in individual mailboxes and on the staffroom notice board. The environment for this meeting should be conducive to networking, with comfortable surroundings, refreshments and a timed agenda—strictly adhered to. The orientation meeting has three purposes:

- to familiarize the teachers with current research in gifted education relevant to their own teaching situation
- to recognize and share the expertise which each teacher has gained through their involvement with gifted adolescents
- to invite interested teachers to join the Resource Team.

It should be stressed at this time that membership on the Resource Team is optional and that the time commitment and responsibilities involved are realistic. The duties and functions of the Resource Team are then described.

The Resource Team is a network of interested and involved people whose responsibilities include a commitment

- to attend short meetings as required
- to act as liaisons with their departments, when needed
- to be available, when necessary, to support and advise teachers and students in the operations of the model
- to assist in the training of other members of their departments in the process of enrichment
- to encourage the development of an enrichment resource pool in their departments
- to stimulate and give support to suggestions for enrichment research topics in subject and skill areas.

As a network, the Resource Team does not function as yet another chaired committee. Membership on the Resource Team is an opportunity to share expertise and resources within a setting that is a personally enriching experience rather than an onerous additional responsibility. The coordinator's role is characterized by shared responsibility rather than sole responsibility; it is the role of facilitator, not chairperson (Runions & Smyth, 1986). The orientation meeting should end with the nucleus of the Resource Team being created.

The subsequent meetings of the Resource Team focus on the training activities: outlining the model, its theoretical basis, components and operations; examining a step-by-step case study to aid in the understanding of the various phases in the student's contact with LES; creating a realistic timeline for the implementation of the model; deciding upon evaluation strategies; considering the possibility of documenting the implementation process for research purposes. All research referred to in the course of these meetings should be available to members of the Resource Team and any interested staff members and should form the basis of a collection of professional resources.

The inservicing of the various departments by members of the Resource Team begins the networking phase of the model. This phase of implementation is most effective when all departments are represented on the Resource Team. It may be necessary to recruit members from departments not represented at the initial meetings. However, it is equally important to remember that LES is a service—an option that staff and students use when ready. The Resource Team must realize that not all staff or students will wholeheartedly support or need the service. Teachers who do not initially respond may respond to later reminders or personal invitations. Once the service is in operation, specific examples may persuade those who are initially hesitant to become involved. As the model expands, the Resource Team should become a Resource Network, enlarging its membership through the inclusion of students, parents and members of the community. Initially, though, the key to the Resource Team is the staff.

It is crucial that during implementation, communication among team members and with the staff be continuous. The questions, criticisms and concerns arising from the initial contacts with the staff should be freely discussed at open meetings of the Resource Team. Early planning should focus on strategies to seek endorsement for the model from the decision-making groups within the school community. Because this is a networking model, informal communication is as important as formal communication. LES must not be perceived as the *"gifted club"* with select membership and activities. Participant ownership helps to minimize the apathy or antagonism that is sometimes the response to independent, segregated gifted programs.

Step 2: Endorsement

In each school there is a hierarchy of responsibility for decision-making which must be addressed and from which must come support. But for ownership to develop, support must come from the staff. Staff members should recognize their potential to become an integral part of the service. Consequently, those ready to participate should be encouraged to do so and be provided with opportunities to take active roles.

The **Enrichment Talent Pool** *(ETP)* acts as a springboard for staff participation. Initially, the ETP is created when all teachers in the school recognize and identify the students who display gifted behaviors in their subject areas. At a staff meeting chaired by the Resource Team, the staff is introduced to the model and instructed on the broad-based identification of giftedness (Renzulli, 1978). Using a checklist of characteristics of gifted behaviors, the staff then nominates students to the ETP. This process recognizes the important role of the teacher in LES. Since teachers are also asked to identify both achieving and underachieving students, the openness of LES to all types of giftedness is underlined.

With the support and cooperation of the staff from all subject areas, the ETP is created. A memo listing the ETP members and subject area(s) in which the student was recommended should be circulated among the staff. This annotated list encourages a better understanding of giftedness and may dispel assumptions that the gifted are gifted in all subjects and at all times.

Networking—the process of identifying and developing resources in and beyond the school community—takes place when departments are encouraged to identify skill development units, instructional sheets and learning activity packages which may be useful to the Resource Team in training students to become independent learners.

Small group department meetings, facilitated by members of the Resource Team, determine potential learning activities and topics for possible independent investigation within the courses offered (Figure 4). Teachers may need further training in the operations of the model so they can see what happens when a student decides to pursue independent learning. The technical procedures—compacting, time management, monitoring and evaluation—become clearer if concrete examples to illustrate each step of the process are given. Live role-playing or videotaped scenarios have been helpful here. Networking recognizes the efforts of individual teachers and departments to identify existing enrichment opportunities and resources and to use LES as a focus for enrichment within their respective departments.

1. Identify students for SCREENING/EXPLORATION, to determine interests, abilities, needs for independent study.
2. Identify students as potential RESOURCE CONTACTS because of achievements, interests, expertise (skills, knowledge).
3. Identify SKILLS ("How to . . .") needed for particular subject areas or courses (references, information, instruction).
4. Identify TYPE I/TYPE II ACTIVITIES for small group/entire class, facilitated by LES.
5. Identify TEACHERS in particular subject areas as RESOURCE CONTACTS (skills; expertise; knowledge; experience; interest).
6. Identify COMMUNITY RESOURCE CONTACTS for particular subject areas.
7. Identify TYPES OF ACTIVITIES/TOPICS which students may pursue as either BONUS marks or PARTIAL CREDIT components in particular courses, or at the JUNIOR/SENIOR levels.
8. Identify other ways in which LES can support teachers/students.

Figure 4. How May A Department Use LES?

Throughout the implementation, the flexibility of LES is an asset. Suggestions for strategies and refinements may be made by staff and members of the Resource Team to respond to the specific needs of a school and community. It is essential that communication takes place between the departments and the Resource Team through the respective team representatives who are the active links in the network. Problems, issues, concerns and suggestions should be immediately addressed and, if required, acted upon.

After the Resource Team has been established, support has been given by the administration and staff, and the staff has been trained, the ETP members and their parents are introduced to the philosophy, components and operations of the model. This initiative acknowledges the research that the gifted adolescent wants to take more responsibility for determining what is to be learned, with whom and under what conditions, and to become a catalyst for his or her own learning and the learning of others (Runions, 1982). LES can create that opportunity.

After the formation of the ETP, a meeting is held with identified students and their parents. At this meeting, the screening process is explained and the ways in which the model can be used in both the regular classroom and specialized program are demonstrated. The message that LES is a service to respond to and give structure to learning initiatives is emphasized. LES is presented as a way to achieve credits within and beyond the school setting and to win recognition for initiative and excellence.

The response from these parent meetings is enthusiastic! Parents comment that their daughter's or son's real learning strengths and interests are being recognized and supported for the first time. Parents see for themselves a new role in the education, not only of their own children, but also in the education of themselves and others. This meeting provides an excellent opportunity for community networking. By developing and distributing a community resources questionnaire, the Resource Team can facilitate unique and personal channels of communication between the school and home. By also inviting members of community service organizations and the local press, a broader community awareness of LES is created and the Community Resources Pool is initiated.

All participants have now been trained and given the opportunity to participate. LES is ready to begin full operation.

Step 3: Operations

Because LES is a facilitating framework, its operation is integral to its implementation. Through its use, participants begin to understand its practice and potential. LES needs to be identified with a physical space in the school building to become a concrete reality. With the open and varied use of this space as a small conferencing room—easily accessible to students and staff, individually or in small groups—and not as a classroom or resource room, LES communicates its differences. The space contains the open files which document students' progress on independent learning projects and a message board for notices of events, seminars, workshops and daily changes around conferencing times. The paper management system associated with this space is kept to a minimum and consists of the following forms:

- Student Profile (Form 1)
- Independent Learning Contract (Form 2)
- Teacher's Conference Schedule (Form 3)
- Student Weekly Learning Log (Form 4)
- Progress Report (Form 5)
- Student Self-Evaluation (Form 6).

Initial student interest in LES is sparked from a variety of initiatives: recommendation by self, peers, parents, teachers, community; advertisements about the services offered; invitations to attend special seminars and activities. Whatever the initiative, the subsequent contact results from a high motivation to pursue an area of interest through independent learning.

A student approaching LES is first interviewed by the coordinator or member of the Resource Team, and together they complete a Student Profile (Form 1). In addition to demographic and career interest information, the student is asked to identify friends or family members who share similar interests or skills. In this way, peer nomination of

LEARNING ENRICHMENT SERVICE

STUDENT PROFILE

Name: ______________________ Year: __________
Address: ______________________ Level: __________
Phone:

Timetable					

Referral: Teacher ______ Peer ______ Parent ______ Self ______ Community ______
Major Academic Strength(s) ______________________
Minor Academic Strength(s) ______________________
Learning Strengths: Writing ______ Reading ______ Thinking ______ Speaking ______
Learning Style Assessment: ______________________
Extra Curricular Activity(s) ______________________
Non-School Activity(s): Part-time Job ______________ Hours/week ______________
Recommended in: ______________________
Career Interest(s) ______________________
Areas of Interest (Specialized skills) ______________________

____

Students with similar Interests/Skills ______________________
Family Interests/Skills ______________________

ENRICHMENT SERVICES RECORD

Date	Request	Referred by	Result/Recommendations

Form 1. Student Profile

other students to the ETP is facilitated and the Community Resources Pool can be enlarged. During this interview, options are detailed; the student can use the services of LES to pursue independent learning as follows (Figure 5):

For Non-Credit

- For the personal *pleasure* of learning: pursuing an area of academic or non-academic interest apart from the school curriculum

- For *screening:* entering into a specialized program which requires demonstrated independent learning skills.

For Credit
- For *bonus marks:* taking on an additional responsibility to improve marks in a course
- For *individual curriculum differentiation:* compacting out of a class and pursuing an independent alternative assignment
- For *partial credit:* pursuing studies related to a guideline, to accumulate one-quarter credit for each thirty hours studied (OSIS, 1984)
- For *full credit:* studying existing courses independently with special arrangements with subject teachers and LES
- For *upgrading:* completing units to improve knowledge and skills necessary for a particular subject, and moving from general to advanced level credits (OSIS, 1984).

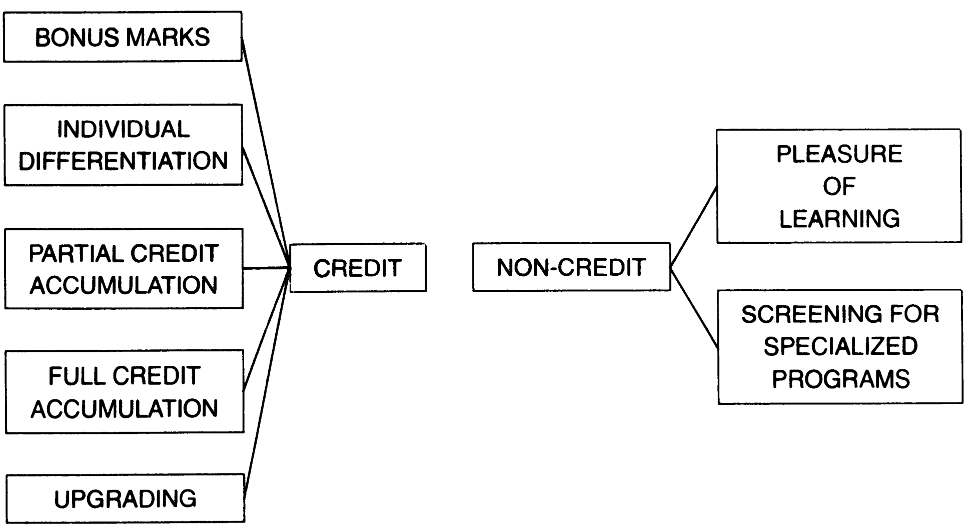

Figure 5. Student Options Through LES

Regardless of the option chosen, an Independent Learning Contract (Form 2) is drawn up. The Independent Learning Contract has many and varied uses. It helps students become aware of their independent learning style and to develop the strengths of that style (Butler, 1984). It continuously evaluates their capabilities in the areas of decision-making (Can the student overcome the initial and ongoing hurdles in structuring the project?), organization (Can the student organize time, energies and efforts to complete the task?), communication (Can the student effectively share ideas and insights with the teacher and other interested individuals?) and responsibility (Can the student meet weekly deadlines and self-defined objectives?). The Independent Learning Contract process teaches the student how to learn independently (Maudsley, 1979).

LEARNING ENRICHMENT SERVICE

INDEPENDENT LEARNING CONTRACT

STUDENT ____________________ BEGINNING DATE ____________________
TEACHER ____________________ ESTIMATED ENDING DATE ____________________
COURSE/GUIDELINE ____________________ DATE ____________________
LES CONTACT ____________________ Credit __________ Non-Credit __________

Area/Topic of RESEARCH

CONTRACT		
Intended Purpose(s)	Intended Audiences	Intended Products/Outcomes
STUDENT	TEACHER	LES
Responsibilities __________ Signature	Responsibilities __________ Signature	Responsibilities __________ Signature
GETTING STARTED		
People Contacts	Place Contacts	Print Contacts

Form 2. Independent Learning Contract

The chosen option determines the conditions of the Independent Learning Contract. If used as a screening option for admission into a program requiring demonstrated independent learning skills, it is an agreement between the LES contact and the student. This contract should last for no more than ten hours (Figure 6). Experience has shown that ten hours is sufficient to assess the student's independent learning readiness. A longer contract may result in a significant drop in student motivation. If the contract indicates that the student needs further training in a skill area, help is given. If the contract is used as credit option, it is an agreement among the LES contact, the student and the classroom teacher who grants the credit.

LEARNING ENRICHMENT SERVICE

INDEPENDENT LEARNING ASSESSMENT

Hours Required: 10
Time Limit: One Month

Required Activities

1. Choose a topic to explore.
2. Complete an Independent Learning Contract indicating what resources you will use and how you will use them.
3. Keep a Student Weekly Learning Log on which you record what new information was learned and what you have learned about yourself as an independent learner on each activity pursued during the independent study.
4. Share the results of your study with at least two others and record their reactions.
5. Meet with Learning Enrichment Service once a week while working on the study.

Figure 6. Independent Learning Assessment

The Independent Learning Contract consists of (1) the participant's written agreement of mutual responsibilities and details of an end product, (2) the Teacher Conferencing Schedule (Form 3) which outlines on a weekly basis the progress of the student and (3) a Student Weekly Learning Log (Form 4) which records the hours spent, resources used and problems encountered. This contract forms the weekly basis for conference discussions. In addition to meeting with the classroom teacher who grants credit, the student meets with the LES contact on a weekly basis. These conferences generally last ten minutes. Because the student who uses LES has been screened and is learning how to manage independent learning, additional time is usually unnecessary.

When the student completes the Independent Learning Contract, the product (or outcome) is evaluated by the LES contact, the student and the classroom teacher. If the contract is for credit, the classroom teacher assigns the grade and grants the student

LEARNING ENRICHMENT SERVICE

TEACHER'S CONFERENCE SCHEDULE

Student's Name ______________________________

	DATE	PROGRESS	PROBLEMS	PLAN(S)
1.				
2.				
3.				
4.				
5.				
6.				
7.				
8.				
9.				
10.				
11.				
12.				

RECOMMENDATIONS FOR FURTHER INDEPENDENT LEARNING

Form 3. Teacher's Conference Schedule

LEARNING ENRICHMENT SERVICE

STUDENT WEEKLY LEARNING LOG

Student ______________________ Week ____________

Topic ______________________ Total Hours ____________

DATE	ACTIVITY	TIME	WHAT WAS LEARNED/RESOURCES USED	DIFFICULTIES/ FUTURE PLANS

Form 4. Student Weekly Learning Log

credit or bonus marks. The LES contact evaluates how well the student managed the learning on a weekly basis (Form 5). The student evaluates the independent learning experience in terms of resulting personal growth (Form 6). The LES contact may further conduct an evaluative interview, helping the student to better understand the matching of expectations with results and assessing personal growth. The product (or outcome) generated by the contract is shared with the student's class or with interested individuals in a symposium setting, giving the gifted adolescent an opportunity to discuss the Independent Learning Contract, its product and a personal assessment of the experience.

In any setting, facilitating change is not easy. The perceived inflexibility of the secondary school makes change even more difficult (Sarason, 1982). In theory and in

LEARNING ENRICHMENT SERVICE

PROGRESS REPORT

Student ______________________________ Date ______________
Topic ______________________________
Teacher ______________________________
LES Contact ______________________________
Product (Title and/or Brief Description)
____

SCALE
4 Outstanding
3 Above Average
2 Average
1 Below Average

Number of hours student(s) worked on Product ________

Factors Assessed

1. Early Statement of Purpose ______
2. Problem Focusing ______
3. Level of Resources ______
4. Diversity of Resources ______
5. Appropriateness of Resources ______
6. Logic, Sequence, and Transition ______
7. Action Orientation ______
8. Audience ______
9. Overall Assessment ______
   A. Originality of the idea ______
   B. Achieved Objectives Stated in Plan ______
   C. Advanced Familiarity with Subject ______
   D. Quality Beyond Age/Grade Level ______
   E. Care, Attention to Detail, etc. ______
   F. Time, Effort, Energy ______
   G. Original Contribution ______

Other Comments:

Credit ☐

Non-Credit ☐

Person completing this form ______________________________

Form 5. Progress Report

Adapted from: Renzulli & Reis (1982) "Student Product Assessment Form (SPAF)" in Renzulli (Ed.).
Technical Report of Research Related to the Revolving Door.

LEARNING ENRICHMENT SERVICE

STUDENT SELF-EVALUATION

Name: ______________________________ Date: ______________

TOPIC(S):

1. What do you like best about independent learning?
   Why? ______________________________
2. What were the most difficult steps? How did you overcome the difficulties? __________
3. What new skills have you learned in working independently?
4. In what ways was your plan of action reasonable and creative? In what ways might you have improved your plan?
   Ways it was reasonable: Possible improvements:
   Ways it was creative:
5. Who else was interested in your independent learning? What did they find most interesting? ______________________________
6. In what ways have other people been helpful? ______________________________
7. What other ideas do you have for independent learning? ______________________________
8. In what ways were you an independent learner before this program? ______________
9. In what ways have you become a more independent learner? ______________________
10. In what ways has your family been supportive for independent learning? ____________

Form 6. Student Self-Evaluation
Adapted from: D. Treffinger (1981). **Fostering Independent Creative Learning.** *Williamsville, NY: CCL Press.*

practice, LES creates a facilitative framework for effecting change. By encouraging gifted adolescents, their parents, teachers, administrators and members of the community to play a more active role through the implementation of LES, participant ownership is actualized. Evaluation further facilitates this process by becoming an integral part of the implementation, through the description and documentation of the change and the measure of its impact. (See Figure 7 for an overview of the system).

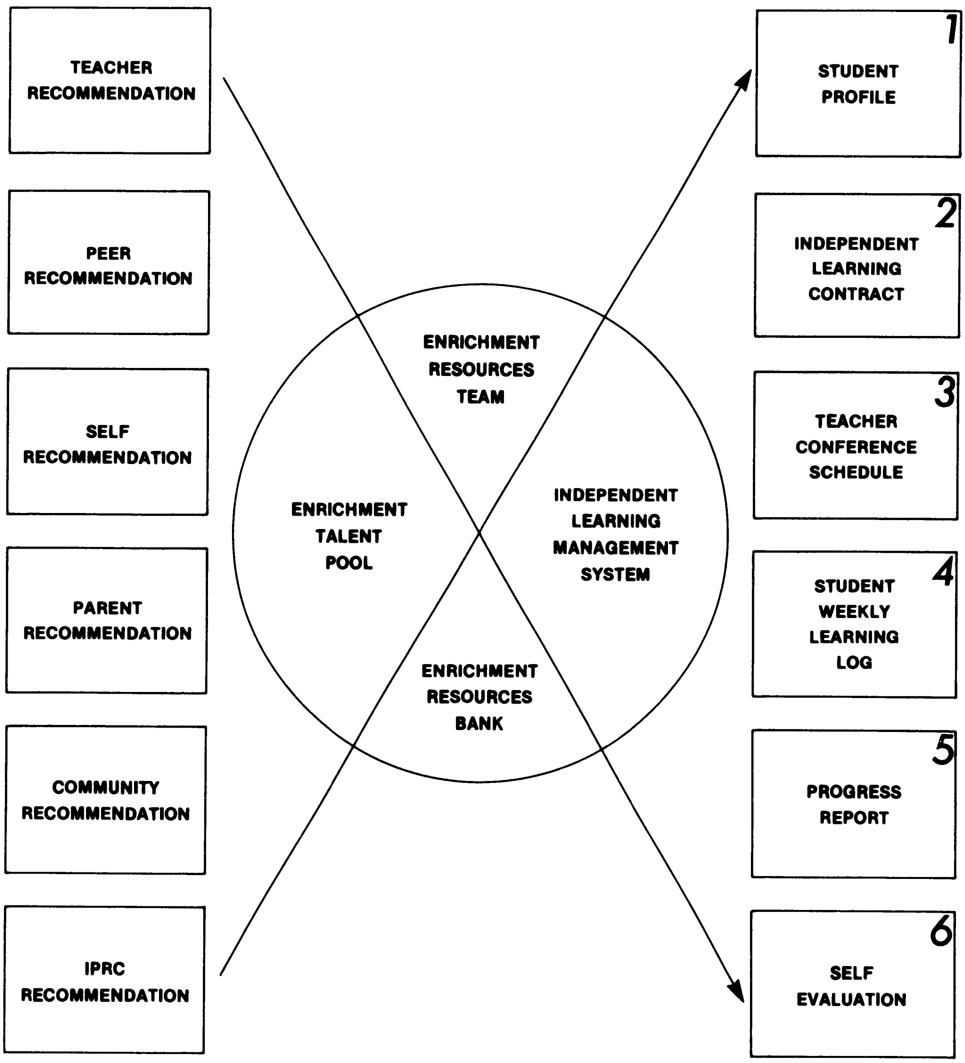

Figure 7. LES Operations Flow Chart

Evaluation and Further Research

In a recent interview, Dr. Joseph Renzulli commented, "*I think that evaluation of gifted programs is the single most creative endeavour in the evaluation technology today. In a number of ways, it stands as a last frontier for evaluation methodology and research.*" (Buescher, 1984, p. 7) A participatory approach to evaluation is an example of such a creative endeavour. Through its use, the participant ownership central to LES can be documented, analyzed and understood. Building on the theory of participatory evaluation, this section will detail and describe a variety of exemplary and exploratory techniques and strategies drawn from the fields of qualitative and quantitative research to use in the evaluation of LES.

Participatory evaluation is part of the evolving "*naturalistic responsive*" approach in qualitative evaluation (Eisner, 1975, 1979; Guba, 1978; Guba & Lincoln, 1981;

Parlett & Hamilton, 1972; Patton, 1978, 1980, 1981, 1982; Stake, 1975). The approach to evaluation is "*naturalistic*" in that it

- has a phenomenological basis
- focuses on description and understanding
- supports the discovery and verification of propositions
- takes a holistic view of what is being evaluated and how that evaluation is structured
- works from an emergent design mode
- is conducted in a selective, rather than intervention mode
- deals with multiple realities and the importance of values (Guba, 1981).

The commitment of qualitative evaluation is to be factual, descriptive and to express the experiences of participants in their own words and through their own perceptions (Lofland, 1971). The evaluation is "*responsive*" when it is oriented more directly to program activities, rather than to program; when it reports differing value perspectives on successes and failures of the program (Stake, 1975). "*Responsive*" evaluation is a systematic, continuous and interactive process of involvement,

. . . a cycle of activities which include in general order: talking with program staff and audiences to identify the program scope; developing an overview of program activities; discerning program concerns; conceptualizing program issues and problems; identifying data needs relative to issues previously generated; selecting observers, judges, instruments; observing contacts, activities and outcomes; preparing portrayals, scenarios and case studies; validating, confirming or disconfirming of prepared evaluation propositions; formatting of reports for audience use; and assembling of formal reports. *(Barnette, 1984, p. 32)*

Key to understanding the nature of naturalistic responsive evaluation is an appreciation of the role of the evaluator.

The nature of the evaluator's role has been described by a number of researchers and is important to the comprehension of participatory evaluation. Guba and Lincoln (1981) describe the evaluator as a "*human instrument*" having the capacity to be responsive, to be flexible, to see organizations as holistic entities rather than as components, to rely on both propositional and tacit knowledge and to search for that which is both expert and atypical. Patton (1982) describes the "*consultative style*" in which evaluators and information users are partners. The effect of this style is to aid decision-makers and information-users in sharing in the responsibility for evaluation, ensuring that they understand the evaluation, thereby increasing ownership and commitment. The participants as well as the decision-makers are "*stakeholders*" and must learn how to evaluate.

When working with a group of people in an evaluation process, the situation can be defined as partly a training exercise aimed at empowering the participants to assert greater control over program implementation and outcomes through their increased knowledge about understanding both program and evaluation processes. When a program evaluation is defined as a learning opportunity for participants learning about program evaluation as well as learning about the program being evaluated, the evaluator is helping build an increasingly sophisticated group of consumers able to better use information for program improvement. *(Patton 1982, p. 303)*

In this way, evaluation becomes more than findings in a finished report.

Although it is part of the "naturalistic responsive" approach insofar as it is collaborative, the participatory evaluation of LES goes beyond this approach, with participants becoming the key evaluators rather than relying on an external professional. It is the role of the LES coordinator to facilitate, *as a participant*, this shared process of evaluation. The coordinator's role as evaluator is as *an equal partner* in the evaluation process. Adapting the techniques of SHAPES (Shared Process Evaluation System) (Davie et al., 1979) to LES, the participants are made responsible for the generation of evaluation criteria, the gathering of data which reflects these criteria and the judgment of what was worthwhile, based on these criteria. The participants prepare and present their findings to decision-makers, plan strategies to involve future participants and to increase participation. Their shared participation creates advocacy, not just reflective judgment and critical documentation (Marino, 1981). This process not only helps people to better understand themselves and increase their awareness of problems and issues, but also raises their commitment and organizes them as change agents in and beyond the program.

The evaluation of LES necessitates the use of a variety of evaluative techniques to create a more purposeful and composite picture of the quality of participant involvement. Many techniques common to quantitative and qualitative research are used: interviews, questionnaires, case studies, life histories (Bogdan & Biklen, 1982); and some future methodologies: delphi, trend analysis, scenario, conceptual mapping (Carney, 1976; Hencley & Yates, 1974). Specific tools used in the evaluation of gifted programs are adapted to LES: Student Product Assessment Form (SPAF, Reis & Renzulli, 1981); guides to student self-evaluation (Treffinger, 1981) and the Style Differentiated Instruction (SDI, Butler, 1984). Most of these approaches are utilized to document the use of the LES management system, assessing the operations of the five services: *screening, training, networking, counseling,* and *information exchanging* in the four learning environments: *enrichment talent pool, regular classroom, community resources pool* and *specialized programs.*

Formal and informal evaluation is continuous throughout the operations of LES. Students receive weekly comments during conference times and give comments through the Student Weekly Learning Log and Student Self-Evaluation forms. Parents, community members and mentors offer their responses through written comments, spontaneous telephone conversations and scheduled school/community meetings. Teachers offer evaluation to students when they see them in class or individually through conferencing. Administrators give and receive evaluation information through progress reports by students and teachers, through formal and informal observation and through discussion with visitors to the program whose objective insight often provides valuable data. All participants are invited to give feedback at scheduled evaluation events—symposiums, presentations and meetings. At the end of each semester, written formative and summative evaluation reports are prepared through the analysis of the data gathered from the use of the five services by the four learning environments (Figures 8 and 9).

The most creative endeavors for evaluating LES are found in the varied uses of visual tools to document, analyze, monitor and present the participatory process in part or as a whole. Such visual tools are important to the participatory process because they picture the process in its complexity and subtleties, present its dynamism and spark action leading to further participation (Marino, 1981; Patton, 1982).

Visual documentation is becoming a very important and useful evaluative research tool. Although rooted in a long social science tradition (Bateson & Mead, 1984; Becker,

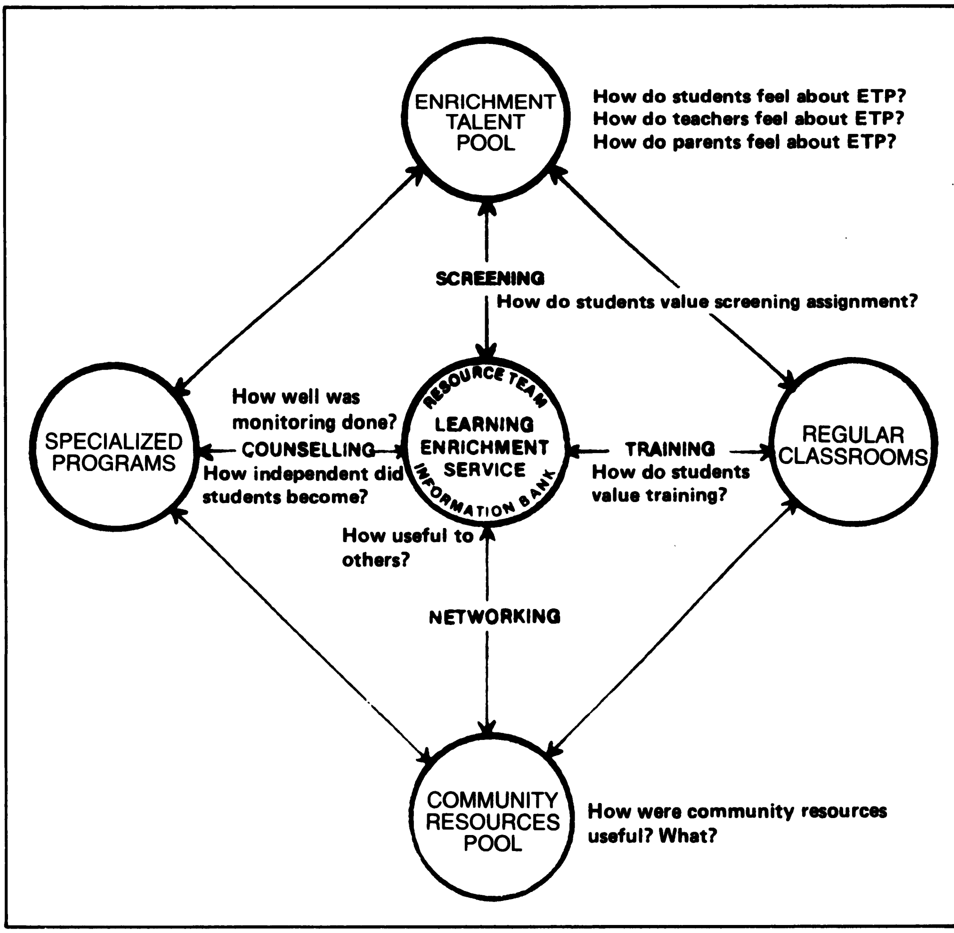

Figure 8. Structuring a Qualitative Evaluation of LES

1979; Collier, 1967; Hockings, 1975; Wagner, 1979), it has only recently received wide attention. More evaluators and researchers are using visual documentation as a research tool because

In the collection of data

- it is more descriptive than words
- it aids the participants with their memory and study of detail
- it is a popular medium and acts as a stimulus for gathering data
- it creates a visual framework for understanding and classifying events of daily life
- it often takes less time than detailed note-taking of the experience
- it gives a continuous and detailed record of the change process in which the participants are sharing.

In the analysis of data

- it presents the many dimensions of reality and creates a new understanding of the subjective

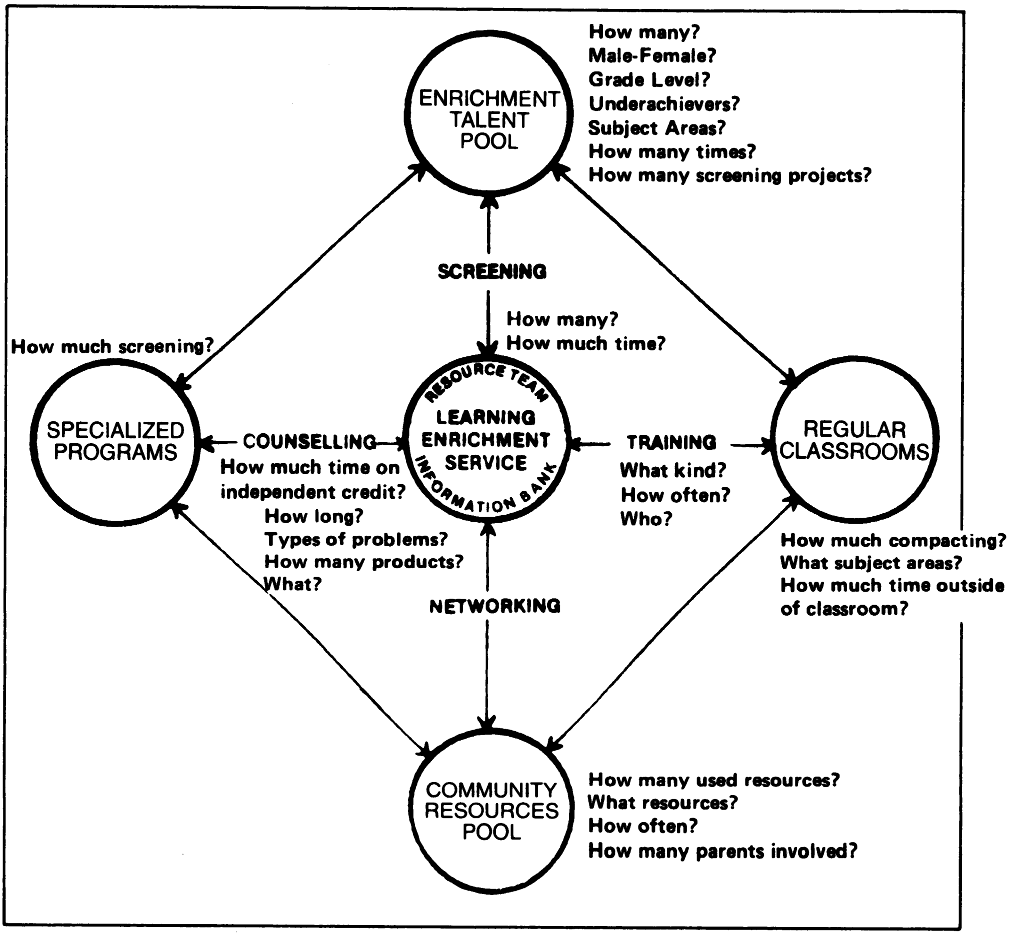

Figure 9. Structuring a Quantitative Evaluation of LES

- it helps the participants see patterns, relationships and aspects of life from a different perspective
- it can often give clues about hidden values and perceptions
- it can act as factual evidence for keeping inventories and organizing the data
- visual recall of the documentation increases reflective analysis and increases participant analysis with its immediate feedback.

In the presentation of data

- it often creates a more persuasive total picture
- it presents the reality of the experience ("seeing is believing") which is an effective tool for decision-making
- it is compact, easily transported and accessible at any time
- it presents a means of vicariously living the experiences of the participants.

One visual tool that is the focus of ongoing research and development is the Participatory Matrix (Figure 10). The Participatory Matrix can be used by individuals or groups to document and detail participation in LES. It is a means of visually communicating the interaction among specific services, their products and key participants. It can be used on a daily, weekly or monthly basis in a number of ways:

- *as a planner*—generating and organizing activities around the five services which can eventually become a database for computer programming;
- *as an analyzer*—quantifying and qualifying (a) the degree of participation, (b) the roles of the participants, (c) the level of satisfaction of the participants, (d) the patterns of the evolving network;
- *as a communicator*—(a) facilitating group process to identify patterns of use and non-use, strengths and weaknesses of student/parent/teacher/administrator/community networks, (b) presenting the total picture of participation in the model to interested others.

Directions
1. Select by circling the service, e.g. Networking.
2. Detail activities of that service to date, e.g. Some of LES Activities for Networking.
3. Select by circling the type of information required on participation or to be recorded, e.g. Number.

Services	Screening Training Networking Counselling Information Exchange				
Activities	Participants Number Role Level of Satisfaction Network (Names)				
	Student(s)	Teacher(s)	Administration Coordinator(s)	Parent(s)	Community
Mentorships	Total 40	Total 17	Total 9	Total 20	Total 46
Career	10	2	2	4	12
Academic	20	5	3	8	10
Creative	5	1	1	4	5
Seniors	8	1	2	3	25
Juniors	7	8	1	1	4
Service Leadership	Total 17	Total 8	Total 8	Total 6	Total 50
Burlington Cultural Centre	2	1	3	2	6
Senior Citizens Home	5	1	2	1	40
Centre for Inland Waters	5	4	2	3	0
YMCA	6	2	1	0	4
Cablenet (Cable 10)	Total 16	Total 4	Total 7	Total 14	Total 54
Vandalism	7	1	3	2	16
Drugs	6	2	2	6	30
Careers	3	1	2	6	8
Learning Circles	Total 43	Total 5	Total 1	Total 15	Total 8
Science	11	1	0	2	5
Computer	20	1	0	8	1
Nuclear Disarmament	12	3	1	5	2

NOTE: This visual tool can become a record of participation, a menu for a computer program, a way of monitoring and can be detailed further, e.g., career — which ones?

Figure 10. Participatory Matrix

The Participatory Matrix represents a significant step in the development of LES. As any model, LES is necessarily about generalities, but as Alfred North Whitehead has commented, "We think in generalities; we live in details" (Patton, 1982, p. 41). The Participatory Matrix details and generates details of LES in practice.

A second visual tool that is also the subject of research and development is the video camera. The potential of this tool of visual documentation has increased rapidly with the advent of video-portapacks as a simple, compact and affordable tool for immediate feedback. A video recording can be one of the most effective visual tools available to program evaluators today. It expands the impact of photography and other visual tools by capturing the dynamics of life—its interaction and changing reflection. As a prism, it focuses through a greater number of senses; as an instrument of consensus, it allows for greater involvement of the participants. Video recording expands film by facilitating accessibility and quick inexpensive results for the non-expert, allowing more flexibility and participant control and development.

A number of video documentary evaluations (videodocs) are used through LES as participatory evaluative research tools for the collection, analysis and presentation of data. Two different approaches are followed: (1) combining video recording with techniques of investigative journalism to conduct key interviews and report follow-ups (Guba, 1981) and (2) utilizing a cinema verité approach to documentary to express and capture the perspective of the participants' experiences (Mamber, 1974, Rosenthal, 1971, Gwyn, 1972).

Videodoc interviews have been conducted with a number of participants in the learning process. With students, they were used for the following: (a) screening of readiness for independent learning: attitudinal and skill assessment on entry to the program, (b) identifying individual learning styles (how students like to learn independently), (c) group evaluation: taping presentations, symposiums and events and (d) self-evaluation at the end of the program.

With teachers, the interviews were used to look at facilitation skills individually and in group process. Videodocs of community meetings, learning circles, parent and mentor interviews have been produced. In each of these situations, the same format is followed: the taping, the playback and a follow-up discussion.

In using a cinema verité approach, students, teachers, parents and community are given opportunities to videotape their perceptions of LES and learning. These videodocs are useful in discussion of specific and shared issues. This collective investigation, analysis and action is a method of self- and community-discovery allowing individuals and groups to see themselves as others see them, to see what was revealed and not revealed by them and to vicariously share different times and spaces (Gwyn, 1972). These visions are offered at small group or community meetings to sensitize the group or community to critical incidents and can become video files for a participant documentary of the program.

Videodocs have also become an important part of the data bank for training students, teachers, parents, mentors and administrators on independent learning skills, group process and the creation and presentation of video products. They are not commercial documents, but are catalysts for change and are creating a sense of purpose and direction by becoming the ongoing and living history of the LES experience.

A third visual tool whose potential as an evaluation and information facilitator is being developed, is the micronet, *Mentor* (Runions, 1982). Micronets are small, microcomputer-assisted information networks that link individuals and institutions in order to generate and share information resources. The management of one's own learning and the learning of others challenges the cooperative management of information resources. The effectiveness of a micronet to meet this challenge is related to its ability to anticipate and allow for increased utilization of available resources and to give constant and constructive feedback to the greatest number of users at the lowest possible cost. The potential of microcomputers for human resources management is quickly gaining recognition.

Mentor is a microcomputer program that allows the individual learner continuous management of developing information networks more effectively. It is a human resources file used by students engaged in mentorships. The students identify key topics around types of mentors (academic, career, creative, senior, junior, micro) from whom they will be learning. Each key topic is further specified by subtopics. Each subtopic is further refined, based on access to different types of available resources: (1) documented information (book, video, tapes, etc.), (2) people contacts, (3) organizational contacts and (4) associated ideas. The access to these resources is organized by careful identification of types of resources, their locations, their main contact and their best time for contact. Once compiled and detailed, this human resources file is then entered into the microcomputer and updated weekly by the student. *Mentor* frees the learner to pursue interests in different ways supporting self-directed and codirected growth which challenges the learner to be a more competent, responsible, independent, creative person.

As a participatory model, LES is characterized by participant ownership. The evaluation of such a model requires the participants to take an active and meaningful role in the communication of their shared expectations and experiences. Significant research needs to be undertaken to further develop and document the process of participant evaluation through the study of

- the role of coordinator as evaluation facilitator
- the use of unobtrusive methods for evaluating participation
- the impact of video-technology on the evaluation process
- the perceptions of non-participants of participant evaluation
- the long term impact of participant evaluation on the gifted adolescent's self-concept
- the role of the evaluative interview as a technique for self-evaluation
- the impact of participant evaluation on the development of home learning and community learning systems
- the use of participatory evaluation techniques on non-participatory program
- administrative decision-making before and after participant evaluation.

Because of participant ownership, the evaluation of *LES* is unique in every situation:

> *There is no one way to conduct evaluations routinely . . . a successful evaluation, i.e. one that is useful, practical, ethical and accurate, emerges from the special characteristics and conditions of a particular situation—a mixture of people, politics, history, context, resources, constraints, values, needs, interest and chance.* (Patton, 1981, p. 300)

Conclusion

The Learning Enrichment Service Model is a management system to facilitate enrichment programming for gifted adolescents across the secondary school curriculum. Its operative definition of giftedness is broad-based, its identification system is broad-based and its program delivery system is inclusive rather than exclusive. It provides five services: *Screening, Training, Networking, Counseling* and *Information Exchanging* to four learning environments: *Enrichment Talent Pool, Regular Classrooms, Community Resources Pool* and *Specialized Programs* through the development of participant ownership.

LES is a model for change that presents a variety of opportunities for future research. Key to the further development of LES is an investigation of the following:

- the effectiveness of LES in meeting the needs of the unidentified and the underachieving gifted adolescent in the regular classroom
- the impact of LES on the quality and quantity of enrichment opportunities presented in the regular classroom
- the extension of LES to become a facilitator of enrichment for gifted adults in the secondary school and university settings
- the role of LES in developing students and teachers as qualitative researchers
- the use of learning styles research in the operations of LES
- the application of adult learning principles to gifted adolescents' learning
- the development of a networking model for management of the LES Resource Team
- the relationship between independent learning inside and outside of school.

In theory and practice, LES displays both descriptive and normative characteristics as it both documents and prescribes its development (Nash & Culbertson, 1977). Its name is a simplification of a complex process which is evolving and responsive to the constant and changing needs of its participants. Few relationships in the model are simple, linear forces with predictable results. LES builds on the notion of process and perceptions, demonstrating how schooling is affected by complex interacting forces competing for equal attention.

LES has its own totality, a coherent and logical process, given focus within its management system. Adaptability and flexibility, not fundamentalist rigidity and regularity, are the keys to its successful development. LES is based on the assumption that

Learning is a human activity based in experience. It is an event which happens to people and between people. As such, it must be described in human terms, in terms meaningful to particular people in particular times and places. While non-human resources are involved in building a school and environment for learning, these resources do not produce learning directly without the mediation of human action (Ryan & Greenfield, 1975, p. 248).

The aim of the model is active participation, and its

Success is not determined by whether we fully accomplish the aim, but by what happens to us during the journey toward fulfillment. If on this journey we can learn what we value and what others value; if we can make our institutions work on our behalf; if we can forestall the alienation of parents, teachers, students and if we can learn to resolve conflict in order to work for mutually held goals, then much success will have been achieved. The major injustice of this era may be that we have convinced ourselves that there can be no satisfaction until the goal is reached and thus we make no claims for it until the journey ends. But it never does. (Fenstermacher, 1975, p. 238)

 LES is such a journey.

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Discussion Questions

1 What are the characteristics of a participatory model? Explain the significance of these characteristics in meeting the needs of gifted adolescents and gifted underachievers.

2 Using the criteria set out in the introductory chapter of this book, compare the LES model with another model.

3 Assess the impact of the minimal emphasis on identification associated with the LES model.

4 Describe the role of the following individuals in the implementation of the LES model:

a. administrator
b. guidance counselor
c. classroom teacher
d. teacher-librarian
e. department head
f. parent
g. student
h. community resource person

5 Create a timeline for the implementation and evaluation of the LES model.

6 Develop a sequence of inservice workshops to prepare a school for implementing the LES Model.

7 Prepare a budget for the implementation and operation of the model as a two year pilot program.

8 How does the Enrichment Resource Team operate as a network? Explain how this differs from other management teams.

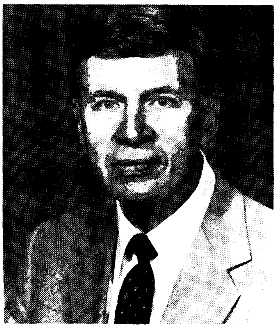
9 Develop strategies for networking enrichment resources within the community.

10 Suggest strategies for creating ownership for the LES model by parents, teachers, community and students.

11 Explain how the affective development of the gifted adolescent can be encouraged through LES.

12 What are the characteristics of "teacher as facilitator"? How can these characteristics be developed?

John Feldhusen



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The Purdue Three-Stage Enrichment Model for Gifted Education at the Elementary Level

The Purdue Three-Stage Model was developed for the purpose of providing a foundation for the enrichment of gifted elementary students. Goals of the model include the development and maintenance of good self-concepts, the stimulation of abilities of bright students by providing opportunities for interaction, and independent work in challenging areas.

Stage I of the Model, *The Development of Divergent and Convergent Thinking Skills*, focuses on fluency, flexibility, originality and elaboration, decision-making, forecasting, and related skills. Activities are selected which prepare a student to deal with questions for which there may be a number of possible answers or questions which require reaching *the* correct or best solution. Stage II, *The Development of Creative Problem Solving Skills*, provides opportunities for students to learn a variety of techniques and strategies which may be applied in a creative problem solving process. Students experience solving real problems which they have selected and refined. Implementation of solutions is a part of this stage. Stage III, *The Development of Independent Study Skills*, allows each student to select a topic or question for individual investigation. By applying a variety of research skills, each student develops the study and prepares a product through which the results of the investigation may be shared with an audience.

The Purdue Three-Stage Model has been implemented in a number of pull-out enrichment programs in Indiana and other states. One such program, PACE, is a state-validated program in Indiana. Research has supported the effectiveness of this model in developing creative thinking skills in elementary gifted students in a pull-out program and maintaining positive self-concepts in students participating in the program.

The Purdue Three-Stage Enrichment Model for Gifted Education at the Elementary Level

Gifted and talented youth have characteristics which are unique or different from average or less able students. For example, Renzulli et al. (1976) list the following as characteristic of students who are very able learners:

1. Has unusually advanced vocabulary for age or grade level; uses terms in a meaningful way; has verbal behavior characterized by "richness" of expression, elaboration and fluency.
2. Possesses a large storehouse of information about a variety of topics.
3. Has quick mastery and recall of factual information.
4. Has rapid insight into cause-effect relationships; tries to discover the how and why of things; asks many provocative questions; wants to know what makes things (or people) "tick."
5. Has a ready grasp of underlying principles and can quickly make valid generalizations about events, people or things.
6. Is a keen and alert observer; usually "sees more" or "gets more" out of a story, film, etc. than others.
7. Reads a great deal on his own; usually prefers adult level books; may show a preference for biography, autobiography, encyclopedias, and atlases.
8. Tries to understand complicated material by separating it into its respective parts; reasons things out for himself; sees logical and common sense answers.

They also list the following as characteristics of highly creative students;

1. Displays a great deal of curiosity about many things; is constantly asking questions.
2. Generates a large number of ideas or solutions to problems and questions; often offers unusual, unique, clever responses.
3. Is uninhibited in expressions of opinion.
4. Is a high risk taker; is adventurous and speculative.
5. Displays a good deal of intellectual playfulness; fantasizes; is often concerned with adapting, improving and modifying institutions, objects and systems.
6. Displays a keen sense of humor and sees humor in situations that may not appear to be humorous to others.
7. Is unusually aware of his impulses and more open to the irrational in himself; shows emotional sensitivity.
8. Is sensitive to beauty; attends to aesthetic characteristics of things.
9. Nonconforming; accepts disorder; is not interested in details; is individualistic; does not fear being different.
10. Criticizes constructively; is unwilling to accept authoritarian pronouncements without critical examination.

These characteristics give rise to special instructional needs. Feldhusen & Wyman-Robinson (1980) proposed the following as special needs of gifted and talented youth:

1. Maximum achievement of basic skills and concepts.
2. Learning activities at appropriate level and pace.

3. Experience in creative thinking and problem solving.
4. Development of convergent abilities, especially in logical deduction and convergent problem solving.
5. Stimulation of imagery, imagination, spatial abilities.
6. Development of self-awareness and acceptance of own capacities, interests and needs.
7. Stimulation to pursue higher level goals and aspirations (models, pressure, standards).
8. Exposure to a variety of fields of study, art, professions and occupations.
9. Development of independence, self-direction and discipline in learning.
10. Experience in relating intellectually, artistically and affectively with other gifted, creative and talented students.
11. A large fund of information about diverse topics.
12. Stimulation to read and access to materials.

A major goal in the education of gifted and talented youth is to help them develop their potential talents to the highest levels of accomplishment. A good education for the gifted cannot be imposed or forced on them. Thus, a second goal is to stimulate or motivate them to strive independently for high level achievement. In essence, this goal is self-actualization or the development of each gifted person to a maximum level of self-fulfillment.

Rationale

The combination of characteristics, needs and goals was used as a guide in developing the Purdue Three-Stage Model for gifted education at the elementary level. The model begins with the assertion that gifted and talented children must first be assessed or identified—a process which determines the presence and levels of special talents and/or abilities. The critical decision to be made is not really whether the child is gifted or not but whether the talents and/or abilities are so high that special educational provisions are necessary. A preeminent need of gifted and talented youth is for instruction in basic subject matter at an appropriate level and pace. A third grader who can read or do math at the sixth-grade level needs reading instruction at or above the sixth-grade level and at a brisk pace. In our Three-Stage Model, we leave this accommodation to be carried out by the regular classroom teacher if the program takes the form of a pullout program. However, an IEP (Individual Education Program) should be used to plan and guide the instruction in the regular classroom.

All of the other needs listed earlier can be dealt with in a pullout/resource room program which involves the child one full day or two half days per week. A second major need is for the development of thinking skills such as those represented in Needs 3, 4 and 5. The Purdue Three-Stage Model uses *Stage I* as the base for teaching simpler thinking skills such as fluency, flexibility, originality, elaboration, imagination and question-asking and *Stage II* to teach more complex thinking strategies such as logical deduction, critical thinking and creative problem solving. *Stage III* of the model involves gifted children in independent, self-directed learning and project activities to begin their early development toward creative production in adulthood. Correlated activities in the Purdue Three-Stage Model provide experiences for the development of self-awareness, the stimulation of interest in higher level occupations, and enthusiasm for reading. Through readings, discussion and other exploratory activities, gifted youth should develop a large knowledge base. They should also experience and profit from interaction with other gifted youth in this model program.

The specific characteristics can also be used to guide development of instructional activities in the Purdue Three-Stage Model. For example, we advocate the development of exploratory reading activities as an outgrowth of the seventh learning characteristic, "*Reads a great deal on his own.*" Similarly, the second creativity characteristic—"*Generates a large number of ideas or solutions to problems and questions*"—leads to a great emphasis on creative thinking (brainstorming in particular) in all three stages of the model activities. All of the other characteristics and needs have been used as guides in designing activities for the Purdue Three-Stage Model.

In the broadest sense, the goals of full utilization and development of talents and abilities and self-actualization are over-arching guides for the model. Teachers are urged to use various affective, self-concept, goal analysis and goal-setting activities in work with gifted and talented youth. Such affective activities must, of course, be continued as the students progress into middle school and through high school if a long range impact is expected.

The Purdue Three-Stage Model is a comprehensive program when coupled with appropriate identification techniques, the use of IEPs to specify and direct the teaching of basic subject matter at appropriate levels and pace, and the teaching of higher level thinking skills. The model is most often implemented as a pullout/resource room program, but applications in full-time, self-contained classes for the gifted have also been successful, as have been applications in cluster-grouped classrooms (three to five gifted children clustered in a regular heterogeneous classroom). It has also been used effectively in organizing special enrichment classes in Saturday, summer, after-school and before-school programs.

Genesis of the Purdue Three-Stage Model

The concept of a three-stage model was first presented in 1973 by Feldhusen, Linden and Ames as an approach to course design for university students. The model stressed learning of basic subject matter at stage one, group activities in problem solving and project work at stage two and individual projects at stage three. Feldhusen (1980a) later elaborated on the model in the book ***The Three-Stage Model for Course Design.***

In 1977 Feldhusen and Kolloff began tryouts of the model with gifted and talented youth at the elementary level. Those trials showed the model to be quite useful but in need of some substantial revisions. With Kolloff as the first experimental instructor, followed later by a number of others, the model took shape and was coded as a system in 1979 in an article in *G/C/T.* In this article Feldhusen and Kolloff (1979a) argued that programs should begin by considering the special needs of each gifted and talented youth. For some, the first and preeminent need is for acceleration or radical acceleration such as early admission, grade advancement, taking reading or math with a higher grade, condensing a three-year junior high school program into two years, taking college courses in high school or early high school graduation. For others, the primary need is for extending enrichment experiences. The Three-Stage Model, as described, is primarily an enrichment model.

Stage I of the Purdue Three-Stage Model begins with instructional activities to teach process thinking skills, especially fluency, flexibility, originality, elaboration, logic, critical thinking, analysis, synthesis and evaluation. Appropriate content and basic skills in science, mathematics and language arts can also be taught in Stage I in conjunction with the teaching of process skills in thinking.

Stage II of the model stresses the learning of more complex and practical strategies and systems which gifted youth can use in advanced studies and project activities. These include convergent and divergent problem solving, inquiry, brainstorming, synectics, morphological analysis and attribute listing. These are typically taught in the context of activities presented and directed by the teacher.

Stage III provides opportunities for gifted youth to experience self-initiated and self-directed study projects using the thinking skills acquired in Stage I and the strategies learned in Stage II. These Stage III studies give gifted youth a chance to learn the role of adult creative achievement and to progress toward self-direction. Stage III activities grow out of the students' own interests and knowledge base and serve to stimulate a deep intrinsic interest in an area of investigation. An overview of the model is presented in Figure 1; Figure 2 contains the goals and objectives of the model.

Stage I

Divergent & Convergent Thinking Abilities

Teacher-Led Short Span Activities
Emphasis on Fluency, Flexibility, Originality, Elaboration
Application of Skills in Various Content Areas
Balance Between Verbal and Non Verbal Activities

Examples of Resources

Basic Thinking Skills (Harnadek, 1976)
New Directions in Creativity (Renzulli & Callahan, 1973)
Purdue Creative Thinking Program (Feldhusen 1983)
Sunflowering (Stanish, 1977)

Stage II

Development of Creative Problem Solving Abilities

Teacher-Led & Student-Initiated
Techniques of Inquiry, SCAMPER Morphological Analysis, Attribute Listing, Synectics
Application of a Creative Problem Solving Model

Examples of Resources

CPS For Kids (Stanish & Eberle, 1980)
Problems! Problems! Problems! (Gourley & Micklus, 1982)
Design Yourself! (Hanks, Belliston, & Edwards, 1977)
Hippogriff Feathers (Stanish, 1981)

Stage III

Development of Independent Learning Abilities

Student-Led, Teacher-Guided
Individual or Small Group Work on Selected Topics
Application of Research Methods
Preparation of Culminating Product for an Audience

Examples of Resources

Big Book of Independent Study (Kaplan, Madsen, & Gould, 1976)
Self Starter Kit for Independent Study (Doherty & Evans, 1980)
Up Periscope! (Dallas Independent Schools, 1977)
Interest-A-Lyzer (Renzulli, 1977)

Figure 1. Three-Stage Model for Gifted Education

Goals

1. Develop gifted students' basic thinking abilities.
2. Help gifted students develop more adequate self-concepts by providing small group interaction with other gifted students.
3. Help gifted students develop their intellectual and creative abilities through challenging instructional activities.
4. Help gifted students become more independent and effective as learners.

Cognitive Objectives

Gifted students will:

1. Produce multiple ideas for various cognitive tasks *(Fluency)* (Stage I).
2. Think of a wide range of ideas for differing tasks *(Flexibility)* (Stage I).
3. Be original and create relatively unique or innovative ideas *(Originality)* (Stage I).
4. Develop basic ideas and fill in interesting and relevant details *(Elaboration)* (Stage I).
5. Ask questions which clarify puzzling and ambiguous situations *(Clarification)* (Stage II).
6. Use effective techniques in solving closed (single solution) and open (multiple solutions) problems *(Problem analysis)* (Stage II).
7. Evaluate alternative ideas or solutions in problem situations *(Evaluation)* (Stage II).
8. Sense and clarify problems in a variety of situations *(Variation)* (Stage II).
9. Evidence self-motivation, direction, and independence in learning and project activities *(Independence)* (Stage III).
10. Synthesize ideas in independent and small group creative project activities *(Synthesis)* (Stage III).
11. Carry out an independent program of free reading at a challenging level appropriate to the level of reading skill *(Implementation)* (Stages I, II, III).
12. Use language effectively in speaking and writing *(Effectiveness)* (Stages I, II, III).

Figure 2. Goals and Objectives of the Three-Stage Model

Feldhusen and Kolloff (1979b) and OrRico and Feldhusen (1979) elaborated on the use of the Three-Stage Model as a vehicle for career education for gifted and talented students. Both articles reported the results of field experiences and special career education instructional units. Kolloff had developed a special unit on the study of famous inventors and OrRico had developed a simulation which called for analysis of several occupations. Both were field-tested and reported in these articles.

In 1981, Kolloff and Feldhusen presented a comprehensive report on the application of their model in all of the elementary schools of a county in Indiana. The school system had adopted the model and given it the name PACE (Program for Academic and Creative Enrichment). Kolloff served as the original director of the project in the county schools. The program was evaluated extensively and selected to be a Demonstration Project for Indiana by the Indiana Department of Public Instruction's Division of Innovative Education.

Gregory (1982) used the Purdue Three-Stage Model in designing art courses for talented students in the Purdue Super Saturday Program (Feldhusen & Sokol, 1982). She reported that the model was highly effective in providing guidance to teachers in the art courses. Flack and Feldhusen (1983) reported on the use of the model in teaching future studies in an enrichment program for gifted youth. They described many activities which Flack had tried out in the PACE program and which were tied to each of the three stages.

Teachers need assistance in developing curricula for the Three-Stage Model. Both Feldhusen and Kolloff teach courses on curriculum development in gifted education. Procedures for developing units are presented by Feldhusen (1980b) in a chapter titled, "Using the Purdue Three-Stage Model for Curriculum Development in Gifted Education" and in the book ***Reach Each You Teach*** by Treffinger, Hohn and Feldhusen (1979).

Identification for the Three-Stage Model

The process of identification begins by securing nominations of students who may be in the gifted programs. This step can be combined with inservice training during the first iteration of the identification process. Since identification is a continuous process, repeated each year, later iterations may involve little further need for inservice training as teachers become more skilled in identifying the gifted.

The **first step** may be viewed as the process of securing nominees for a program. Figure 3 provides a framework of tests and measurements which will all be involved at one time or another in the identification process. For the purposes of this first step, several instruments and procedures are used.

Standardized Tests	Nominations and Recommendations
Intelligence	School Personnel
Creativity	Parents
Achievement	Peers
Aptitude	Self
Checklists, Rating Scales, Questionnaires	Biographical Information
School Personnel	School Records
Parents	Biographical Inventories
Peers	Interviews
Self	Parental Questionnaires

Figure 3. Types of Tests for Identifying Gifted, Creative and Talented

First, for the intellectually gifted, we search intelligence test records and nominate all children with IQ's of 120 and over. There is no magic number here, but if we must rely on group tests with low score ceilings, 120 seems a reasonable cutting point. Teachers may also nominate those whom they believe to be gifted and, if resources are adequate, they can be tested individually for intelligence.

Next, we search the most recent achievement test scores and nominate children who have scored at or above the 95th percentile in one or more of the broad achievement areas such as mathematics, language arts, reading, science, social studies or study skills. The culmination of the first step is to assemble a list of nominees and to begin a summary sheet for each nominee. Figure 4 illustrates a sample summary data sheet. It can be adapted to include the information gathered in any school.

Teacher ____________ Grade ____________ School ____________
Name ____________ (Or Identification Number)
Address ____________
____

Parent Name ____________ Phone ____________

Grades:

Language Arts	____________
Mathematics	____________
Social Studies	____________
Science	____________

Standardized Achievement Test Scores

Language Arts	____________
Reading	____________
Mathematics	____________
Social Studies	____________
Science	____________

Torrance Checklist of Creative Positives ____________

Renzulli Scale Scores

Learning Characteristics	____________
Creativity Characteristics	____________
Motivation Characteristics	____________

IQ ____________ Name of Test ____________

Other Supporting Information

____
____
____
____
____

Figure 4. Worksheet for Identifying Gifted Children

The **second step** calls for the gathering of further information on nominees. In some schools, aptitude or cognitive abilities testing may be possible and, if so, should be secured for all nominees. Alternatively, these test results, if in the files, can be used in step three to identify nominees. The major activity in the second step is to secure teacher ratings of nominees. ***The Scales for Rating the Behavioral Characteristics of Superior Students*** (Renzulli et al. 1976) are recommended. Minimally, the scales for learning, motivation and creativity should be used. Ideally the scales for leadership, art, music and drama should also be secured from teachers who know the nominees in those areas. Teachers must, of course, have inservice training in the use of these scales to assure adequate reliability in their ratings.

Several excellent new rating scales for use in identifying gifted, creative, and talented students have been developed by Male and Perrone (1979a, 1979b). Their scales cover the following areas of ability: creativity, learning, leadership, convergent thinking, goal-related thinking, social skills, divergent/creative thinking, affective thinking and physical skills. These are all rating scales which can be used by teachers or other professional school personnel to evaluate perceived abilities of the gifted. The authors of these scales have done a good job in all aspects of scale development.

In schools enrolling large numbers of students from minority and economically disadvantaged homes, we recommend use of Torrance's *Checklist of Creative Positives* (1969). The scale is useful in identifying youngsters with creative, expressive potentials. Further information for this second step can be secured from school records, biographical inventories or interviews. The interview can be especially useful in assessing children's motivation to participate in a special program.

The **third step** calls for synthesis of the data or information and the tentative identification of students to be in the program. Figure 4 is a model which can be used to assemble all the information which has been gathered. It is best to prepare one such form for each nominee.

The **fourth step** is to select gifted, creative and talented youngsters for the programs. We advocate that a committee of teachers, a principal and the program coordinator be organized to make the final professional judgment of which students have special need to be in the program. The criterion scores for nomination in the first step can be used as guides in making final selections. It is expected that the program coordinator will guide the committee to avoid potential biases.

In the final selection, it is most productive if the use of rigid cut-off scores can be avoided. The ideal program would include all students who need enrichment opportunities as a part of their educational program. This recommendation suggests flexibility in the number of students selected for program activities. Many programs establish a fixed number of participants for each class, but this may result in the exclusion of qualified students or the acceptance of individuals who do not meet the criteria.

Following the selection process, an IEP or Growth Plan should be developed for each student selected. The IEP can specify not only the Three-Stage program as one experience but also other in-school activities such as Future Problem Solving, Olympics of the Mind, or Junior Great Books and out-of-school activities in the arts, museum programs, mentoring, etc. Figure 5 presents a simplified IEP which can be used at any grade level to plan programs for gifted and talented youth.

At the end of the identification process we urge that special attention be paid to borderline cases of children who were not selected but who may nevertheless be viewed by one or more teachers as having special talent or ability. Full discussion of such cases may lead to their inclusion in the program, at least on a trial basis.

In most school systems it will take several years to achieve efficiency and accuracy in the identification process. It is important that there be re-examination and improvement of the process each year. Children who have been identified in previous years and who have performed well in programs should not have to undergo the process each year. After the first year, the major effort turns to the assessment of new arrivals, to the re-examination of borderline cases who were not selected in previous years, and to the evaluation of children who have been in the program.

Name of Student ______________________________

Grade Level ______________ Period Covered ______________

Special Talents, Strengths

____

____

____

Weaknesses, Remedial Needs

____

____

____

Recommended Program Services or Options

School-Related

____

____

____

Extra-School

____

____

____

Specific Learning Objectives

____

____

____

Recommended Evaluation Checkpoint

____

____

____

Figure 5. Individualized Education Program

The Three-Stage Model for Gifted Education

The Three-Stage Model has achieved its widest acceptance as a framework for pullout classes. The organization of the model lends itself to implementation in the elementary grades and the three distinct stages can be integrated effectively into a school year.

Once the identification and selection process has been completed, the students are grouped for instruction. The groups are flexible in terms of size and composition; however, the typical group consists of eight to twelve students at the same grade level. This size permits individual attention to the needs of the students and allows close interaction in the independent study stage. When students at the same grade levels are grouped together, scheduling of pullout classes may be facilitated.

The first few weeks of the program focus on Stage I where the emphasis is on **basic thinking skills,** particularly the major components of creative thinking. Initial activities are selected by the teacher to develop fluency, flexibility, originality, and elaboration. The activities can be based in science, mathematics, language arts, social studies and art and draw upon spatial, verbal or oral modes of expression. Among the specific skills taught is brainstorming: guidelines are presented in Figure 6. Students who have not

Rules:

1. Quantity of ideas is initially the goal.
2. Criticism and evaluation are deferred.
3. Wild, imaginative ideas are acceptable.
4. Hitchhiking on others' ideas is encouraged.
5. All ideas are written down or recorded for future evaluation.
6. After all ideas are generated, evaluation against appropriate criteria takes place.
7. Students learn to contribute ideas succinctly.
8. Students learn to give each participant a chance to present ideas.

Figure 6. Brainstorming

been encouraged to think divergently—to think of many ideas, to produce original responses—often begin the project unaware that there can be many "*correct*" answers to a question or that the unusual response is to be valued. The processes incorporated in Stage I are designed to make students comfortable with divergence. Stage I should also include some work on logical and critical thinking as illustrated in ***Mind Benders*** (Harnadek, 1981) and ***Critical Thinking*** (Harnadek,1976). There is value in teaching the skills of good questioning, imagery, and the higher levels of the Bloom Taxonomy (1956) in Stage I. Students in the program should also be taught to understand the psychological meaning of all these processes so that they can better master and control use of the different modes of thinking. Throughout the school year, Stage I activities are introduced as warm-up and reinforcements of these thinking skills. Activities such as boundary breakers (Sisk, 1975) are excellent warm-ups of this type. A brief summary of divergent thinking abilities is presented in Figure 7.

1. Fluency	How *many* ideas can you come up with? Fluency is the number of responses which are relevant and not repeated within the list.
2. Flexibility	Can you think of another category or another way of looking at the idea? Flexibility is the number of shifts to other ways of looking at the question.
3. Originality	Can you think of an idea that no one else has come up with? Originality is the uniqueness of a response.
4. Elaboration	Can you add to your ideas? Elaboration is the development of an idea by adding descriptive details or relating it to other ideas.

Figure 7. Basic Abilities Involving Divergent Thinking

Using Stage I as a foundation, the second phase of the model begins with the introduction of techniques and strategies employed in creative problem solving. Although initial practice of brainstorming and listmaking is incorporated into Stage I, Stage II begins with the exploration of a variety of approaches to **creative problem solving.** Each is introduced in the context of a problem to be solved. A specific technique is then applied to the problem, giving students an opportunity to practice the particular strategy in an isolated problem situation while receiving guidance and feedback. Morphological analysis, synectics, attribute listing and inquiry are among the creative problem solving techniques introduced in this manner.

The culmination of Stage II is the application of a creative problem solving model to a real problem. A model for creative problem solving (CPS) is introduced and the students are guided through the steps on a practice problem identified or selected by them. Often the problem is one commonly found in school, such as fighting on the playground or litter in the lunchroom. A creative problem solving model is presented in Figure 8. The model shows the cognitive operations required at each stage in the left margin.

Small groups of five to seven are most effective for using the creative problem solving process. This encourages each individual to participate. After grouping the students, the resource teacher explains each of the six steps of the CPS model and guides the students as they practice. Problem sensing allows students to brainstorm responses to a question representing general problems. After listing many of these problems, students narrow down and select the most critical ones. Fluency, deferred judgment and evaluation—important brainstorming processes—are applied in this step.

Stage II, problem analysis, encourages discussion and elaboration of the selected problem. By sharing illustrations of the problem, the group achieves a clearer understanding of the situation; members of the group reach a common understanding of the problem. At this point, it is appropriate to formulate the problem as a question—the next step in the CPS process—prefaced by the phrase "How can we . . . ?" This enables the students to focus on a clearly defined, personalized problem.

Often it is necessary to do research on the topic in order to gain factual information which may further clarify aspects of the problem or contribute to a solution. This may mean a trip to the library, an interview with an expert, a survey of recent newspaper

Processes	
Fluency Flexibility Originality Deferred Judgment	**I. Problem Generation** A. What are the problems our community will be facing during the next few years? Brainstorm problem identification
Analysis Evaluation	**II. Problem Analysis and Clarification** A. What are illustrations of the problem? B. What are things that *cause* the problem? C. What are further problems caused by the problem? D. What are attributes, characteristics or dimensions of the problem?
Synthesis	**III. Problem Identification** A. Restate the problem after Step II discussion. B. State the problem as a question: "How can we . . . ?"
Fluency Flexibility Analysis Originality	**IV. Idea Finding** A. What do we know? B. What information sources can we use? C. What could we do? D. What creative thinking techniques are appropriate? 1. Synectics 2. Attribute Listing 3. Forced Association
Synthesis Elaboration Evaluation	**V. Synthesizing A Solution** A. Pick out the best elements from Stage IV. B. Put together a solution. C. Does it fit the problem?
Synthesis Evaluation Originality Flexibility Evaluation	**VI. Planning The Implementation** A. Who will do what? B. How? When? Where? C. What are the steps? D. What obstacles are likely to arise? E. How can we convince others? F. How can we evaluate the effectiveness of the solution?

Figure 8. Creative Problem Solving Model

articles or a phone call to a local agency. This expanded view of the problem question prepares the students to embark on the idea finding step. It is at this point that a search for solutions begins. Brainstorming ideas for solving the problem is a first step in idea finding followed by the identification of a variety of possible techniques, such as morphological analysis (Feldhusen & Treffinger, 1980), synectics (Gordon & Poze, 1979) and SCAMPER (Eberle, 1977).

After the application of appropriate problem solving strategies, students look over the suggested solutions and select the best one or synthesize the elements which make the best solution. The solution is then compared to the problem statement to see if it fits. Additionally, it is often a good idea to have a "reality check" to determine whether the identified solution could actually be implemented.

The final step is planning the implementation of the solution and determining the necessary steps in the process. Criteria must also be established to evaluate the effectiveness of the solution. Attention is given to the progression through the steps so that sufficient time is allocated to critical steps such as solution finding and so that no step receives a disproportionate amount of time. Early in the process, small groups of students are guided through each step with the resource teacher directing their efforts and monitoring the amount of time spent on each aspect of the process. Once the groups are experienced problem solvers, they can undertake the process with little or no supervision.

Inexperienced or younger students in grades K–3 may benefit from having the problem statement presented to them in simplified form. Feldhusen and Moore (1979) developed this format for creative problem solving, tested it in over fifty primary classrooms, and found it to be highly successful in teaching this process. Older, more experienced problem solvers can use the more complex model presented in Figure 8, but younger students should begin with the simplified model presented in Figure 9.

1. Problem Generation: Children brainstorm problems which face students in their school.
2. The group evaluates the list, discusses the problems, selects the three most serious or important and then selects the one most important. Then it clarifies the problem and states the problem as a question.
3. The group brainstorms solutions to the problem, following the same rules as above. Solutions can be full or partial ways of solving the problem.
4. The group takes the ideas presented in phase three and creates a synthesis for a solution. The solution might be eclectic, but it should hang together. They select out the best elements from phase three.
5. The group develops a plan for implementing the solution. Who, where, how, when? They then write the plan and turn it in for teacher evaluation.

Figure 9. A Simplified CPS Model

Stage III begins after twelve to sixteen sessions on creative problem solving. Topics raised and discussed during Stage II may lead to ideas for **independent study.** The purpose for this component of the model is to allow gifted students to pursue an area of interest and study it independently. A suggested sequence of steps in the process is presented in Figure 10.

1. *Selection* and narrowing of topic
2. *Identification* of possible resources
3. *Formulation* of questions to be answered
4. *Information* gathering
5. *Synthesis* of findings
6. *Development* of final product
7. *Presentation* of study to an audience
8. *Evaluation*

Figure 10. Steps in Stage III

Selection and narrowing of a topic are among the most difficult aspects of the study as gifted students struggle in their search for general areas of interest and appropriate specificity in their final selection. One method of assisting students in defining their interests is the use of the ***Interest-A-Lyzer*** (Renzulli, 1977). Once the area is defined, questions are formulated. These questions become the bases for the independent study. Another early consideration is the availability of sufficient resources to begin the study. The next step, then, is to identify possible sources of information and to make a determination as to their appropriateness for answering the core questions of the independent study. Figure 11 is a list of information sources which will encourage students to consider a wide variety of resources. Information gathering and background reading consume a great deal of time during the next phase of the independent study. It is at this point where guidance is needed to assist the young gifted child in locating, acquiring and organizing the information.

Libraries	Senior Citizen Organizations	Industries
Museums	Travel Agencies	Hospitals
Government Offices	Nature Centers	Artists
Historical Associations	Bookstores	Laboratories
Radio & TV Stations	Universities & Colleges	Newspaper Offices
Greenhouses	Local Agencies	Art Galleries
Courts	Yellow Pages	Graphic/Print Shops
Architectural Firms	Local Businesses	

Figure 11. Sources of Information for Stage III

Various resource skills become necessary and important early in this phase of study. Using the library is often the first step in gathering background information. The assistance of the librarian-media specialist may be enlisted during this stage to instruct small groups or individuals in the use of library resources. The elementary age gifted student will need skills that are usually taught to older students. The encyclopedia is often the first (and perhaps the only) source of information identified by students. While this reference may serve as an initial resource for some areas of study, students must be guided to go beyond the encyclopedia and discover atlases, almanacs, biographies and the many other reference materials available in the library. One technique which has proved successful in acquainting students with the wide variety of library resources is the scavenger hunt. The resource teacher and the librarian may cooperatively design a list of questions which can be answered by using the materials located in the library.

A problem which frequently occurs with gifted students, particularly in the upper elementary grades, is the limitations of an elementary school library. The topics selected by these students may be scientifically or futuristically oriented or may be narrowed to the degree that information is not available in the school library. If junior high or high schools are located near the elementary school, as is often the case, students may seek information there. College or university libraries and public libraries are also possible sources of information on the topics.

Another skill needed by these students is the use of the card catalog. Before attempting to locate the topic or area of study in the catalog, it is best that students list all the possible keywords which may point them to the information. At this point, students should also be instructed in the cataloging system of the library. Young gifted students may locate a book in the card catalog but may fail to find it on the shelf because they are not familiar with the Dewey Decimal System or the Library of Congress System.

The Reader's Guide to Periodical Literature is an aid to many students researching current topics. The librarian and resource teacher should instruct the students in the use of this reference. Again, having key words prepared ahead of time will help students use the *Reader's Guide* more efficiently. Libraries now contain much more than books and filmstrips. The availability of multi-media kits, microfiche, self-instructional programs for the computer and other materials is widespread. In many schools, students are using computer data bases to gather information from libraries and clearinghouses all over the country.

Once information is located, other skills become important. Students must be helped to sort through the available information to locate that which will contribute to their studies. The use of the table of contents and the index should be reviewed with the students. Skills of skimming books and articles to locate information that will contribute to the topic, rather than reading the entire source, will usually have to be taught. Methods of recording information are important. Note-taking, paraphrasing and summarizing will be necessary skills as students collect information. It is most helpful if they are taught to use notecards on which they record both the information in paraphrased language and the source of that information.

A problem sometimes encountered at this time is student reluctance to engage in background reading. A fifth grade student, even though gifted, may feel overwhelmed when faced with five books relating to the chosen topic, some of which may be at difficult reading levels. This seems an insurmountable task, and students sometimes want to circumvent this step. The resource teacher should assist by helping students identify important sections or chapters which relate most clearly to the topic of the study.

Another approach to independent study is the experimental research study. This may involve designing an experiment, developing a survey instrument, gathering and analyzing the results and communicating the findings. The basic research design models and the research skills which gifted students need to learn are presented in Figure 12. As a prelude to conducting research, gifted students must also learn good questioning skills. A list of questioning skills used in the design of a research study are presented in Figure 13. These skills have usually been presented and practiced in Stage II as a part of inquiry methods and creative problem solving. A review and application to the Stage III topic may be all that is needed to get the student started.

Designs:	Experimental	**Skills:**	Observing
	Correlational		Formulating and Testing Hypotheses
	Historical		Interviewing
	Descriptive		Constructing Questionnaires
	Case Study		Surveying
	Action		Sampling
	Developmental		Tabulating and Analyzing Data
			Storing and Retrieving Data
			Communicating
			Constructing Charts and Graphs

Figure 12. Research Designs Skills

1. *Analyzing* an ambiguous situation
2. *Asking* questions which yield useful information
3. *Clarifying* the problem
4. *Testing* hypotheses
5. *Evaluating* possible solutions
6. *Drawing conclusions*
7. *Using information* elicited by other students

Figure 13. Questioning Skills

Other skills which may be used during Stage III are letter writing, telephoning and interviewing. Teachers often assume incorrectly that gifted students know how to carry out these communication tasks. It is helpful to provide an example of a business letter for students to use as a model. Students making telephone calls for information or to set up an appointment for an interview may need suggestions for telephone procedures. In preparing for an interview, a student may need guidance in preparing questions and procedures for an interview. A form to assist students in preparation for these activities is presented in Figure 14. Tape recording an interview may be helpful to the student later in reviewing interviewing skills. Of course, the student should have permission from the individual being interviewed to record the interview.

Topic ____________________
Person Interviewed ____________________
Title ____________________
Date ____________________
Time ____________________
Place ____________________

Telephone ______
In Person ______
Taped ______

Questions To Ask:

1.
2.
3.
4.
5.

Other Possible Sources:

Figure 14. Interview Form for Stage III

The role of the resource teacher then becomes that of a facilitator while students are conducting their Stage III research activities. Ideally, the resource teachers and the library-media specialist will work closely in a partnership for the benefit of students engaged in Stage III. Two excellent resources for Stage III are ***The Big Book of Independent Study*** (Kaplan, Madsen, & Gould, 1976) and the ***Self-Starter Kit for Independent Study*** (Doherty & Evans, 1980).

Throughout the course of the study, plans are considered for the appropriate synthesis of knowledge and presentation to an audience. The list in Figure 15 can be used to remind students of the different forms of product. Other significant learnings may occur during this aspect of the independent study. Media production, art and graphic techniques may be employed as final products are developed and students have opportunities to explore a variety of ways to share their findings. It is important that students carefully plan their products and presentations so that they are well organized. With the assistance of the art teacher or media coordinator, students can learn about techniques for layout of displays, lettering, cover design and related graphics methods.

Model	Filmstrip	Blueprints
Diorama	Puzzle	Book
Poster	Newspaper	Short Story
Computer program	Legislation	Invention
Simulation	Multi-media production	Sculpture
Video-tape	Diagram	Dance
Audio-tape	Demonstration	Puppet show
Slides	Mobile	Game
Photographs	Poem	Display
Play	Painting	Collage
Letter	Musical composition	Cartoon
Diary	Commercial	Comic strip
Chart	Skit	Journal article
Film	Graph	Map

Figure 15. Products for Stage III

Oral presentations should be rehearsed before being shared with an audience. Specifically, introductory statements should be written out and note cards prepared so that the presentation is fluent and complete. Upper elementary students should be encouraged to memorize their note cards. There are many other ways of sharing the findings of a study. A gifted student may create a slide-tape production, an artistic rendering, a film or a newspaper article. Each student must determine the most appropriate vehicle for presenting the results of the study.

Selection of an appropriate audience for the presentation may be done cooperatively by the student and the resource teacher. Outside of school, there may be organizations in the community which can serve as potential audiences such as local cable channels, newspapers, galleries, historical societies and governmental groups. Publishers, state legislatures and professional associations are examples of higher level audiences appropriate for some gifted youth's presentations.

Stage III is the difficult yet rewarding culmination of a series of hierarchically designed activities. For most gifted students it represents a new venture, and while they are excited at the prospects, there may be some problem areas along the way. Some young or inexperienced students are reluctant to select a topic or problem which is new to them, preferring to study an area or question about which they already know a great deal. Guiding the student to a related but unexplored topic is the role of the resource teacher. Occasionally a student will try to skip over the investigation and information gathering steps and begin immediately on the development of a final product. This may be an indication that the student is overwhelmed by the amount of information available or uncertain about how to obtain the information. The role of the teacher in this situation is to assess the readiness of the student to use the information gathering methods and to plan with the student the specific steps which must be taken. Sometimes there may also be a student who is unwilling to bring a project to culmination. Such a student may be fearful of submitting the final product to an audience for evaluation or of acknowledging the study as a finished work. The teacher can assist by establishing deadlines with the student and by encouraging the student to complete the study.

Some Examples of Program Activities

An example of a Stage III independent study topic will be presented next. A sixth grade student, Jon, sought to answer questions about how a hospice program functioned in his community and to explain the roles of the various people involved in a hospice. The final goal of his study was to prepare a product which could be shared with several audiences. The first step was to locate and assimilate general background material on the hospice movement. Armed with this information, Jon contacted the hospice program associated with the local hospital. He arranged an interview with the hospice staff and prepared a series of questions which he would ask. Realizing the potential impact of the responses, he arranged to videotape the interview. Since one of the most critical aspects of the hospice program is the volunteer component, Jon contacted two volunteers and set up an informal conversation between them which was also videotaped. In this discussion, Jon intended that feelings and emotions of the volunteers would emerge to complement the factual information from the professional hospice staff.

Videotaping the interviews allowed this sixth grade student to combine his interest in hospice with a longstanding desire to learn about video productions. Working with a high school junior in the role of a mentor, Jon learned about the equipment used for videotaping as well as the importance of preplanning the interview so that the technical aspects could be coordinated. Following the taping, Jon worked in the studio participating in the editing process and preparing his titles. The finished product, which was shown to school and community groups and potential hospice volunteers, reflected Jon's involvement and growth in many cognitive skills.

Let us now visit three typical classes during the implementation of the Three-Stage Model in an elementary pullout program. The first visit occurred about two weeks into the program and began with a warm-up activity. The resource teacher instructed the students to make a list of yellow foods. She told the students that they should be fluent and try to list as many responses as possible. After five minutes, students stopped and counted the total number of responses they produced. Totals ranged from 14 to 32. Each student marked an individual graph which charted progress in the creative thinking components of fluency, flexibility and originality. The students were then asked to categorize their lists of yellow foods, determining as many possible conceptual classifications as possible. Categories such as fruits, vegetables, drinks, desserts and dairy products were proposed. Then the teacher introduced the term flexibility. Someone had listed only yellow *fruits*. The teacher pointed out that that reflected less flexibility than listing fruits, drinks, vegetables and desserts. The teacher also asked students to see if anyone had a food listed which did not appear on any other list. A pineapple popsicle and saffron rice were the two *original* responses given by two students.

For the next activity, the teacher distributed a series of 8 × 10 pictures of which only a small area was revealed. The remainder of each picture was masked with construction paper. The teacher selected several Norman Rockwell prints for this activity and distributed them among the students. Each student wrote one or two paragraphs based on the small portion of the picture which could be seen. After sharing the paragraphs orally, the students looked at the whole picture and compared their earlier perceptions to what was ultimately revealed.

The remaining portion of the class session focused on a lesson from the Purdue Creative Thinking Program (Feldhusen, 1983). A taped dramatization from the life of Amelia Earhart was played. The tape included a brief discussion of a principle of creative thinking, and follow-up activities provided an opportunity for the application of this principle.

These and similar Stage I activities occur early in the implementation of the Three-Stage Model. They have in common the fact that they focus on the development of creative thinking abilities using a variety of contexts and content areas. The activities are relatively short span and are selected and directed by the teacher. Over a period of several weeks, gifted students become comfortable as they use both convergent and divergent thinking skills and become ready to build on this foundation.

A class working in Stage II a month later was engaged in activities which focus on problem solving skills. The students were spending much of their time working in groups to practice strategies which apply to the process of problem solving. Previous sessions had introduced inquiry and SCAMPER techniques (Eberle, 1977). Morphological analysis (Feldhusen & Treffinger, 1980) was the topic for the next two class sessions. After a brief warm-up activity from Stage I, the resource teacher introduced morphological analysis as a technique for creative problem solving. The students were challenged to create a new fast food sandwich. After determining the necessary components of a sandwich, the students made lengthy lists of possible sandwich outsides, insides and condiments. Each student then developed a new combination of ingredients to make an original sandwich. Elaborating on these solutions, students gave each sandwich a name. As a group, the class proposed criteria against which their products could be evaluated. In preparation for the next class session, students began to create advertisements for their sandwiches. Songs, jingles, slogans and posters filled the classroom. For the next meeting, the students actually made their sandwiches and presented them for evaluation by the class. Each sandwich was accompanied by the advertisement, and a "Fast Food of the Future" award was presented. Morphological analysis or putting together elements in new combinations, had been introduced to these gifted students. They had also had an opportunity to apply the strategy in a motivating activity. Later in Stage II, they would have other opportunities to use the technique, and when the creative problem solving model was introduced, morphological analysis would be a part of the idea finding step.

Stage II emphasizes the development of strategies for creative problem solving. Students gain familiarity with a variety of problem solving processes which they practice using sample problems. Small groups work together in Stage II. The activities in Stage II are of longer duration and have more continuity than those of Stage I. In preparation for Stage III, students explore creative problem solving topics leading to individual interests which may be pursued in the independent study phase of the model.

Stage III begins between three and four months into the implementation of the model. In a class engaged in Stage III activities, students were working individually on the various aspects of their studies. The group had moved from the classroom to the library for this meeting. One boy had been reading about the life of the composer, Beethoven. Charlie was looking for clues to the inspiration for Beethoven's music because he was planning to compose a piece of music as a part of his study. Next to him at the table, Rachel was using several magazines and newspaper articles to write questions for a survey on drunk driving. She surveyed students at several grade levels to determine their attitudes and knowledge about alcohol and its effects.

At the word processor, Erin was writing letters to several agencies requesting up-to-date figures on endangered species. Nearby, Beth previewed a filmstrip that shows some future predictions made in the late 1940's. She examined these predictions to see which of them had occurred. Her analysis also included an assessment of the accuracy of the predictions. The final step for Beth was to formulate some predictions of her own based on trends that she has observed and read about.

Pete was preparing for an interview with a geneticist. His questions were based on the background reading he had completed. His tasks were to make the phone call to set up the appointment and to show his interview questions to the resource teacher.

American architecture was the subject of David's independent study. He had obtained several books from a university library and was using a copy stand and camera to make a set of slides to illustrate a talk he had prepared.

Two students from this group had gone to use the high school library. The elementary library had limited information on their topics: the hospice movement and careers in the medical sciences.

The resource teacher was instructing two students in the use of the *Reader's Guide*. Another student, Sara, was reviewing her contract prior to meeting with the resource teacher. Sara was having difficulty making progress with her study. She had selected solar homes as her topic and had located materials which were too difficult for her. She was also frustrated by her inability to decide on a format for a final project. The resource teacher talked with her, suggesting other sources of information which might not require as much reading. Together they went over an extensive list of possible products to help Sara get some ideas of ways in which she could share her project.

During Stage III, students primarily work independently on the subject of their choice. The study involves application of many information gathering skills and methods of investigation. The culmination of Stage III is a product which communicates to an audience what the student has learned. The resource teacher monitors the progress of each individual student through the use of contracts and conferences. Stage III takes the majority of time for the rest of the school year. Some studies are more involved and complex and may take longer than others, and students may be at different phases of project development.

Young or inexperienced students may be introduced to Stage III by having small groups of students work together on an area of study. Often the resource teacher will propose a broad topic allowing students to select an aspect of the larger topic to pursue individually or in small groups. A single topic allows the teacher to guide the study and focus on the skills needed by the students.

There is a great deal of flexibility in the implementations of the Three-Stage Model. During the first year of the program, more time will be spent on the processes comprising Stage I than in subsequent years. The application of the creative problem solving process may be allotted more time after the first year. Finally, Stage III may involve much more time and more complex research after the students have been in a program for several years and are familiar with the skills and processes of independent study.

Inservice Training for Teachers

Proper implementation of the Purdue Three-Stage Model calls for substantial inservice training for teachers. Such training can take the form of both college credit courses and non-credit workshops. In states such as Indiana where teacher licensing in gifted education has been enacted, much of the training of teachers can be incorporated in the courses required for the endorsement.

During the early phases of program implementations, awareness workshops are needed for all teachers to acquaint them with the nature and needs of gifted students and to teach them about the forms and applications of program models in the United States. It is also anticipated that such workshops will foster favorable attitudes toward the emerging program among the teachers. In many schools such inservice training is carried out at the same time that a formal needs-assessment is being conducted to determine the attitudes and perceptions of teachers, parents, administrators, students and community members toward the potential program.

Another early need is to prepare teachers for their role in the identification process. They need to learn about the nature and characteristics of gifted and talented students and how to complete rating scales such as ***GIFTS*** (Male & Perrone, 1979a), ***Scales for Rating the Behavioral Characteristics of Superior Students*** (Renzulli et al. 1976) or the ***Checklist of Creative Positives*** (Torrance, 1969). This inservice training should include opportunities to try out the scales on real cases and to discuss differences among ratings. Teachers may also be expected to provide initial nominations of students for the gifted program, and for this role they need special inservice training to become aware of the behavioral signs which indicate that a student has superior talent or ability. In this nomination process, teachers have a special need to learn how to distinguish between children who show signs of superior talent or ability and those who exhibit the "good student" social behaviors. The latter behave in ways that please teachers. They are neat and courteous, do all assignments on time, and show enthusiasm for school. Teachers often mistake these behaviors for signs of giftedness.

Inservice education must also focus on curriculum development for all teachers who work with gifted students. What will be taught? When? How? How fast? Much time must be spent learning how to develop a curriculum. The broad sequence for several years and the specific activities for tomorrow are all a part of curriculum. Planning a unit on volcanoes, second degree equations, the American judicial system, the life of Margaret Mead or magnetism involves learning how to write objectives, how to organize and sequence activities, how to test and/or evaluate and how to find the appropriate published instructional material. Teachers who are developing curricula need to know how to incorporate training in such process skills as the Bloom Taxonomy (1956), Talents Unlimited (Taylor, 1974) or Williams' Cognitive and Affective Dimensions

(1970). Excellent guidelines are available for the curriculum development process (Kaplan, 1979; Maker, 1982; Treffinger, Hohn, & Feldhusen, 1979), but teachers need much guidance and time in inservice training to learn how to develop a properly differentiated curriculum for gifted students.

Inservice education of an advanced nature is also needed in the areas of tests, assessments and evaluation. Teachers need to learn how the principles of measurement relate to teaching the gifted, what tests are available, and how to use them, how to evaluate tests, and how to carry out individual assessments in preparation for writing growth plans and for planning class activities. Training in this area most often requires a college credit course and an instructor trained in measurement theory. The course should cover both individual student evaluation and program evaluation.

Inservice training for teachers is a continuous process which must deal with new and emerging topics such as Future Problem Solving, Olympics of the Mind, Imagery, Left Brain/Right Brain Dominance, Metacognitive Skills and Counseling the Gifted. Thus, a comprehensive program must deal with not only the basic topics but also the new concepts emerging in the field. Inservice training has been a continuous process in relation to the Three-Stage Model. Teachers have participated regularly and annually. Their inservice work in curriculum has resulted in a large teaching manual of tried and tested activities (PACE, 1981). This curriculum inservice training has also focused on the published materials in gifted education, their selection and evaluation.

Inservice training of both a noncredit workshop nature and as college credit courses is fundamental to the success of the Purdue Three-Stage Model. We believe that it is also ideal to have a state licensing endorsement program in gifted education to stimulate teachers to acquire higher level training. Some secondary programs have also adopted our Three-Stage Model. Secondary teachers also need intensive training in how to teach math, science, social studies or English to the gifted. It should be recognized that inservice training is a continuous, long-range process through which we seek differentiated approaches to teaching gifted and talented youth.

Coordination With Regular Classroom

A common criticism of resource room/pullout programs is that the student's giftedness and talent is attended to briefly in the program time and totally neglected in the mainstream classroom experience. There is a special need to identify the achievement levels and basic skills of gifted youth and to speed up the pace of instruction for them in all their studies. Thus, we have advocated from the beginning of the development of the Three Stage Model that resource teachers take the initiative in establishing liaison with regular classroom teachers and seek ways to provide continuity of experience between the resource room and the regular classroom. To that end, we begin by urging that the resource teacher be itinerant and that a resource room be established in each elementary building. If the children are bussed to a central resource room, coordination with regular teachers is difficult. We also advocate that there be substantial inservice training for regular classroom teachers so they can learn their role in serving gifted students in the regular classroom and understand better the goals and activities of the resource room.

Resource room teachers should try to coordinate the arrangement of time when gifted students are pulled out so that there is minimal disruption for regular teachers. Ideally, an optimal schedule can be arranged through cooperative discussion at the beginning of the school year. The resource teacher can also help the regular teacher compact (Renzulli et al. 1981) instruction in the regular classroom so that gifted students can have more time for their special studies. Resource teachers can often assist regular teachers in locating special published materials which can best be used to meet the needs of gifted students.

One desirable approach to bridging this gap between the resource and the regular classroom is to use cluster grouping in which all gifted students at a grade level are assigned to one classroom and not dispersed to several rooms. The teacher who has the cluster can then serve as the single liaison with the resource teacher, and the two can plan effectively for each child's total experience. The cluster teacher should receive special training in gifted education and should be selected because of a positive motivation to work with gifted students.

There is a great need in resource room/pullout programs to attend to each gifted student's total school experience. The resource teacher and the regular teacher must plan together to meet the needs of each gifted student.

Research on the Three-Stage Model

An extensive evaluation of the Three-Stage Model as the foundation for PACE was conducted by Kolloff (1983). The program was implemented in eight elementary schools in grades three through six. Approximately 400 students were identified as gifted and randomly assigned to either the PACE program or a control group.

The PACE students participated in the pullout program which was taught by trained resource teachers in each of the eight schools. The program activities were designed to address the goals of the Three-Stage Model. After six months, tests were administered to assess differences between the program and control groups on measures of creative thinking and self-concept. A multivariate analysis of variance yielded a significant difference between the two groups. Subsequent univariate analyses supported the effectiveness of the program in developing both verbal and figural originality in participating students. Fifth grade boys in the program were also significantly higher in verbal fluency than the controls. Measures of self-concept yielded no significant differences between PACE students and the control group. This finding contradicted the outcomes of several other studies which found declines in self-concept among gifted students who participated in a special program.

This research study supported the effectiveness of the Purdue Three-Stage Model in developing creative thinking abilities in gifted elementary students who participated in a pullout program based on this model. Further study is needed to determine the effectiveness of the model in developing problem solving and research skills (Kolloff & Feldhusen, 1984).

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Discussion Questions

1. Which of the characteristics of gifted students relate most directly to capacity for thinking and the learning of thinking skills? How could a teacher use this list of characteristics of gifted students to design instructional activities?

2. What are major advantages of pullout/resource room programs? Disadvantages?

3. What are major strategies or skills which should be taught in Stage II?

4. What do you see as major difficulties in implementing Stage III with a group of 16 children? How would you overcome these difficulties?

5. Consider the identification system proposed for this model. What do you see as major strengths or advantages in using the final selection committee?

6. What are all the thinking skills which you think should be taught in Stage I?

7. How would you schedule and evaluate the presentations by students as a culmination of their Stage III projects?

8. How would you design the inservice program? How much time? When? By whom?

9. How would you develop the specific curriculum for a three-stage program? Where would you get help?

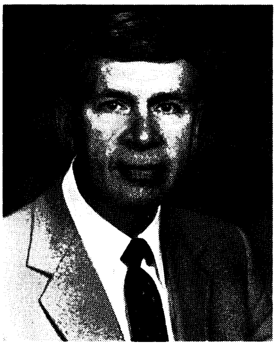
10. What should the role of the regular classroom teacher be in this model? How could the regular classroom teacher help with Stage III projects?

11. How important is it for gifted youth to learn creative program solving? Why?

12. How could this model be implemented in a regular classroom with no pullout? How could this model be implemented in a full-time self-contained class for the gifted?

John Feldhusen

VI



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Summary

The Purdue Secondary Model for Gifted and Talented Youth

The major purpose of the Purdue Secondary Model is to meet the diverse cognitive and affective needs of gifted, talented and high ability students at the secondary level. The model recognizes that students' needs become increasingly differentiated as they progress through educational experiences. The model also recognizes that no single educational experience or program will meet their needs. While some students may need and will benefit from enrichment activities, others need specific accelerative experiences. Still others—and perhaps most—will profit most from an appropriate combination of enrichment and acceleration. Furthermore, the Purdue Secondary Model recognizes that students can display their unique talents and abilities in a wide range of topics and areas.

The model, therefore, is comprehensive in that it attempts to accommodate not only the more common areas of math, science, English and social studies but also areas such as industrial arts, home economics and business. Provisions are also made, within the model, for the visual and performing arts. Therefore, as can be seen, the model is in essence an eclectic approach to gifted education which applies the best features of acceleration and enrichment to the diverse needs of gifted, talented and high ability students at the secondary level.

The Purdue Secondary Model for Gifted and Talented Youth

Fourteen-year-old Jenny is enrolled in a comprehensive high school in a midwestern college community of moderate size. Jenny is a highly gifted adolescent. Her SAT Scores place her at the 90th percentile in a comparison group of students at least one year older than she. She absorbs mathematics at a pace faster than her high school math courses provide it. She has a talent for and an interest in languages and in the past two years has dabbled with Latin and Russian by securing and paying for her own tutors. She wants to graduate early from high school in order to get into a college program in premed.

Identifying Jenny as gifted is not the problem, programming for her is! The school has made some modifications: She has been moved from French III to French IV. However, there is a debate in the counseling office as to how to give Jenny credits for her accomplishments. She didn't really "test out" of French III, so does she get credit for it? If she doesn't, how does the school explain her presence in French IV? Will she receive credit for that course if she has not met the prerequisities?

In math, Jenny has certainly become a programming problem. She can do the course work in one-third the time period required. She has taken Algebra I, Geometry, and is currently enrolled in Algebra II. There is no trigonometry course. She wants to take calculus, so her parents and the school personnel have discussed enrolling her in the appropriate course at the university. No action has been taken at this point.

The high school has some honors sections. However, the differentiation of the curriculum is not made explicit by written course outlines, nor by a systematic effort to prepare students for Advanced Placement examinations. Next year, the math teacher most likely to be teaching the precalculus course is not interested in teaching the course as an honors section.

Jenny is in a school district whose students average one year above grade level on end-of-year achievement test batteries. The district is not faced with extreme financial difficulties or with the need to program extensively for culturally different students. The local university contributes many hours of service to the school and much talent to the school resources. Yet there is no comprehensive programming plan for gifted adolescents in the secondary school.

When Should the Model Be In Place? A Rationale for the Purdue Secondary Model for Academically Able Adolescents

The Purdue Secondary Model for Gifted and Talented Youth could provide the structure needed by school personnel in planning for Jenny's needs (Feldhusen & Reilly, 1983). To be defensible, a secondary school program must be based on the identifiable characteristics and special needs of the gifted adolescent. The lists of characteristics of the gifted in the literature are legion. Some are generalized constructs (creative, motivated, verbal); many more are behavioral (demonstrates intense curiosity). Some have been pragmatically operationalized into cut-off scores (on a measure of intelligence or aptitude) or as an accelerated accumulation of subject matter (completed one year of precalculus math in 70 hours of instruction). The common thread which runs through these listings of characteristics and which surfaces in the discussions of those who have studied gifted adolescents is their capacity to absorb great amounts of information readily and to transform that information in complex and creative ways. Further, there has been great interest on the part of researchers to recognize giftedness in persons who produce new information or make new connections in contrast to those who consume knowledge already produced (Gallagher, 1975; Sternberg & Davidson, 1983). Feldhusen (1984) conceptualizes giftedness as a composite of (1) general intellectual ability, (2) positive self concept, (3) achievement motivation and (4) talent.

These and other characteristics of the gifted have, in turn, led to statements of need in educational programming. One such list generated by Feldhusen and Robinson-Wyman (1980) provides the basis for many of the recommendations made in the Purdue Secondary Model (see Figure 1). Specifically, needs are the foundation on which the Purdue Secondary Model is built. Each need will be emphasized as appropriate in the discussion of the various components of the model.

1. Maximum achievement of basic skills and concepts.
2. Learning activities at appropriate level and pace.
3. Experience in creative thinking and problem solving.
4. Development of convergent abilities, especially in logical deduction and convergent problem solving.
5. Stimulation of imagery, imagination, spatial abilities.
6. Development of self-awareness and acceptance of own capacities, interests, and needs.
7. Stimulation to pursue higher level goals and aspirations (models, pressure, standards).
8. Exposure to a variety of fields of study, art, professions, and occupations.
9. Development of independence, self-direction and discipline in learning.
10. Experience in relating intellectually, artistically and affectively with other gifted, creative and talented students.
11. A large fund of information about diverse topics.
12. Access and stimulation to reading.

Figure 1. Basic Needs of Gifted, Creative and Talented Students

In addition to the particular needs of gifted adolescents, the rationale for the Purdue Secondary Program Model is based upon Feldhusen's eclectic or integrative approach to the education of the gifted (Feldhusen, 1982). This approach incorporates concepts from enrichment, acceleration and extended learning opportunities in order to formulate a suitably comprehensive model. It has been argued that the enrichment/acceleration conflict is an unfortunate and possibly meaningless polarity (Feldhusen, 1984). Narrow conceptualizations of either provision lead to programs which fall short of meeting the diverse needs of the gifted. The single experimental study which compared enrichment and acceleration found that a combination of the two approaches best served the gifted (Goldberg et al., 1966). Studies which have supported acceleration have appeared frequently in the literature (George, Cohn & Stanley, 1979). Evaluations of enrichment programs which indicate positive effects are beginning to appear as well (Kolloff & Feldhusen, 1984). Our present knowledge of best practice should lead educators to be eclectic in providing programs for the gifted. Comprehensive program models should enrich and accelerate; they should use an integrative or eclectic approach. Key terms describing eclecticism are faster pace, higher level, greater depth and cognitive complexity. In summary, the Purdue Secondary Model is derived from (1) the special needs of the gifted and (2) the philosophical perspective that *comprehensive* programs for the gifted must include both accelerative and enriching options.

What is the Structure of the Model?

As stated in the rationale, a premise of the Purdue Secondary Model is that a comprehensive structure is necessary for adequate programming. The comprehensive plan is a program rather than a collection of *"provisions"* for gifted adolescents (Gold, 1980; Tannenbaum, 1983). Whether or not a school district can or chooses to implement all aspects of the elaborated model will be determined by resources—both financial and talent resources. However, the comprehensive nature of the model is deliberate. It should be taken as a recommendation of what *"ought"* to be done. It is left to the specific needs of a school's gifted adolescents and the availability of staff and school resources to select which parts or how comprehensively the model is adopted. The model in brief is presented in Figure 2. The components of the model include those which are functional (i.e., counseling, vocational programs, cultural experiences) and those which are basically modes of delivery (i.e., extra-school instruction and the seminar format.)

Counseling Services

The **Counseling** component of the Purdue Secondary Model for Gifted Education is of primary importance and overgirds the rest of the structure for two reasons: First, the counselor often has the initial responsibility for identification in secondary programs. Because talents and abilities become differentiated at the junior high or middle school level, there is a need to identify the special abilities of gifted adolescents as opposed to identifying the *"all-purpose"* gifted child, as is often done at the elementary level. Second, according to Gowan and Demos (1964), *"poor guidance policies probably lose more able students in junior high school than any other factor"* (pp. 128). Thus, it is important to involve counselors early in the secondary program in order to sensitize them to the needs of gifted adolescents.

For students at the secondary level, there is ordinarily a great deal of identification evidence in the cumulative record including test scores, teacher evaluations, grades, and awards and recognition. Prior performance evaluations in an elementary gifted program may also be available. For students who have transferred into the school fairly recently, it may be necessary to secure some of this information anew, and there may be a need to secure new auditions or ratings for artistically talented students. All of this information is used to arrive at a decision concerning the student's need for special services and for formulating an individual growth plan to specify the services which should be provided.

Counselors also have some responsibility to assist gifted and talented students who are experiencing adjustment problems. Some gifted youngsters are rejected by peers because of their intellectual intensity, some become behavior problems because of boredom in school, and some are disliked by teachers because they are intellectually threatening. In all these cases, counselors can and should provide individual counseling to the students. Counselors in one school in which this model is being implemented

1. Counseling Services
1. Talent Identification 2. Education Counseling 3. Career Counseling 4. Personal Counseling

6. Foreign Languages
1. Latin or Greek 2. French or Spanish 3. German or Oriental 4. Russian

2. Seminar
1. In-Depth Study 2. Self selected topics 3. Career education 4. Affective Activities 5. Thinking, Research & Library Skills 6. Presentations

7. The Arts
1. Art 2. Drama 3. Music 4. Dance

8. Cultural Experience
1. Concepts, plays, exhibits 2. Field trips 3. Tours abroad 4. Museum program

3. Advanced Placement Classes
Open to students in grades 9-12 All subject matter areas

4. Honors Classes
1. English 2. Social Studies 3. Biology 4. Language 5. Humanities

9. Career Education
1. Mentors 2. Seminar experience a. study of careers b. study of self c. educational planning

5. Math-Science Acceleration
1. Begin algebra in 7th grade. 2. Continue acceleration and fast paced math. 3. Open science courses to earlier admission.

10. Vocational Programs
1. Home economics 2. Agriculture 3. Business 4. Industrial arts

11. Extra-school Instruction
1. Saturday school 2. Summer classes 3. Correspondence study 4. College classes

Figure 2. The Purdue Secondary Program Model

meet weekly with small groups of gifted students to discuss problems which are unique to gifted and talented youth. They have used the Learning Tree Filmstrips, ***Feeling Good About Yourself*** (1983), very successfully as stimulus material.

Counselors should also plan for special career counseling for students in the special program for gifted and talented youth. Gifted adolescents need exposure to higher level occupations in the arts, business and professions. Such career counseling can be a part of the activities in the special seminar for gifted and talented youth which is a part of this Secondary model. Moore, Feldhusen and Owings (1978) presented a description of such a career education seminar for junior high students and reported evaluation evidence which demonstrated the program was successful in developing knowledge about and favorable attitudes toward higher level occupations. It should be noted that the important role of the counseling program in the Purdue Secondary Model addresses several of the needs of the gifted as outlined by Feldhusen and Robinson-Wyman (1980). In particular, counselors can be instrumental in helping gifted adolescents develop self-awareness and acceptance of their capacities, interests and needs. They can stimulate talented young people to pursue higher level goals and aspirations, to develop independence and to relate effectively to others. Finally, counselors have the responsibility to expose the gifted adolescent to a variety of fields of study, art, professions and occupations (Needs 6, 7, 8, 9 and 11).

In smaller schools, a counselor can serve as the overall program coordinator for a secondary program for gifted and talented youth, but in a medium or large-sized school it is preferable to have another person, broadly trained in gifted education, to serve as the overall program coordinator. The overall coordinator should be a full-time staff member who devotes major time to program development, coordination and administration and part-time to teaching in the program, especially in the seminar which is described in detail in the next section.

Seminar

In addition to the functional counseling component, the **Seminar** is central to the Purdue Secondary Model. The seminar combines several crucial learning activities, notably the opportunity for in-depth research and the correlated activities of writing, discussion and presentation. The seminar should be led by an excellent teacher-mentor who can organize and lead topical discussions and who can provide guidance in investigative procedures. It is important that the seminar retain its identity and not simply become another class to attend. Examples of successful seminar approaches include those listed in the Career Education component in which gifted youth are introduced to higher level occupations and careers, to the study of self in relation to those careers, and to the educational routes to those careers (Feldhusen & Kolloff, 1979). A second type of seminar, more purely academic in nature, is the library or empirical research investigation of a topic, question, or hypothesis. For example, in one gifted program, an American history course was developed around nine broad statements which students systematically investigated (Hawke, 1975). One of the statements read as follows: *"The majority of the Presidents of the United States have been elected on the basis of personal appeal rather than political philosophy."* Gifted youth were given some basic information by the teacher, provided with "fact" sheets to guide their inquiry, and encouraged to share information in buzz groups. Each investigation lasted approximately one month and culminated in the oral or written presentation of research results which supported or did not support the broad statement. The seminar can provide continuity and a central focus for gifted adolescents along with the opportunity to pursue highly individualized programs of study. Thus, the seminar, like the counseling component, takes on great importance in the model.

Advanced and Enriched Curriculum Opportunities

Several of the blocks specified by the Purdue Secondary Model for the Gifted are recommendations for advanced and enriched curriculum opportunities. Specifically, *Advanced Placement* (Block 3), *Honors Classes* (Block 4), *Math-Science Acceleration* (Block 5), *Foreign Languages* (Block 6), *the Arts* (Block 7), *Cultural Experiences* (Block 8) and *Vocational Programs* (Block 10) fulfill several of the needs listed in Figure 1, notably learning activities at an appropriate level and pace, and exposure to a variety of fields of study, art, professions and occupations (Needs 2 and 11).

Advanced Placement has long been a reliable option for providing gifted youth with accelerated learning experiences in a number of traditional content areas. The College Board now offers 28 college course examinations and course outlines in the following areas:

history	art	biology	chemistry
English	languages	music	mathematics

After completing courses, students take examinations which are submitted to a panel of expert graders who rate performance on a 1-5 scale. Passing an examination at a level of 3, 4, or 5 establishes transferable credit at many colleges and universities throughout the United States (College Board, 1983). Advanced Placement has the advantage of flexibility which removes barriers for gifted youth. For example, students may take Advanced Placement examinations and receive credit even if they have not attended the courses. Secondly, students need not be in high school to take advantage of the Advanced Placement option. If younger adolescents wish to take courses and/or examinations, Advanced Placement graders will score and report results for those students as well. Finally, Advanced Placement has developed and promoted the use of independent study and small group tutorials in schools where insufficient enrollment does not permit a regularly scheduled class.

Block 4, the **Honors Classes** component, is also an option for advanced and enriched curriculum opportunities for gifted youth. Honors classes have a long and distinguished history in secondary and post secondary education (Fenton, 1966). In the strictest definition, Fenton states that acceleration, enrichment for a single gifted adolescent in a class, or ability grouping are not in and of themselves sufficient for an honors class. Ideally, honors programs should be a carefully articulated set of courses offered over several years and characterized by aiming *"for a firmer grasp of the method of a discipline"* than regular academic courses (Cohen, 1966). Special honors classes can be offered in most academic areas. However, mathematics and physical sciences are not included because they require special consideration and will be addressed separately in the following component of the model. Typically, honors classes enroll the top 10-20 percent of students as determined by grade averages and test scores. Although not limited to the gifted and talented, honors classes can offer stimulating learning experiences, particularly if class time is spent in examining the implications and interrelatedness of the material (Fenton, 1966).

Unfortunately, honors classes have occasionally been misused in the service of the gifted adolescent. Honors classes do not constitute a gifted program. Often such courses offer only more work and more severe grading standards. Further complications are possible if the honors class is assigned as a *"plum"* to a teacher with no training or talent for working with highly able youth. When well conceptualized and ably implemented, honors classes can stimulate students' higher level thinking skills. They are an excellent starting point for a district considering the comprehensive Purdue Secondary Model.

Math-Science Acceleration is a part of the Purdue Model. The positive effects of mathematics acceleration have been extensively studied and documented by Stanley's Study of Mathematically Precocious Youth (Stanley, Keating & Fox, 1974). The talent search locates adolescents with high mathematical reasoning ability through the use of off-level SAT testing. Talent searches are carried out in all regions of the continental United States. These mathematically talented youth should begin the math sequence with algebra in the seventh grade and proceed through pre-calculus courses and calculus, if possible, in high school. Similarly, chemistry and physics courses should be available to gifted students earlier in their high school years. Students who demonstrate an aptitude for or an interest in such courses should be permitted to take them.

Mathematics and science courses for the gifted should be fast paced and taught generatively or inductively as much as possible. Wittrock (1974) and Wheatley (1984) have both described a method of instruction which they characterize as "*generative*." That is, learners are actively engaged in creating their own concepts through problem solving, discovery, inquiry, decision making and other forms of active cognitive interactions with the content. While these generative methods are too time consuming to be used exclusively in standard mathematics classes, students who are excellent mathematical reasoners are able to generalize from few examples (Krutetskii, 1976). Therefore, the generative approach is appropriate for these gifted adolescents.

In incorporating a strongly accelerative component in the Purdue Secondary Model, it is important to address a common misconception about such content provisions. VanTassel-Baska, Landau and Olszewski (1984) point out that acceleration does not mean simply moving through the same material faster. Indeed, it scarcely seems appropriate to have gifted adolescents doing the same types and numbers of problems even though they plow through them in fewer class hours. Mathematics and science curricula structured around a conceptual rather than a skills framework permit the gifted to master the content in half the time ordinarily required. Such curricula provide depth; important concepts are treated with greater complexity and given wider applicability. The consideration of complexity and broader coverage of key ideas are important elements of math-science acceleration.

Block 6 presents the recommendation of **Foreign Languages** for the gifted. It seems likely that there are special values for the gifted in studying a foreign language. In addition to the intellectual discipline which language study develops, the study of another language and culture broadens the gifted students' world view. The awareness and understanding of other cultures that comes from the study of another people's language may break down rigidity and narrowness.

While foreign language study has been part of the secondary school curriculum for many years, it is an area of study which suffered greatly in the recent cycle of school retrenchment. Many secondary students with a talent for languages do not have the opportunity to pursue a language in depth. If foreign languages are offered, they are generally not available until 9th grade and may include only a choice of two modern languages. This is too little, too late.

Ideally, the secondary school should make a commitment to language offerings during the middle, junior and senior high school years. However, if this is not possible, opportunities for foreign language study for the gifted should be pursued in other areas. Languages have been offered in the Saturday or summer enrichment format. In addition, foreign language courses have been a staple of the talent search model. The Johns Hopkins program includes Latin and German. The Midwest Talent Search has offered Latin on a regular basis. These fast paced talent search offerings have provided information about the effectiveness of language study for gifted adolescents. For example, VanTassel (1981) studied various approaches to teaching Latin courses for the gifted and found that direct study of Latin, as opposed to study of English-Latin derivations, was most effective in increasing gifted students' knowledge of the structure of the English language—a primary goal of Latin study.

In summary, the advanced placement, honors classes and math-science acceleration components of the Purdue Secondary Model are particularly relevant to several of the needs of gifted adolescents. In particular, these components encourage maximum achievement of basic skills and concepts, learning activities at an appropriate level and pace, experience in creative thinking and problem solving, the development of convergent thinking—particularly logic, the acquisition of a large fund of knowledge and access and stimulation to reading (Needs 1, 2, 3, 4, 10, and 12).

Arts and Cultural Experience

The Arts (Block 7) presents a vital component of the model artistic experiences. Art, music, dance, drama and sculpture represent rich worlds of accumulated aesthetics which can be experienced by gifted youth. In both ***Cradles of Eminence*** (Goertzel & Goertzel, 1962) and ***Three Hundred Eminent Personalities*** (Goertzel et al. 1978), the Goertzels document the dynamic role of artistic experience in the lives of many of their gifted subjects. The arts particularly stimulate imagery, imagination and spatial ability (Need 5).

For students who show exceptional talent in the visual and performing arts, opportunities for immersion, such as summer camps or competitions, are recommended. Such provisions bring talented young people together with one another. The stimulation students find in the company of others who have similar interests should be encouraged by including the arts in the Purdue Secondary Model.

The ***Cultural*** component (Block 8) suggests that the need for cultural experiences can be addressed in a number of ways in the secondary program. They can be incorporated into the seminar with teacher-leaders arranging art and cultural opportunities as out-of-school experiences that take place evenings, weekends and summers. Alternatively, some schools have offered a combination of cultural and art experiences with coursework in the humanities: notably in honors classes in English, history or foreign languages. Art and music appreciation courses can also provide the framework for art and cultural experiences. The art and cultural experiences components of the Purdue Secondary Model are avenues for exposure to the arts and for relating affectively with other talented adolescents (Needs 9 and 11).

Career and Vocational Education

Career Education (Block 9) is a special problem for gifted and talented youth because of their unique need to become interested in and to learn about higher level occupations in the arts, business and professions. Hoyt and Hebeler (1974) presented a comprehensive overview of the special needs of the gifted in career education. They also presented several model program descriptions and curriculum guidelines for career education for gifted and talented students. More recently Kerr (1981) in ***Career Education for the Gifted and Talented*** discussed the career development needs of gifted and talented youth and described a number of program models.

Our Purdue Secondary Model follows guidelines developed by Moore, Feldhusen and Owings (1978) in projects with gifted and talented youth at Columbus and Elkhart, Indiana. This model stresses career exploration and self study in a seminar setting and mentorships in art, business, professional and legal settings. The seminar can be multipurpose, as in programs in these two Indiana cities. There the seminar combines career education, college planning, cultural studies and group counseling.

Vocational Programs (Block 10) for youth with special talents in home arts, business, agriculture and trade-industrial areas is rarely an identified aspect of gifted programs. Often it seems that the vocational areas are viewed as being at the opposite end of the ability spectrum from giftedness and talent. Nevertheless, teachers in the vocational subjects are well aware that some youth show unusual talent or capacity to learn in their classes, and they are making individual provisions through special projects and youth organizations to serve these youth. In his book ***Vocational Education for Gifted and Talented Students,*** Milne (1982) discusses the problems of getting schools to attend to this area and proposes guidelines for developing programs.

We propose in the Purdue Secondary Model that the comprehensive secondary program provide for the identification of youth with vocational talents, that there be a special seminar program for these youth, that growth plans be written for these students, and that this entire effort be viewed as a part of the total gifted program. The commitment to career and vocational programs is an attempt to address the need of gifted adolescents to accept their own capacities and interests, to pursue higher level goals and to learn about a variety of professions and occupations (Needs 6, 7, and 11).

Extra-School Instruction

Not all of the needs of gifted and talented youth can be met in school. Feldhusen & Robinson-Wyman (1980) and Feldhusen & Sokol (1982) have described Saturday programs which provide enriched and accelerated classes for gifted and talented youth from the preschool level through grade 12. Feldhusen and Clinkenbeard (1982) also described three types of summer programs for gifted and talented youth. These programs have all been evaluated extensively and found to be effective in meeting the needs of intellectually and artistically gifted youth (see Block 11).

Schools are inevitably limited in their capacity to provide services for the full range of needs of gifted and talented youth in the regular school program. Saturday and summer programs afford opportunities to teach special topics, to utilize various community specialists, to offer course work in the arts and vocational areas and to offer accelerated or college level classes for precocious youth. A comprehensive program should involve both Saturday and summer programs. Parents and volunteers can often provide invaluable assistance in both organizing and conducting such programs.

How Does A Student Move Through The Program?

Glenn was first identified for a gifted program in the fourth grade. The multiple criteria used by the district included reading, math and composite scores on an achievement battery and the learning, motivation, and creativity sections of the *Scales for Rating the Behavioral Characteristics of Superior Students* (Renzulli et al., 1976).

The district had a policy of using intelligence tests only for problem cases, and no group or individual IQ scores on Glenn were available. Teachers consistently described him as "*creative.*" He showed cartooning talent and was an excellent writer. They also felt Glenn was immature and given to laughing and becoming upset in the classroom at inappropriate times. He was successful in the elementary pull-out program. Given the opportunity to do independent projects, Glenn selected and completed them carefully. He was good at making presentations to the class, although he confided that doing a presentation worried him. One of his most elaborate and revealing projects was a series of cartoons featuring "Marvin, the Lonely Genius." The cartoons were done in pencil, ink and finally on acetate in order to project them on an overhead for the class presentation. The collection included both single frame and multiple frame strips. In the narration, Glenn discussed his choice of Marvin's character, explained how he got ideas for his cartoons and why cartooning was important for people. He said he wanted to develop a character who had "some things right and some things wrong with his life." Glenn remained in the pull-out program for two years. While he was in sixth grade, the resource teacher left and a replacement was hired. Glenn opted not to continue in the program. His sixth grade teacher believed he should have been removed from the program anyway because his math achievement had dropped precipitously. Glenn finished elementary school without special programming.

In seventh grade, screening for the Purdue Secondary Program was initiated by the junior high counselors. A review of test data uncovered an individual intellectual assessment done in sixth grade when Glenn's math achievement was not what his parents felt is should be. During the assessment, a slight vision problem was found and Glenn was fitted for glasses. The assessment indicated that Glenn's score was in the upper 10% of children his age. When the counselor reviewed teacher recommendations, she found that Glenn's seventh grade English teacher identified him as the best writer she had worked with in several years. She felt he needed extra adult attention and inquired about the possibility of finding a practicing writer to be Glenn's mentor.

During seventh grade Glenn worked with a mentor one afternoon per week as a part of the seventh grade seminar for gifted students on career education. His mentor was a journalist, and Glenn became interested in newspaper lay-out and design. Glenn's participation in the seminar and mentorship were so successful that he requested more involvement in other activities. He was referred to a special Saturday program for gifted students which was organized by a parent advocacy group in cooperation with the school. He enrolled in a series of art and art appreciation mini-courses.

When Glenn reached high school, he was placed in an English honors section, and also enrolled in a French course. He took the standard math sequence. He continued to excel in art, and by the time he graduated from high school had earned credit in art history and folio art courses through Advanced Placement. The counselor continued to coordinate Glenn's progress through the program. She was instrumental in locating information about universities with excellent art programs and in persuading him to take courses in industrial arts to develop his interest in wood-working. Glenn graduated from high school in four years with nine hours of college credit—six in art and three in Advanced Placement English.

Because the district's secondary schools had implemented most of the Purdue Secondary Program, Glenn had the opportunity to select those components of the gifted program best suited to his needs. The selection according to strength is similar to Stanley's smorgasbord (1980). However, in the Purdue Secondary model which offers a comprehensive program in the public school setting, the gifted adolescent not only chooses components which reflect strength (in Glenn's case, English and art related experiences) but also selects standard high school fare in areas of relative weakness (in Glenn's case, a regular college preparatory math sequence met his needs). Rather than a smorgasbord, the Purdue Secondary Program is similar to ordering from a Chinese menu. One orders from both Column A (selections which represent an area of strength for the student) and Column B (selections which represent an area of relative weakness for the student).

What Curricular Modifications Are Necessary?

Beyond the program structure looms the need to develop curriculum for these various offerings. The question of an appropriate curriculum for the gifted has received the attention of many scholars and practitioners. In the sixties, when the Goldberg study (1965) concluded that administrative arrangements alone (in this case grouping) did not significantly affect the achievement of gifted adolescents, some educators began to see that instruction needed to differ in kind. In response to the national concern over Soviet ascendancy in the space race, huge curriculum projects were undertaken. One notable exercise in curriculum concern was the Woods Hole Conference organized by Jerome Bruner. Bruner brought together many of the educators and academicians who worked on secondary school projects like the highly respected and massive BSCS (Biological Sciences Curriculum Study) and Physical Sciences Study Committee (Bruner, 1960). In any serious discussion of appropriate curriculum for the gifted, Bruner's work deserves recognition because his interest in the structure of academic disciplines has influenced our field greatly. It is not by chance that his controversial social studies curriculum, ***Man: A Course of Study*** (MACOS, 1970), is still used successfully in gifted programs today. MACOS is characterized by content that is conceptual and broadbased in nature, and it emphasizes an understanding of the method of anthropological research (Bruner, 1970). MACOS is an elementary curriculum, but the interest in leading adolescents to a genuine understanding of a field of study by presenting the key ideas of that discipline and the method for investigating them was an important part of the biological and physical sciences curricula. Basically, Bruner (1960) believed that each discipline was characterized by certain concepts, the relationships between those concepts, and a means of learning about that content (methodology). Taken together the content and the methodology formed the structure of the discipline. There were similarities and differences between disciplines, of course, but Bruner's idea was to formulate school curricula based upon the key concepts and distinctive methodology.

An example may serve to illustrate Bruner's conceptualization of structure. In the field of developmental psychology, one key idea is that a child's thinking is qualitatively different from an adult's. The author of that key "idea," Piaget (1959), stated that children differed in kind from adults, not simply in degree. As they matured, children's thinking changed; it did not merely add a few more tricks to a miniature adult repertoire. Because this key idea (or theory) is embedded in a social science, the appropriate methodology is the scientific method. The researcher proceeds by generating a research question, deriving hypotheses from it, collecting evidence which supports or contradicts the hypotheses, and in most instances attaching a probablistic estimate to the conclusions. The essence of the scientific method is that one submits one's ideas to the test again and again to determine if and under what circumstances they will survive.

In contrast, the structure of another discipline, literature, is somewhat different. A key idea in literature is that man is a microcosm or a "little" world reflecting the events taking place in the broader social and political world. This fundamental literary concept has its most elegant expression in Elizabethan and Jacobean drama. For example, in ***Hamlet,*** when the viperous uncle murders Hamlet's father, seduces his mother and improperly ascends the throne, he serves as a metaphor for a society which has gone bad. There is something "rotten in Denmark" alright and in the whole world of the playwright's making. The methodology is not logic of science, but the powerful use of metaphor. The author's work is a mirror held up for us to recognize the similarity between the characters and events in literature and the people and events in our lives. Man is the microcosm of the world. In literature, one learns by identification rather than deduction.

These two examples, one from the social sciences and one from the humanities, illustrate the different structures of the disciplines. The two pose different questions, involve different fundamental ideas and proceed to create knowledge in different ways. What is particularly intriguing, however, is that both disciplines—psychology and literature—take as their common arena the investigation and understanding of human beings.

The theoretical power of Bruner's structure of the disciplines and his eloquent essays on the issue have appealed to educators since his writings appeared two decades ago. Now, recent empirical research into the structure of academic disciplines supports Bruner's theory. In a study which investigated the key concepts and structure of various fields, Donald (1983, 1984) found that the structure of the physical sciences is best characterized as a hierachical tree diagram with branches from more important concepts to smaller ones. The structure emphasized a key relationship in the physical sciences: cause and effect. In contrast, the humanities disciplines were loosely structured and linear. Many concepts were related but of equal importance. The humanities structure was characterized by similarity among concepts rather than inclusive concepts "swallowing up" the smaller ideas in a hierarchy. Falling in between, the social sciences were spoke-like structures: certain key concepts were pivots or central organizers for other related ideas. As Bruner asserted, different disciplines identified concepts and the relationship among them differently. For Bruner, the important issue for curriculum developers is to capitalize on the key ideas and the methodologies which make their discovery possible.

Evidence that curricula which afford such depth are appropriate for the gifted can be found in the work of Renzulli et al. (1981), Gallagher (1975) and Tannenbaum (1983). In ***The Enrichment Triad Model*** (Renzulli et al. 1981), Type III activities require that gifted students behave as professionals in order to complete an independent and original piece of work. Maker (1982) believes this curricular adaptation for the gifted to be essentially Brunerian. Gallagher (1975) suggests that the gifted should be knowledge producers rather than consumers. To engage in knowledge production the gifted student must have an understanding of the fundamental ideas and the means to investigate them. Finally, another transformation of curriculum influenced by the structure of the disciplines approach is the use of mentorships and shadowing programs. The gifted literature is replete with examples of mentorship and internship programs with practicing professionals serving as guides to gifted adolescents. Indeed, the successful completion of many independent projects and career experiences requires an understanding of the methodology of the discipline in which those experiences take place.

Thus, the structure-of-the-disciplines approach to curriculum development has influenced many educators interested in the gifted and has manifested itself in a number of programmatic recommendations for gifted youth. It has, for example, been translated into practice in East Moline, Illinois. The United Critical Thinking Model developed in United Township High School has incorporated Bruner's theory into the World Studies, American Studies and Western Civilization courses for 10th, 11th and 12th grade students (Poulter & Erickson, 1983). Students enrolled in the project are introduced to the methods used by historians and literary critics to investigate their disciplines. Key concepts in the humanities and social sciences are identified and used as the basis for curriculum development.

Bruner's approach is particularly well suited to the Purdue Secondary Model for several reasons. First, Bruner's approach is essentially academic as is the Purdue Model. Second, there is mutual focus on key content, and a rich web of ideas in the disciplines which provide the gifted adolescent with the much desired large fund of information about diverse areas of study. And finally, Bruner's approach, which is solidly philosophical and refreshingly complex, affords educators of the gifted with the intellectual challenge they need to provide differentiated experiences.

Indeed, much has been made of differentiating curriculum for the gifted. These suggestions range from Passow's extremely comprehensive framework (Passow, 1979), the total learning environment, to considerably more pedestrian lists. Passow suggests that our current view of differentiated curriculum for the gifted as those experiences which take place in gifted programs is far too limited. He recommends that the broadest possible conceptualization of curriculum be considered. Passow is interested not only in the academic curricula of general and specialized knowledge but also in the learning of attitudes and values which he labels the subliminal/covert curriculum, and in nonschool curricula which acknowledges experience-based learning opportunities. While Passow's argument for these four curricula serves to stress the importance of attending to all the needs of the gifted, it is left to others to translate his recommendations into specific guidelines.

Maker (1982) has identified four dimensions of the curriculum which should be differentiated for the gifted: content, method, product and learning environment. An example of a content modification would be to offer content to the gifted which is more abstract. Emphasis is on generalizations (e.g., population growth will continue to reduce the number of persons engaged in farming) as opposed to data (e.g., in 1940, thirty percent of the people in the U.S. lived on farms; in 1985, three percent of the people in the U.S. live on farms). A well-known example of a process or method modification in developing curriculum for the gifted is the emphasis given to higher level thinking skills. According to Maker (1982), product modifications generally refer to professional quality projects which address real world problems and audiences. And finally, an example of a modification in the learning environment is the move from a low mobility to a high mobility classroom.

One of Maker's very worthwhile contributions to differentiating experiences for the gifted is her chart (see Figure 3 for excerpts) which presents the characteristics of gifted students as they have been identified in the literature and the curriculum modifications which address each of these special characteristics. The "X" axis of the chart lists characteristics of the gifted under four groupings: learning, motivation, creativity and leadership. The "Y" axis of the chart lists twenty-five curricular modifications grouped by content, method, product and learning environment. By locating a specific characteristic, for example, *"has a ready grasp of underlying principles . . . "* one can note the curricular modifications which are necessary to accommodate that aspect of the gifted student, in this case, the level of abstractness of the content. Maker's summary is useful as a ready reference for the general kinds of modifications recommended for the gifted.

Child Characteristics and Probable Social Roles	Content							Process/Method								Product				Learning Environment					
	Abstractness	Complexity	Variety	Organization	Economy	Study of People	Methods	Higher Level Thought	Open-Endedness	Discovery	Proof/Reasoning	Freedom of Choice	Group Interaction	Pacing	Variety	Real Problems	Real Audiences	Evaluation	Transformation	Student Centered	Encourages Independence	Openness	Accepting	Complex	High Mobility
Learning																									
Has unusually advanced vocabulary for age or grade level: uses terms in a meaningful way; has verbal behavior characterized by "richness" of expression, elaboration, and fluency. (National Education Association, 1960; Terman & Oden, 1947; Witty, 1955)	x	x	x					x			x								x	x				x	x
Possesses a large storehouse of information about a variety of topics (beyond the usual interests of youngsters his age). (Terman, 1925; Ward, 1961; Witty, 1958)	x	x	x	x				x						x		x	x		x	x	x			x	x
Has quick mastery and recall of factual information. (Goodhart & Schmidt, 1940; National Education Association, 1960; Terman & Oden, 1947)	x	x	x					x						x					x	x					x

Child Characteristics and Probable Social Roles	Content							Process/Method								Product				Learning Environment					
	Abstractness	*Complexity*	*Variety*	*Organization*	*Economy*	*Study of People*	*Methods*	*Higher Level Thought*	*Open-Endedness*	*Discovery*	*Proof/Reasoning*	*Freedom of Choice*	*Group Interaction*	*Pacing*	*Variety*	*Real Problems*	*Real Audiences*	*Evaluation*	*Transformation*	*Student Centered*	*Encourages Independence*	*Openness*	*Accepting*	*Complex*	*High Mobility*
Has rapid insight into cause-effect relationships, tries to discover the how and why of things; asks many provocative questions (as distinct from informational or factual questions); wants to know what makes things (or people) "tick." (Carroll, 1940; Goodhart & Schmidt, 1940; Witty, 1958)	x	x	x	x	x	x		x	x	x	x			x		x	x			x	x	x	x	x	x
Has a ready grasp of underlying principles and can quickly make valid generalizations about events, people, or things; looks for similarities and differences in events, people, and things. (Bristow, 1951; Carroll, 1940; Ward, 1961)	x	x			x	x		x	x	x	x					x	x		x	x	x	x	x	x	x
Is a keen and alert observer; usually "sees more" or "gets more" out of a story, film, etc., than others. (Carroll, 1940; National Education Association, 1960; Witty, 1958)	x	x	x	x	x			x	x	x												x		x	

Figure 3. Characteristics of Gifted Children and Their Implications for Curriculum Modifications
Curriculum Development for the Gifted, C. June Maker (1982). Reproduced with permission from Aspens Systems Corporation.

But more importantly, the chart provides a rationale for the curriculum decisions to be made. One must have valid reasons for making recommendations and modifications, and the best foundation upon which to base those recommendations are the special characteristics of the learner. Maker's chart emphasizes that point in a concise manner.

Although Maker's summary for curricular modifications is more detailed and specific than Passow's expansive call for four curricula and Bruner's philosophical discussion of the disciplines, school personnel charged with the task of selecting goals, objectives, instructional activities and evaluation procedures still need further information to differentiate the curriculum for the gifted. Kaplan (1979) presented a set of thirteen principles which have served hundreds of schools in developing experiences for the gifted student (see Figure 4). With the accompanying exercises in the handbook, much can be done at the activity, lesson and unit levels. However, additional help is necessary for scope and sequence decisions.

- Present content that is related to broad-based issues, themes or programs.
- Integrate multiple disciplines into the area of study.
- Present comprehensive, related, and mutually reinforcing experiences within an area of study.
- Allow for the in-depth learning of a self-selected topic within the area of study.
- Develop independent or self-directed study skills.
- Develop productive, complex, abstract and/or higher level thinking skills.
- Focus on open-ended tasks.
- Develop research skills and methods.
- Integrate basic skills and higher level thinking skills into the curriculum.
- Encourage the development of products that challenge existing ideas and produce "new" ideas.
- Encourage the development of products that use new techniques, materials and forms.
- Encourage the development of self-understanding, i.e., recognizing and using one's abilities, becoming self-directed, appreciating likenesses and differences between oneself and others.
- Evaluate student outcomes by using appropriate and specific criteria through self-appraisal, criterion referenced and/or standardized instruments.

Figure 4. Principles of a Differentiated Curriculum for the Gifted/Talented

An example of a particular approach to addressing curricular scope has been developed using Adler and Hutchin's ***Syntopicon*** (1952). The Syntopicon is an extensive reference work specifying a set of concepts derived from the writings of the world's great thinkers. In an attempt to distill important content, 102 "*great ideas*," (intended to represent the best ideas of western culture,) were generated by Robert Hutchins at the University of Chicago and a core of academicians. Figure 5 lists the great ideas which constitute the Syntopicon. Hutchins was considered by curriculum scholars a classical humanist (Taba, 1962). He viewed the school curriculum as a means of passing along the accumulated wisdom of these thinkers on important topics. It should be noted that using the topics as a framework for developing academic curricula does not imply the authors' acceptance of Hutchins' approach to the learners.* His philosophy, which tended to view the learner as a vessel into which information is poured, was at odds with Dewey and with subsequent educators, notably Hilda Taba, who saw the student as proactive. However, we believe the topics themselves can give rise to appropriate curricula for the gifted. The cooperative efforts of academicians from the various disciplines in selecting important content provides a rationale for developing differentiated curricula for the gifted. It addresses the concern Gallagher et al. (1983) expressed concerning our lack of attention in determining what is significant content for the gifted.

1. Angel	35. Honor	69. Poetry
2. Animal	36. Hypothesis	70. Principle
3. Aristocracy	37. Idea	71. Progress
4. Art	38. Immortality	72. Prophecy
5. Astronomy	39. Induction	73. Prudence
6. Beauty	40. Infinity	74. Punishment
7. Being	41. Judgement	75. Quality
8. Cause	42. Justice	76. Quantity
9. Chance	43. Knowledge	77. Reasoning
10. Change	44. Labor	78. Relation
11. Citizen	45. Language	79. Religion
12. Constitution	46. Law	80. Revolution
13. Courage	47. Liberty	81. Rhetoric
14. Custom and Convention	48. Life and Death	82. Same and other
15. Definition	49. Logic	83. Science
16. Democracy	50. Love	84. Sense
17. Desire	51. Man	85. Sign and Symbol
18. Dialectic	52. Mathematics	86. Sin
19. Duty	53. Matter	87. Slavery
20. Education	54. Mechanics	88. Soul
21. Element	55. Medicine	89. Space
22. Emotion	56. Memory & Imagination	90. State
23. Eternity	57. Metaphysics	91. Temperance
24. Evolution	58. Mind	92. Theology
25. Experience	59. Monarchy	93. Time
26. Family	60. Nature	94. Truth
27. Fate	61. Necessity & Contingency	95. Tyranny
28. Form	62. Oligarchy	96. Universal & Particular
29. God	63. One and Many	97. Virtue and Vice
30. Good and Evil	64. Opinion	98. War and Peace
31. Government	65. Opposition	99. Wealth
32. Habit	66. Philosophy	100. Will
33. Happiness	67. Physics	101. Wisdom
34. History	68. Pleasure & Pain	102. World

Figure 5. The Syntopicon: Great Ideas

The Syntopicon has been recommended as a general reference for instruction (Corbett, 1971), but using it specifically as a framework to develop curricula for the gifted was first suggested by Ward (1961) and later implemented by VanTassel-Baska in

Note: See* **Harvard Educational Review, *1983 Vol. 59 (4) pp. 377-411 for an excellent criticism of Adler's controversial* **Paideia Proposal,** *a document which sets forth his plan for curriculum reform in the schools.*

a project carried out by a team of content specialists from Purdue University representing mathematics, science, social studies and language arts (VanTassel-Baska, 1979). They used the Syntopicon great ideas of change, sign and symbol, and reason to develop differentiated units.

The feasibility of using the structure for generating thematic content units has also been demonstrated in a course in secondary curriculum developed for the gifted taught at Purdue by the authors. The decision to use the Syntopicon as the structure for thematic units which are a part of the course requirements was based on two aspects. First, gifted adolescents are at the cognitive level of formal operations and capable of dealing with the abstract and inclusive topics listed in the Syntopicon. Secondly, the organization of the secondary school does not encourage teachers in one discipline to coordinate with teachers in another. At the secondary level, developing broad-based thematic units in the content areas is best accomplished by selecting those *"big ideas"* which appear in more than one discipline. The idea will manifest itself differently in different disciplines; examining those ideas in the context of a number of disciplines allows the gifted adolescent to determine the similarities and differences in the concept as it appears in various areas of human endeavor.

To promote dialogue among teachers representing different disciplines, the class members were grouped into teams of three to four people. The teams included teachers from the humanities, fine arts and the sciences. Attempts were made to place at least one person from each area on a team. Interesting combinations are possible. For example, one team combined a chemist, a musician and two English teachers. Another included a biologist, a psychologist and a literature specialist. The teams were given the list of the 102 great ideas and asked to select one which they identified as a key concept in their disciplines. Most teams found topic selection to be a difficult task, although a few topics like *"prudence"* were immediately discarded as not likely to win the adolescent audience. In order to make a final decision, team members found they needed to read the summary essays which accompanied each of the Syntopicon ideas. The summary elaborated the concept and traced it historically in the writings of Western thinkers.

Once the teams had selected their topics, they were asked to write a descriptive introduction to the proposed thematic units. The introduction included a definition of the big idea, at least three concepts which derived from the big idea and a brief rationale of the importance of the concepts to gifted adolescents.

The concepts served as the foundation for the thematic content units produced by each team member. Not surprisingly, the biologist's unit was an investigation of ecosystems. The psychologist's unit examined the ethical ramifications of experiments using human subjects. The literature teacher selected science fiction to explore the nature of cause and effect. The units were *"detachable,"* that is, each team member could use the unit at any time during the school year. Although the content of each unit was related, each was complete on its own. This design permitted departmentalized teachers the freedom to use the unit as their schedule permitted. However, most members agreed that introducing them at the same time would have the most impact for the students. For example, as the initial activity for the units on Cause, all students were to read the Ray Bradbury short story, "A Sound of Thunder" in their English class. Subsequently, other team members planned to coordinate introduction of the units in science and social studies classes.

The process of conceptualizing and producing these broad based content units was an exercise in examining the structure of the disciplines. Each team member was forced to identify key concepts in his or her discipline and to articulate to other team members how one learns in the discipline. In summary, the use of the Syntopicon as the basis for curriculum development in the Purdue Secondary Program Model reflects the model's emphasis on academic talent and inquiry. The use of the Syntopicon framework proved to be highly successful in promoting understanding across disciplines and between teachers.

Finally, the Syntopicon, whatever its limitations, is a product of many fine minds attempting to specify important concepts. Such an attempt addresses Maker's (1982) premise that one of the difficulties in using Bruner's ideas to formulate curriculum is that neither scholars nor teachers can agree on which ideas are important. Further, the Syntopicon framework also addresses Gallagher's concern that we have not determined what is significant content for the gifted. Experience with the Syntopicon and curriculum development indicates that teachers can agree on key concepts and write appropriate units of instruction.

Implementation of a Comprehensive Secondary Model

The most comprehensive implementation of the Purdue Secondary Model has taken place in the Gary (Indiana) Community Schools. Purdue University has had a formal working relationship with the Gary Schools for ten years. The program at Gary, articulated across grades K-12, is directed by Dorothy Lawshe. (See Figure 6.) Many of the concepts presented in the Purdue model derive from our observations of her work in Gary. The secondary program in Gary is preceded by a rich set of opportunities for gifted students in the elementary grades. K-6 students have access to full-time, self contained classes or pullout/resource room classes, special classes in the arts and Saturday enrichment classes. At the middle school level, gifted adolescents begin to move through a set of academic experiences designed to challenge them.

The program at Gary is truly a multi-service approach (Feldhusen, 1982). Figure 6 presents information about the complete model. Key features at the secondary level are the Advanced Placement course, mentoring, seminars, special classes in language arts, social studies, mathematics, science, languages, a Saturday program; and two programs in Washington, D.C. Parts of the model are also being implemented at two other sites in Indiana where evaluation data will be secured.

What are the Strengths and Limitations of the Model?

The major strengths of the Purdue model are its comprehensive nature, its attention to developing curriculum guided by a well established rationale, the use of growth plans and its attention to giftedness and talent in the arts and vocational areas in addition to the intellectual forms of giftedness. The needs of gifted and talented youth are diverse (Feldhusen & Sokol, 1982) and a virtual smorgasbord of special services are needed to meet those needs (Feldhusen, 1982). The Purdue Secondary Model comprises services to meet most of the special needs of gifted and talented youth.

The growth plans also represent a strength in that they provide a systematic way of linking the special needs of youth with the appropriate program services. The growth plan system also reminds program leaders that it might be necessary to seek services outside of school and in the community to meet a student's unique needs. Butterfield et al. (1979), in ***Developing IEPs for the the Gifted/Talented,*** provide detailed procedures for planning individualized programs for gifted and talented youth.

Grade	Program/Opportunity	Eligibility Criteria
Elementary School Opportunities		
K–6	The Banneker Academically Able Program—Identified students are bused to the Banneker Achievement Center each day for a total academic program which includes: • Development of Higher-Level Thinking Skills • Curriculum Concepts for the Gifted in: The Humanities The Junior Great Books The Sciences Mathematics and Computers Foreign Languages (Spanish/Latin) Debate The Arts: Class Piano, String Instruments, Ballet	Students must: • Have scores within the stanine band of 8–9 on reading *and* mathematics subtests of a standardized achievement test. • Have a recommendation from a parent, teacher or administrator. • Have demonstrated above average intellectual ability.
4–6	The Tolleston Elementary Academic Center—Identified students spend one day per week in an academic program designed to provide challenging and appropriate instruction in four laboratory classrooms. Instructional focus will be on the development of higher level thinking skills through: • Mathematics and Problem Solving • Creative Writing and Reasoning • Literature and Reasoning • Science Explorations and Inquiry	Students must: • Have scores within the stanine band of 7–9 on reading *and* mathematics subtests of the Iowa Test of Basic Skills. • Have a recommendation from parent, teacher or administrator. • Have demonstrated above average intellectual ability.
Middle School Opportunities		
6–8	University Workshops and Seminars are provided for students participating in the Midwest Talent Search for highly gifted students.	Students must: • Have scored at the 95th Percentile or better on the Iowa Test of Basic Skills. • Take the Scholastic Aptitude Test (SAT) and have a verbal or mathematics score of 350 or better.
7–8	The Academically Able Program—A total academic program including instruction in: • Language Arts • Social Studies • Mathematics • Science • French or Spanish	Students must: • Have a recommendation from a teacher, principal or parent. • Have reading and mathematics subtest scores on the Iowa Test of Basic Skills within the stanine band of 7–9.

 Figure 6. Gary Community School Corporation Gifted and Talented Programs

Grade	Program/Opportunity	Eligibility Criteria
High School Opportunities		
	The Collegiate Level Advancement in Secondary School (CLASS) Program	Students identified for the Middle School Academically Able Program usually qualify for participation.
9–10	**Options** • People to People Career Development for the College-Bound Student • St. Mary Medical Center Mentorship Program • Methodist Hospital Mentorship Program	Students must: • Enroll in a strong academic program. • Take four college preparatory courses each year. • Maintain a "B" average each marking period. • Be willing to take Advanced Placement courses that are offered in the high school. Students should have plans to attend college.
10–12	**Options** Professional Resource Education Program (PREP): • Medical Component (1983) • Law Component (1984) • Engineering Component (1984) • Business Component (1985)	
11–12	**Options** Advanced Placement Courses in: • French Language • Spanish Language • U.S. History • Biology Indiana University Northwest Seminars in Science, The Humanities, Health Occupations Participation in Two Washington, D.C. Based Programs • The Presidential Classroom for Young Americans • The Washington Workshops Congressional Seminars	
12	College Level Courses Taught in the High Schools: • Purdue University's Mathematics 214 • Indiana University Northwest's Writing 131	

Figure 6. Gary Community School Corporation Gifted and Talented Programs

Saturday School Opportunities

	Academics	Arts
Grades 2–6	French – Beginning French – Intermediate Spanish – Beginning Spanish – Intermediate Creative Computers	Grades 4–8 Little People's Theatre
Grades 4–6	Probability & Statistics Energy Systems Future Problem Solving Introduction to Latin	Grades 4–12 Visual Arts
Grades 7–8	Orientation for the SAT Future Problem Solving	Grades 7–12 Musical Theatre: • Dance • Drama • Orchestra • Vocal Music • Stabe Production • Set Design
Grades 7–12	Creative Computers Seminar in Opera Seminar in Latin/Greek Studies	
Grades 10–12	Professional Resource Education Program (PREP): • Medical Component • Law Component • Engineering Component	

Figure 6. Gary Community School Corporation Gifted and Talented Programs

Youth who are talented in the arts or vocational areas are often left out of special programs for the gifted and talented. Nevertheless, they have special needs which must be met if they are to realize the full development of their talents. A comprehensive program should address their needs and provide appropriate services. In some areas of the arts, such as dance, it might be necessary to provide services in Saturday and/or summer programs or to seek them outside of school. Some schools avoid venturing into programming in the arts or vocational areas because they fear that the identification process will present insurmountable problems. In truth, there are now well established identification procedures consisting of rating scales, auditions, product evaluations and interviews which can be used (Tuttle & Becker, 1983).

The major limitations of the Purdue Secondary Model are its complexity, the need for trained staff and the problems of small and rural schools. The model is comprehensive and therefore relatively complex. This condition interacts with the need for trained staff. It seems unlikely that the model can be implemented by personnel who are not well trained and experienced in work with the gifted. The coordinator must be competent in gifted education and a skilled administrator. Teachers of special classes and seminars must be highly knowledgeable in their subject matter and proficient in teaching process skills. Counselors must be adept at working with the gifted and talented and their special problems. All staff must know how to contribute to the identification process.

The Purdue Secondary Model is also difficult to implement in small schools and rural settings where there may be too few students for seminars and special classes and little possibility of assigning special staff to the gifted program. There may also be little hope of organizing Saturday, summer programs or finding a variety of special mentors in a rural area. The solution often is to create a cooperative arrangement in which services might be shared among several schools.

Conclusion

The Purdue Secondary Program Model is a comprehensive system designed to meet the special needs of gifted and talented youth. It assumes that a good program must provide both accelerated and enriching learning experiences. It is based on the characteristics and needs of the gifted learner and is translated into practice though program and curriculum structure. The Purdue Secondary Model is attentive to the individual student through the use of individual growth plans; yet it is also intended to address the broader issues of curriculum development in providing a challenging and diverse set of opportunities for the many gifted youths in our secondary schools.

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Discussion Questions

1 What would be an *ideal* approach to meeting *all* the needs of Jenny in a high school program?

2 What are the strengths or advantages of an eclectic or integrative model such as the one described in this chapter? What weaknesses?

3 What are all the ways counselors could be involved in programming for the gifted.

4 When and why should we accelerate instruction for the gifted? How can we do it? What are some possible dangers in our failing to accelerate gifted youth?

5 Why are curriculum modifications necessary for the gifted?

6 Examine Figure 3. How would you modify the content in a discipline of your choice to meet the needs of gifted students who are "keen and alert observers"?

7 Examine Figure 4. Which five of those principles would you personally find most useful in guiding your own curriculum development efforts? Why?

8 What disciplines would you try to incorporate into a unit if you were developing a multi-discipline unit? Why?

9 What difficulties would you anticipate in trying to implement a secondary program like the one at Gary? How could you overcome these difficulties?

10 What approaches could one use to train staff for work in the Purdue secondary model program?

11 How could gifted students themselves be involved in implementing this model?

12 See Figure 1. Which are the five most critical needs of gifted youth? Why?

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VII

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Summary

The Grid: A Model to Construct Differentiated Curriculum for the Gifted

The definition of differentiated curriculum, translated into a set of learning experiences related to a given theme, provides for comprehensive and integrated educational opportunities for gifted students. Most importantly, the definition of curriculum referenced against accepted elements of differentiated curricula is an assurance that gifted students are provided with substantive rather than superficial learning opportunities. The grid is one model which facilitates the curriculum developer's task of determining what constitutes differentiated curriculum and how such a curriculum can be constructed.

The purposes of this model are therefore as follows: (1) to translate the principles that govern an appropriately differentiated curriculum for the gifted into practice, (2) to define the process for constructing differentiated curricula for the gifted and (3) to develop a comprehensive, articulated and integrated curricular framework to guide the teaching/learning of the gifted. The elements of learning experiences—*content, processes and product*—are delineated in this chapter. Sample activities based on this model are also included.

The Grid: A Model to Construct Differentiated Curriculum for the Gifted

Curriculum — POWER

- Prove or disprove the constructive or abusive relationship between economic, social, personal and environmental displays of power and the needs and interests of individuals, groups and societies. Gather evidence from multiple and varied historic and contemporary printed resources such as newspapers, journals and magazines; classify and organize the data. Use this data to prepare an oral presentation to influence a selected audience with your viewpoint.

- Establish criteria to judge the significance of person-made and natural sources of power to changes in beliefs, life style and communication. Gather data by using a retrieval system. Identify main ideas in fiction and non-fiction references. Develop a graphic representation (chart, diagram, etc.) to illustrate your findings.

These learning experiences are part of a differentiated curriculum designed for gifted students. They are differentiated because they are considered to be an appropriate match between the recognized needs, abilities and interests of gifted students and the educational purposes and expectation held for these learners. The ultimate goal of a differentiated curriculum is that it recognizes the characteristics of the gifted, provides reinforcement or practice for the development of these characteristics, and extends the recognized characteristics to further levels of development.

These learning experiences were defined with reference to a set of understandings about differentiated curriculum for gifted students:

1 Differentiated curriculum for the gifted should be integrated and comprehensive. An analysis of each of the learning experiences evidences the integration of these components to form a total curricular opportunity:

- PROCESS: Productive thinking—prove or disprove skills (critical thinking)
- CONTENT: Relationship between economic, social, personal and environmental displays of power and the needs and interests of individuals, groups and societies (interdisciplinary)
- PROCESS: Research Skill—use of multiple and varied printed sources
- PROCESS: Basic Skill—classification and organization of data
- PRODUCT: Development of oral presentation.

It is the integration of all the elements (content, process, product) rather than the isolated or disjointed teaching/learning of each aspect of the curriculum as separate and distinct entities that distinguishes these learning experiences of a differentiated curriculum.

2 Differentiated curriculum for gifted students should be defined by design rather than happenstance. Under the guise of differentiated curriculum, a variety of curricular options are made available to gifted students. Different, difficult, esoteric and popular are terms applied to the selection of curricula for the gifted students. In many cases, lack of knowledge about differentiation and/or poor abilities to discriminate from the plethora of curricula stamped "for the gifted" has resulted in definitions of differentiated curricula by whim or fancy. The use of the Principles of Differentiation set forth in

1982 by the National/State Leadership Training Institute on the Gifted and the Talented's Curriculum Council provides a framework for curriculum developers to determine the elements that differentiate curriculum for the gifted. The elements proposed for inclusion in a differentiated curriculum are founded upon and modified from this set of principles. (See Figure 1.)

PRINCIPLES OF A DIFFERENTIATED CURRICULUM FOR THE GIFTED/TALENTED

- Present content that is related to broad-based issues, themes or problems.
- Integrate multiple disciplines into the area of study.
- Present comprehensive, related and mutually reinforcing experiences within an area of study.
- Allow for the in-depth learning of a self-selected topic within the area of study.
- Develop independent or self-directed study skills.
- Develop productive, complex, abstract and/or higher level thinking skills.
- Focus on open-ended tasks.
- Develop research skills and methods.
- Integrate basic skills and higher level thinking skills into the curriculum.
- Encourage the development of products that challenge existing ideas and produce "new" ideas.
- Encourage the development of products that use techniques, materials and forms.
- Encourage the development of self-understanding, i.e., recognizing and using one's abilities, becoming self-directed, appreciating likenesses and differences between oneself and others.
- Evaluate student outcomes by using appropriate and specific criteria through self-appraisal, criterion referenced and/or standardized instruments.

Figure 1. Principles of Differentiation

3 Defining curriculum for the gifted is not synonymous with presribing curriculum. Defining curriculum relates to planning the teaching/learning process; it is analogous to charting or mapping. The definition of curriculum does not imply that all students are expected to cover the same curriculum. Defining the curriculum outlines what might be taught or learned by one student or many students. Definition of the curriculum is separate from the implementation of the curriculum. It is during the implementation of the curriculum that decisions about prescribing the curriculum are made. Such decisions are not inherent in the definition of curriculum; they are part of the interpretation by teachers of how the curriculum is to be used.

The learning experiences which are used as examples, were derived from the use of a grid representing one of many models that can be used to construct curriculum. The grid functions as a decision-making matrix to guide the curriculum developer through a sequential set of procedures leading to the definition of a differentiated curriculum for the gifted. Basically, the grid is a model to determine the essential elements for a differentiated curriculum and to structure its format. The grid, as a model, provides the categorical referents for the selection of the elements to be considered in a differentiated curriculum. It also describes a procedure for connecting these elements to create a set of learning experiences. A curriculum is formed from the set of learning experiences obtained through the use of grid.

Figure 2 provides an outline of step-by-step procedures which direct the reader in the use of the grid to define and structure a differentiated curriculum for the gifted.

Theme—POWER				
CONTENT	**PRODUCTIVE THINKING SKILLS**	**RESEARCH SKILLS**	**BASIC SKILLS**	**PRODUCTS**
relationship between economic, social, personal displays of power, needs and interests of individuals, groups and societies	differentiate between fact and opinion	use a retrieval system	identify the main idea	develop an oral presentation
significance of personmade and natural sources of power to changes in beliefs, life style and communication	prove or disprove	take notes	write a paragraph	make a graphic representation
conditions which promote the exercise of power by individuals, organizations and countries	establish criteria to judge	use fiction and non-fiction	sequence	write an editorial
value of social forms of power to human rights and environmental usage	substantiate with evidence	use newspapers and journals	classify	debate

Figure 2. The Grid: An Example

Selecting the Organizing Element or Theme

The element that provides cohesiveness to the curriculum typically is termed the topic of study or the course title. Regardless of the label attributed to it, an element that organizes and unifies a collection of learning experiences is needed. This element aids in specifying the focus of the curriculum and determining what is considered for inclusion or exclusion in the curriculum. Without this element to provide an organizational thread for the curriculum, there would be a random listing of learning activities which would not be mutually reinforcing. These learnings would be unable to relate collectively to the attainment of the anticipated goals and objectives for which the curriculum was written.

Most organizers have been topical in nature. The rationale for this type of organizer is that it circumscribes the learnings into smaller units which make the curriculum more teachable and learnable. While there is support for this concept, the use of topics as organizers has resulted in stifling learning possibilities for students who are characterized as rapid learners, who are curious and possess a wide variety of interests and the ability to generalize and make relationships. The use of themes as the basis of organizing the curriculum represents a better match between the learning characteristics of the gifted and the learning possibilities that a curriculum could provide for them.

Using themes as organizers allows for a broader and larger scope of learning to be included within the curriculum. The theme provides the overarching construct under which a variety of topical areas of study can be subsumed. Whereas the topic of "dinosaurs" might include subtopics related to types of dinosaurs, environmental relationships between the dinosaur and their habitats, etc., the theme of "extinction" includes, not only a study of dinosaurs and other animals of the past and present that have become extinct, but it could also include topical areas of study pertaining to the extinction of natural resources, the extinction of technology and beliefs, the extinction of various words, phrases and language patterns and the extinction of fashion in furnishings, architecture, etc. The use of the theme widens the options for teaching and learning.

The selection of a theme should be based on a number of factors:

- The theme should be related to and/or rooted in a discipline.
- The theme should be significant to study.
- The theme should not be age or time dependent.
- The theme should allow for a variety of teacher-directed and student-selected options for study.

There are multiple sources of organizers, as shown in Figure 3.

SOURCE	EXAMPLE	ORGANIZER
Student interest	Weather, animals	Change Adaptation
Regular curricula	Simple machines, explorers	Power Explorers
Scholars	Futurism, reading, classics	Survival Conflict
Diagnostic data	Phonetic skills	Communication Expression
Teacher perceptions	Holidays	Traditions

Figure 3. Sources of Organizers.

Determining the Content

Content refers to the knowledge and information defined as useful, important, timely and interesting for gifted students to acquire as a consequence of their matriculation through an educational program. The body of understandings identified as relevant to the gifted learner circumscribes the content. Within this body of understandings are the facts, ideas, concepts, generalizations, principles, theories and systems which comprise historical, contemporary and futuristic contributions of persons to the general and specific meaning of the disciplines. Thus, the nature of the content dimension of a differentiated curriculum for the gifted is defined in response to the following questions: What are the intended outcomes from a particular experience or set of experiences in a subject area or discipline? What should the gifted student know as a result of studying a given subject area or discipline(s)?

The emphasis on thinking skills often causes us to relegate knowledge or information to a less important position in a curriculum for the gifted. When stress is placed on processes, content is perceived as a tool to facilitate the acquisition of these skills, and subsequently, content is designated as a means to an end rather than an end in itself. In actuality, the development of skills cannot be separated from the assimilation of content. No learning can take place without the interaction between content and process. Intellectual inquiry or skill mastery is activated by content; how students think is contingent upon what students are to know.

The selection of content is surrounded by concerns and controversy. First, the determination of the content is subject to the perceptions of the curriculum developers. Ultimately, they are the key decision-makers who define the content to be included within the parameters of the organizing theme. Second, the specification of content to be presented to a student is not necessarily synonymous with what this student eventually learns. In other words, the exposure to a defined area of study cannot be interpreted as comprehension and retention of the material. Third, the broad scope of possibilities available within a given content area demands that selection, not coverage, govern the decisions about the content to be included or excluded from a curriculum. Consideration of what should be emphasized for gifted students in the content dimension of a curriculum is a matter that always can be challenged by educators, parents, community members and the students themselves. Fourth, the constantly changing nature of content due to such factors as technological advances and societal events will demand reevaluation of the relevance of the information identified for students to learn. While there is a body of knowledge that remains static and is important to acquire over time, agreement of curriculum developers about what this material is and when this material should be included in a curriculum is not consistent.

The selection of the content is the most difficult facet of the curriculum development process. Most often, the teacher is the consumer rather than the author of curricula and therefore finds the task of selecting the content alien. In addition, the determination of the content might require the support of subject matter specialists to share both their familiarity and expertise with curriculum developers. Needless to say, there are curricula frameworks and guides which can facilitate the decision-making necessary to identify the content for the curriculum. Listed below are some basic rules to consider in specifying the content.

1. The specific selection of content should be referenced to the organizing element or theme.
2. The topical areas to be studied within the theme should be multidisciplinary. The selection of disciplines to include within the theme are dependent on the purpose of the curriculum and its relationship to a subject area or discipline under study. In other words, if the curriculum is developed for a social studies class, the nature of the disciplines to be included within the curriculum might be rooted in the social sciences. Each curriculum should have a root discipline and allow for extensions to other disciplines as such extensions are responsive to the abilities and interests of the students and the intent of the curriculum.
3. The topics selected for the theme should represent those that are mandatory or expected for all students to learn, those that are introduced because they are consonant with the needs, interests and abilities of the gifted student, and those that are of particular importance or of interest to individual students or groups of gifted students.
4. The topics selected for the theme should allow for the integration of subject areas. For example, the basic subject areas of reading, mathematics, etc. should be included as integral rather than adjunct areas of study.
5. The topics of study should allow for a time perspective wherein the knowledge of the past, present and future are related. Studies of content referenced to the past or the future without emphasis on the relationship between these time periods does not provide the meaning necessary to understand either time period.

The designation of the knowledge to emphasize within the topics of the various disciplines can be facilitated by the use of key words. These words highlight significant areas of information. Some of the key words are categorized as demanding concrete understanding of the knowledge while other key words require more abstract understandings of the information. Following is a listing of key words:

- kinds
- types
- conditions
- significant
- relationship
- evolution
- importance
- value
- characteristics
- purpose
- function
- style

THEME: POWER		
CONTENT	**PROCESSES**	**PRODUCTS**
(Key word + disciplines + theme)		
relationship between economic, social, personal and environmental displays of power and the needs and interests of individuals, groups and societies		
significance of person-made and natural sources of power to changes in beliefs, life style and communication		
conditions which promote the exercise of power by individuals, organizations and activities		
value of social forms of power to human rights and environmental usage		

Figure 4. An Example of Specifying Content

Selecting the Processes

Processes are the skills defined for inclusion in a curriculum. They represent the competencies students will be expected to learn as a consequence of their participation in the curriculum. The identification and subsequent selection of processes for the curriculum is not done randomly. Reference should be made to the scope and sequence of both the regular or basic and gifted programs. Such a document provides the data to make decisions regarding which processes could be included in the curriculum because of the students' developmental readiness to have these skills introduced. Other skills will be included because of the evidence describing the students' need to have additional practice opportunities to attain mastery of these skills.

While differentiated curriculum for the gifted is associated traditionally with the introduction and mastery of productive thinking skills or what has become known as the more abstract and complex mental operations, these skills represent only one of several categories of skills that ultimately should be considered for gifted students. Other categories of processes are basic research skills of the disciplines, learning-to-learn skills, life skills, and the skills of technology. Perhaps the greatest misunderstanding in the definition of processes for gifted students has been the perception that delineating the skills of productive thinking automatically designates the curriculum as differentiated. These skills often have been regarded as the unique property of the gifted and have been used by some curriculum developers to justify the relevance of the curriculum for the gifted. There has also been a disregard for other skills needed by the gifted in favor of the teaching and learning of productive thinking skills.

This curriculum development model facilitates the integration of various categories of processes into a curriculum without ignoring the many skills pertinent to the education of gifted students: The inclusion of productive thinking skills to the exclusion of other types of skills is artificial since each type of skill provides the reinforcement necessary for the mastery of the other types of skills. For example, the ability to develop the skill of verification in problem solving (productive thinking) is contingent upon both the development of the skills of gathering data (research skill) and sequencing information (basic skill).

There are a multitude of sources which serve to define the productive thinking skills or processes of critical and creative thinking, problem solving and logic. Among these sources is the variety of taxonomies and models. These are means by which the curriculum developer ascertains which skills lead to the students' abilities to think more productively and how these skills can be taught. These taxonomies and models are *means* to ends rather than *ends* in themselves. The ability to name the features or steps of a taxonomy or model is not sufficient to ensure the students comprehension or mastery of productive thinking skills. There is often a misunderstanding concerning the use of these taxonomies and models as guides for the definition and instruction of thinking skills for a differentiated curriculum or as the curriculum itself. Another concern is that the use of taxonomies and models as the curriculum results in the robotic nature of the learner to perform thinking as a set of operations without understanding of these operations as they impact one's ability to perform critically, creatively and to function as a problem solver or logistician. Many students can recite steps or activities of a model for thinking without being able to relate these steps to specific content.

THEME: POWER				
CONTENT	**PROCESSES**			**PRODUCTS**
	Productive thinking skills Focus on critical thinking	**Research skills**	**Basic skills**	
	Differentiate between fact and opinion	Use retrieval system	Identify the main idea	
	Prove or disprove	Take notes	Write a paragraph	
	Establish criteria to judge	Use fiction and non-fiction	Sequence	
	Substantiate with evidence	Use news-papers and journals	Classify	

Figure 5. Example of Specifying Processes

Selecting the Product

The synthesis and transmission of the knowledge (content) assimilated and the skills (processes) mastered by the student into a form of communication represents the product dimension of the curriculum. A question relative to the product element of a differentiated curriculum is whether the product is valued as a tool to learn or as the verification of learning. Basically, the product serves both purposes. It is a means by which learning takes place and it is a culmination of the learning that has taken place. A prevalent argument concerning product development centers is on where emphasis should be placed: (1) the product as an expression of the student's achievement or (2) the product as an exemplar of the processes the student has learned to apply in order to achieve. The focus on the overt qualities of a product without regard for the covert factors that lead to the construction of that product also places a disproportionate emphasis on the product for a single purpose rather than the multiple outcomes it serves. Thus, product development is a curricular opportunity which allows the following learning experiences to occur:

1. Exposure to a wide variety of communication forms: illustrative, oral, written, models, etc. Experiences within a particular category also are necessary. For example, written products include writing s story, editorial, daily, abstract, slogans, proposal, etc.
2. Comprehension of and exercises in production skills which include the following :
- Applying the appropriate technology and materials
- Organizing time, energy, resources and decision-making strategies
- Determining criteria for success such as accuracy, display of knowledge, creativity, etc.
- Establishing a bond with the product as evidence of its worth to a target audience and as a reflection or extension of the producer
- Recognizing and appreciating famous and significant artisans and their works
- Identifying formal and informal outlets to share products.

THEME — Power		
CONTENT	**PROCESSES**	**PRODUCTS**
		Develop an oral presentation
		Make a graphic representation
		Write an editorial
		Debate

Figure 6. An Example of Specifying Products

Forming Learning Experience

Learning experiences are formed by intersecting cells from each of the categories labeled on the grid. A learning experience is comprised of the meaningful relationship between the elements:

T/S	+ C	+ R/S	+ B/S	+ P
Thinking skill	+ Content	+ Research skill	+ Basic skill	+ Product
Prove or disprove	+ Relationship between economic, social and personal power, etc.	+ Magazines, journals	+ Classify	+ Oral presentation

Implementing the Curriculum

The formation of a set of learning experiences constitutes the curricular framework. The definition of a learning experience is that it answers the question of what should be taught or learned in a differentiated curriculum. It describes the ends or outcomes of instruction. The next step in the curriculum development process is to describe the means by which the ends are attained. Traditionally, the means are determined by the articulation of lesson plans (motivation, practice, transfer, feedback or knowledge of results, etc.), the selection of instructional strategies (discovery, simulation, inquiry training), and the organization and management of the classroom (independent study, peer-to-peer teaching, etc.).

In Figure 7 is an example of how means were developed for a learning experience. A series of activities were designed to facilitate the students' ability to successfully achieve the learning experience. Among the factors to be considered in deciding the most effective and efficient activities are the following:

- developmental readiness and prerequisite training
- interest of students
- characteristics of giftedness
- availability of resources and time
- type of gifted program.

The learning activities formed from the grid are not limited to large group or teacher-directed lessons. They can be used as independent studies or to form task cards and learning centers. The definition of learning experiences is not bound by any one type of programmatic model or delivery system.

Planning the Lesson

1. ***Objective or Learning Experience.*** Prove or disprove constructive or abusive relationship between economic, social, personal and environmental displays of power. Gather evidence from historic and contemporary magazines and journals; classify and organize data into an oral presentation.
2. ***Prerequisites/Sequence.***
   - Definition of power
   - Analysis of disciplines economics, social sciences, etc.
   - Introduction of contemporary journals: *Time*, *Newsweek*, etc.
3. ***Motivation.*** Watch video of *Ten Angry Men*. Read editorials describing different points of view regarding an issue of social power: strikes.
4. ***Practice-Time-Continua.***
   - Present students with a problem to solve. Have students prove their solution to be the most accurate.
   - Invite a librarian to introduce the *Reader's Guide*.
   - Attend a lecture to determine appropriate elements of an oral presentation.
   - Read and discuss chapters 12–14 in *Power: A Source of Conflict*.
5. ***Independent Study Opportunities.*** Select an area of study.
6. ***Transfer Opportunities.*** Relate the use of power in words and color to other power forms.
7. ***Evaluation Feedback.*** Evaluate students using the criteria for an oral presentation developed by the class.
8. ***Environment Interest Study Learning.*** Create an independent study area with resource material and materials for the production of an oral report.

ARTICULATING ACTIVITIES				
LEARNING EXPERIENCE: Prove or disprove the constructive or abusive relationship between economic, social, personal and environmental displays of power and the needs and interests of individuals, groups and societies. Gather evidence from multiple and varied historic and contemporary printed resources such as newspaper, journals and magazines. Classify and organize the data. Use this data to prepare an oral presentation to influence a selected audience with you viewpoint.				
ELEMENTS OF THE LEARNING EXPERIENCE				
Productive thinking skill	**Content**	**Research skill**	**Basic skills**	**Product**
prove or disprove	relationship between economic, social, personal and environmental displays of powers to needs and interests of individuals, groups and societies	use of magazine and journal	classify	oral presentation
		ACTIVITIES		
• Solve riddles and prove the answer to be correct • Discuss ways by which proof is determined in science mathematics, logic • Compare the application of deductive and inductive reasoning to prove a point	• Locate examples of the constructive and abusive use of power in current events	• Identify the parts of a magazine and journal: table of contents, feature articles, editorials, etc.	• Present students with an aggregate of facts on power; have them classify the information	• Watch a T.V. "talk show" to determine the criteria for an oral presentation • Translate a written report into a 5 minute oral presentation. Discuss the effectiveness of each medium

Figure 7. An Example of a Learning Experience

9. ***Resources: People, References, Media.*** Librarian Reader's Guide, text and magazines.
10. ***Organization: Teacher, Student.*** Large group lecture, small group discussions, independent study.

Conclusion

As was stated earlier, it is not assumed that because a set of learning experiences have been defined that all students are expected to engage in, benefit from, or be ready for those training experiences. Differentiation of curriculum and individualization of the curriculum are not similar. Once the curriculum is differentiated, it needs to be individualized for students. Any or all of the components of a learning experience can be individualized. Modifications in the learning experience are a consequence of the needs, interests and abilities of individual gifted students.

CURRICULUM DEVELOPMENT MODEL — THE GRID

Sandra N. Kaplan

PURPOSES OF MODEL:

1. To translate the principles that govern appropriately differentiated curriculum for the gifted into practice;
2. To define the process for constructing differentiated curricula for the gifted;
3. To develop a comprehensive, articulated and integrated curricula framework to guide the teaching/learning of the gifted.

UNITY: A curricular framework is organized around either a teacher-directed or student-selected issue, problem, theme, question or skill. The organizer provides focus and continuity to the curriculum.

CONTENT	PROCESSES	PRODUCT	AFFECTIVE
The subject matter selected for the curriculum reflects knowledge that is mandatory for all students to learn, knowledge that is commensurate with the level of conceptualization responsive to the gifted and knowledge particular to the individuals needs and interests of the gifted.	The skills or competencies the gifted are expected to master include, but are not limited to, fundamental, rudimentary or basic skills, productive (logic, creative problem-solving and critical-) thinking skills, research skills or the skills of accessing, interpreting, summarizing and reporting information, and personalized skills or those particular to the individual aptitude of the gifted.	The forms of communication or the products by which the gifted summarize and transmit the knowledge they have assimilated and the skills they have mastered should include experiences in a variety of media, learning the technology and materials for appropriate and accurate production, and developing outlets for sharing and gaining feedback relative to the developed work.	The attitudes, appreciation and values introduced to the gifted are an integral feature of, rather than an adjunct to, the curriculum. An understanding of the self as a gifted individual and contributor, a value for learning and productivity, an awareness of the roles and responsibility for leadership are some of the affective learnings to be included in the curriculum.

LEARNING EXPERIENCE: The intersection of the elements (content, processes, product and affect) constitutes the objective or learning experience that guides the teaching/learning process. Learning experiences are essentially fixed ends or the perceived anticipated outcome of teaching and/or learning. They provide the framework for units or courses of study, lesson plans and independence study. The teacher and/or students use the learning experience to develop and plan the activities necessary to attain this end.

EXAMPLE LEARNING EXPERIENCE

STYLE ⟶ Organizer

Productive thinking skill ⟵ *Gather supportive data* to prove or disprove that *perceptions of the self, the environment and the world affect the style of life, art, music and literature.* ⟶ Content

Research skill ⟵ Select resources from the *card catalogue* to gather data. Outline the data collected and use the outline to write an

Basic skill product ⟵ *essay* to substantiate your findings.

Discussion Questions

1 Define the concept of differentiated curriculum for the gifted with reference to the dimensions of content, process and product.

2 Describe the major concerns or problems relative to specifying the curricular dimensions of content, process and product for a curriculum appropriate for gifted students.

3 Discuss the roles of taxonomies and process models in a differentiated curriculum for the gifted.

4 Discuss the concept of defined versus prescribed curriculum.

5 Differentiate between a set of learning experiences and set of learning activities.

6 Develop a learning experience using the grid illustrated in the chapter. Develop a lesson plan using this learning experience as a reference.

7 Compare the grid as a curriculum development model to another model for developing curriculum.

8 Discuss the use of the grid as a curriculum development model for a specific type of program.

9 Discuss the relationship of student interests and needs to the definition of learning experiences derived from the use of the grid.

Mary Meeker

VIII

Dr. Mary Meeker began her career in gifted education as a psychologist in 1962 when, in an effort to understand kinds of giftedness, she analyzed IQ tests for Structure of Intellect factors. In 1969 she developed the first ***Sourcebooks*** for teachers so that gifted programs could go beyond academics into the *development* of intelligence. She edited the 32 ***Frameworks for Gifted*** for the State of California (1970–1972) covering seven disciplines over four grade levels and is co-author of the SOI tests for identifying intellectual abilities. Her tests and materials have been published in Spanish, French, Japanese and Taiwanese. She is dedicated to understanding intellectual giftedness and to helping educators broaden their perspectives on teaching all children.

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Robert Meeker

Dr. Meeker has an academic background in philosophy, systems science and education. He began his professional career as a human factors scientist at System Development Corporation, studying decision making behavior. He designed and managed a computer-based laboratory for social science studies at UCLA, contributed to the earliest work with computer-based survey research programs and managed the evaluation for a national research program in school health sponsored by the Robert Wood Johnson Foundation. His principal work in education has been with the development of computer programs and training materials for the SOI Institute. Prior to his full time involvement with the SOI Institute he designed A New School for the Cities (*Education and Urban Society*, February 1971, entire issue) which applied system-level solutions to the then identified problems of the inner city schools.

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Summary

The SOI System for Gifted Education

The Structure of Intellect Model (Guilford's SI theory) offers us the most comprehensive and valid model for identifying kinds of giftedness. This model, in its full complexity, describes ninety different kinds of intelligence. These "intelligences" are organized into *content* abilities, *operation* abilities and *product* abilities. The Meeker and Meeker applications of the SI model to classroom situations form the basis for this chapter.

The SOI system applies Guilford's model to education in two ways: assessment and training. This essential link between assessment and training offers the advantage of a built-in evaluation procedure for gifted programs. The use of the SI model in assessment, training *and* reassessment highlights the integrated nature of the SOI system. Through extensive field-testing and research, the SOI system has shown that, contrary to past belief, the intellect *can* be trained.

The SOI System for Gifted Education

On Children

The nasturtium lies stifled
under the boards ignorant fall
And photosynthetic needs,
starved,
force stem growth to triple
in its white search for natural properties.

Remove the weight to allow the sun.

Effort pulses red in spots
to capture gain,
in vain.
The stem remains the same.

Distortions run the course.
The leaves grow
green but small.

Flowers?
Not at all.

Mary Meeker

The SOI system for gifted education is distinguished by the fact that it is based on a theory of human intelligence. The underlying theoretical model is called the Structure of Intellect. To understand the SOI system you must first understand the Structure of Intellect (SI) model. In this chapter we will (1) outline the SI model, (2) show how the SOI system applies the SI model to gifted education, (3) report, at a program level, how schools have used the SOI system and (4) report, at a personal level, how the SOI system has helped individual gifted students.

The Structure of Intellect (SI) Model

The Structure of Intellect (SI) model is the result of more than twenty years of research by J. P. Guilford and his colleagues in the Aptitudes Project at the University of Southern California (Guilford, 1966, 1967). The SI model is a comprehensive description of human intelligence; it describes the various intellectual factors involved in human cognitive performance. In its full complexity the model describes ninety different kinds of intelligence. Fortunately, the full complexity of the model is subsumed by an underlying structure which is easily understood. This, in fact, is the power of the SI model — the basic structure of intellect is simple and easily understood while the resulting model is sufficiently complex to describe human intelligence comprehensively.

The structure of intelligence is composed of fourteen facts about cognitive functioning that are already familiar to you as an educator. In other words, the SI model is a common sense model — a formal, scientific, psychometric model, but still, basically, a model expressed as common sense concepts.

Content Abilities

First let us consider the ability to handle different types of intellectual content. We recognize the fact that people differ in their ability to deal with different kinds of content. Architects, graphic designers, layout specialists, pattern makers, taxi drivers, assembly workers, choreographers, builders, dentists, engineers and window dressers, to name a few, all have one thing in common — they have good *figural-spatial* intelligence; if they did not, they could not function well in these jobs. On the other hand, computer programmers, (sight-reading) musicians, stenographers, cryptologists, word-processors, mathematicians, proofreaders, bookkeepers, computer operators, and cashiers, to name a few, all have one thing in common — they have good *symbolic* intelligence. Finally, writers, receptionists, political scientists, guidance counselors, social workers, copy readers, teachers, and actors all have one thing in common — they have good *semantic* intelligence.

There are, then, three different kinds of content intelligence: figural, symbolic and semantic. People have different profiles of content abilities; some people, for instance, are strong in all the content abilities — e.g., the architect who designs the building (figural), does the engineering calculations (symbolic), and makes the presentation to the client (semantic). Some people are much stronger in one content ability than in the other two — e.g., the printer who can set up the jobs and run the press (figural), but has difficulties calculating job prices (symbolic) and has problems communicating with customers (semantic). In fact, the differences in the profiles of content abilities is one of the principal determining factors in the careers that we choose and the avocations and hobbies that we follow.

It is also apparent to you that your students show different profiles of content abilities and this has implications for both their opportunities and their successes in education. Traditional gifted programs, for example, have focused primarily on semantic, secondarily on symbolic, and almost not at all on figural. The recognition of different content abilities will expand the procedures of identification (especially for those who are not gifted semantically) and also help to expand gifted programs to be more comprehensive in their definition. We will illustrate how these Structure of Intellect concepts have been used to expand the definition of gifted programs; in particular we will describe a program that expanded to include Canadian Indians by virtue of the fact that it recognized their gifted figural intelligence (see Hengen study, 1983, in the section on SOI-based programs).

Operations Abilities

In addition to different kinds of content abilities we also recognize differences in the ways that people function intellectually. The SI model identifies five different intellectual functions or operations: cognition, memory, evaluation, convergent production and divergent production. Let's look at each of these in everyday terms.

Cognition. This is the ability to assimilate new material or to recognize and understand material that has been presented before. People who are high in cognition are "bright" — fast learners, quick learners — the sort of people who can track almost any presentation whether it is in their field or not. They understand quickly and can follow instructions easily.

Politicians are typically high in cognition; they receive many briefings in the course of a day and they must be able to assimilate the material very quickly. In fact, anyone who is in a rapidly changing informational environment must be high in cognition to survive. Thus, whether one is an advertising account executive or a taxi fleet dispatcher, a movie producer or an emergency triage nurse, a public relations specialist or construction foreman — the ability to comprehend quickly is an essential ability.

Good teachers instinctively recognize differences in degree of cognitive ability among their students because they must "manage" these differences. Most of classroom management, in fact, is keeping the high cognizers interested while bringing the low cognizers along. When the differences are too great we often use "grouping" to make the differences more manageable; but whatever techniques we use, we are managing differences in cognition ability.

Memory. This ability can be easily contrasted with cognition. Cognition, as we have said, is the ability to get information in. Memory, on the other hand, is the ability to get stored information out.

We (unconsciously) assume that there is a direct relationship between cognition and memory — the ability to take it in is usually matched by the ability to bring it back — so we are perplexed by students with contrasting abilities in cognition and memory. It seems incongruous that the student who nods affirmatively on Monday through Thursday lectures, cannot remember on the Friday test; or, on the other side, that the student who must labor to understand the material could have almost no difficulty remembering it. These are the students who most dramatically illustrate the differences between cognition and memory.

We might note in passing that we do little in school to train memory specifically even though we rely on our students' ability to remember to demonstrate to us what they have comprehended. (We find, incidentally, that the great majority of gifted students have gifted memory.)

Evaluation. This is an interesting ability because we use it everyday and yet it is so little recognized by our educational practices. What is evaluation? It is the ability to make decisions or judgments. Whenever we act in the face of uncertainty, we are using evaluation; whenever we act in the face of ambiguity, we are using evaluation; yet in the curriculum of the classroom there is very little opportunity for students to use, much less for teachers to train, their ability to do evaluation.

Whether we are dealing with uncertainty or with ambiguity we are dealing with incomplete information; typically, in such situations there is no "answer"; there are alternatives or choices that need to be evaluated. The prospect of having curricular experiences in which there is no "answer" is an anathema in most educational circles, so evaluation is usually ignored; yet, its practical importance is obvious.

If people do not develop evaluation abilities (or if they develop them to a minimal degree) what do they do? They either find substitutes for their lack of judgment — rules to follow slavishly or highly structured situations that preempt decisions — or, they become highly anxious, sometimes to the degree that they "leave the field", i.e. they take themselves out of any situation that presents uncertainty or ambiguity to them.

Our students, of course, do the same; when they encounter ambiguity (e.g. five answers that all look correct) and they do not have the (evaluation) ability to deal with it, they either look for some rule to follow, or stab at an answer, any answer, to get out of the situation. If this happens often enough they soon develop (math, reading, or general learning) anxiety, sometimes to the degree that they will "leave the field" by avoiding certain courses or dropping out altogether.

It is worth noting that students who cannot handle ambiguity, can be, and often are, "bright" students who can recall their facts — in SI terms, they are high in cognition and memory, but low in evaluation. This, at once, serves to differentiate these abilities and should direct our efforts to help the student, namely, by directly developing his or her ability to handle ambiguity.

Convergent Production. While this sounds imposing, it is actually the everyday staple of the classroom, problem-solving. "Convergent" signifies that one converges on the answer from the facts given, and "production" signifies that one must rearrange, reassociate, or otherwise manipulate the "given" facts in order to find the answer. Problem-solving, in contrast to evaluation, always has an answer. This lends itself to didactic instruction, thus it is one of the abilities that we exercise constantly in the classroom.

Convergent production is, of course, the backbone of science, mathematics, trouble shooting, debugging, invention, repair work of almost every kind, system design, engineering, and mechanics. The ability to solve problems is prized as much in the world of work as it is in the world of school.

Divergent Production. If convergent production is the ability to converge on an answer from given facts or conditions, divergent production is the ability to find innovative solutions within defined limits. This is the Structure of Intellect ability most identified with creativity. It is one of the most applied parts of the model because it offers a definition of creativity, a means of measuring creativity and, through the SOI system, a means of training creativity; thus, for programs that focus on creativity it provides an attractive conceptual framework.

To summarize to this point, the SI model identifies five different intellectual functions: cognition (taking it in), memory (bringing it back), evaluation (making judgments or decisions), convergent production (solving problems) and divergent production (creating). The SI model also identifies three different intellectual contents: figural, symbolic and semantic.

As you may have already anticipated, these two dimensions of the model intersect one another. Since each of the functions can take place in any of the content areas, the complexity of the model begins to emerge; one can cognize figural, symbolic or semantic content; one can recall figural, symbolic or semantic content; one can evaluate figural, symbolic or semantic content; one can do figural problem solving, symbolic problem solving or semantic problem solving; and, finally, one can be creative figurally, symbolically or semantically.

Products Abilities

The final dimension of the model describes the six different levels of informational complexity at which one performs: units, classes, relations, systems, transformations and implications.

Units. The ability to deal with units is the ability to deal with one thing at a time. People who are strong in this ability are good with details; they make sure that the t's are crossed and the i's are dotted.

One should not assume that it is easier to operate at the units level than at a level of greater informational complexity; it may or may not be, and it may be different for different people (because they have differing abilities when it comes to dealing with things one at a time). Some people have phenomenal memories for telephone numbers (units), but cannot remember multiplication tables (relations); for most of us, however, the reverse is true; we find it easier to remember related information than isolated bits. Units, then, are primary in terms of complexity but not necessarily the easiest to work with in terms of cognitive function.

Classes. The ability to deal with classes or groups is the ability to see critical similarities and differences. People who are strong in this ability are organized cognitively; they have a conceptual place for everything and everything in its conceptual place.

When a young child moves from units to classes it is a quantum leap developmentally because it represents the cognitive economies of being able to deal with groups, sets and collections rather than separate individual entities. Some children do not develop classification abilities beyond the most primitive level and as a consequence they are severely penalized in terms of learning.

Relations. The ability to deal with relations is the ability to see associations and connections between things. People who are strong in this ability are sensitive to the interrelatedness of things; they see the warp and woof as well as the pattern of the fabric; they see the connections everywhere.

The ability to understand relations develops after the ability to classify; young children learn relational concepts (above/below, over/under, inside/outside, etc.) long after they learn to classify and they master the complications of relations (inverse, transitivity, etc.) long after they learn the simple relational concepts. The ability to understand complex relations is the door into so-called higher-order thinking skills.

Systems. The ability to deal with systems is the ability to see the relations of relations. People who are strong in this ability see not only the big picture, but the ever bigger picture as well.

The ability to understand systems is the threshold into the higher-order (or critical) thinking skills. "Higher-order" thinking skills are considered to be "higher" than the basic thinking skills which deal primarily with units, classes and simple relations. Systems level thinking is, of course, essential to science, mathematics, historical analysis, plot development, urban planning, inter-agency budgeting, and for its namesake, systems engineering.

Transformations. The ability to deal with transformations is the ability to see things in a different perspective or in a different light. People who are strong in this ability are very open-minded — able to see situations (problems, tasks, etc.) anew without imposing preconceptions that would obscure the solution. Inventors are masters at transformational thinking. Invention is rarely scientific discovery; it is almost always the application of well known principles and techniques in a way that produces new results.

Transformational thinking is, in fact, another aspect of creativity (in addition to divergent production). When we speak of *creative problem solving* it always involves transformation; that is the creative aspect of the problem solving — being able to converge on the answer by virtue of redefining the problem in a new way. The most dramatic examples of innovation whether in science, the arts, mathematics or invention involves transformational thinking.

Implications. The ability to deal with implications is the ability to see outcomes or consequences. People who have this ability are far-sighted in their outlook by anticipating outcomes and profit from their mistakes by avoiding the negative (or undesired) consequences of past actions. As Piaget has shown, in formal thinking, implications is one of the last abilities to be fully developed and yet it is an ability that we can measure very early with tests like maze tests (the ability to see ahead is an implications ability).

Implications thinking is an essential component in analysis whether it is in editor writing, numerical theory or jurisprudence. "Logical" thinking and deductive reasoning are practically synonymous with the ability to see implications and outcomes.

This completes the outline of the SI model. From these fourteen concepts the whole of the SI model can be derived — ninety different types of intellectual function described in terms the operation involved (cognition, memory, evaluation, convergent production, or divergent production), the content area involved (figural, symbolic, or semantic), and the degree of informational complexity (units, classes, relations, systems, transformations, or implications). The interactions delineated in this model is diagrammed in Figure 1.

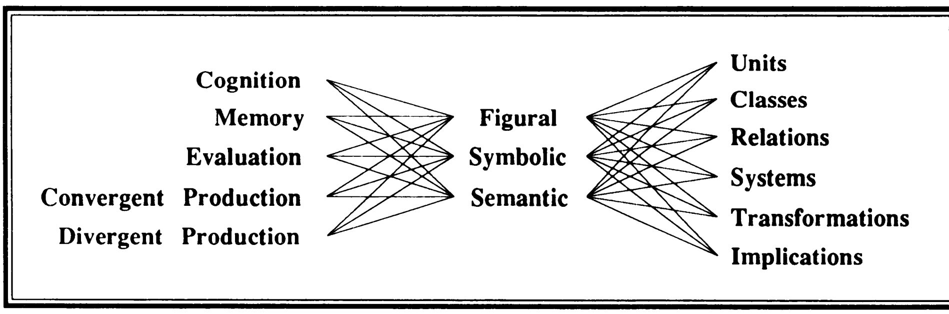


Figure 1. SI Model: Intersection of General Abilities Producing Ninety Different Specific Abilities

The value of such a model is that it provides a map of human intellectual function. As practitioners in education, we may not be concerned with the total domain that is mapped; in fact, we will only be concerned with those parts of the domain that relate to our educational objectives; that, indeed, is the application of the SI model to education and that is the subject of the next section.

The SOI System: Applying the SI Model to Education

The SOI System applies the Structure of Intellect model to education in two ways: assessment and training.

Assessment

The assessment component is a direct outgrowth of the research that produced the SI model. The SOI tests are based on SI concepts; in many cases the SOI tests are modifications of the original tests that were used to identify the different abilities in the model. The SOI tests have been designed for levels appropriate to school age children. (While some of the SOI tests range to post-secondary populations, the primary emphasis has been on school age children.) The SOI tests have been designed for group administration by a psychologist, psychometrist, coordinator or classroom teacher.

Since these tests have been designed for practical use in educational programming, we could not, of course, test all of the ninety different intellectual abilities. Different subsets have been selected for different age groups and educational purposes, but the basic concepts behind all the tests are the SI-identified abilities. The titles of the various tests will illustrate the different foci in terms of age and educational purpose: SOI Test of Learning Abilities (grades two through twelve); SOI Process and Diagnostic Test (kindergarten through grade three); Reasoning Readiness Test (kindergarten and grade one); Gifted Screening Test (grades two through twelve); Atypical Gifted Screening Test (grades two through twelve); Personal Productivity Assessment (high school and above for career counseling).

SOI tests have been used in gifted programs in two ways; as a means of identifying gifted students and as a basis for designing individual courses of training within the gifted program.

Identification of Giftedness. SOI tests have been used as a means of identification — most often, of course, in conjunction with other criteria — of gifted intellectual abilities. The broad spectrum of the SOI tests means that one is opening the lens of identification to more possibilities than the focus of traditional IQ tests. Furthermore, the differentiation of abilities — as drawn from the ninety different SI abilities — yields an individual profile of intelligence rather than a single aggregated score (e.g. 129); this profile of intelligence shows the teacher, student and parents *how* the candidate qualified as gifted. Or, and this is important to any process of gifted identification, how the candidate did not qualify. There is, for instance, not much information or much basis for improving oneself for future qualification, in a score of 129 when the cut-off is 132; there is not much solace or hope in having missed the cut-off by three points.

The situation is quite different with a differentiated test such as the SOI. A candidate may still miss the cut-off, to be sure, but the information as to why he or she missed is available, first, as a basis of explanation and, second, as a basis of improvement for future qualification. If the criterion for qualification using the SOI-LA were, say, twelve out of the twenty-six tests in the gifted range, and the candidate only made eleven, then the post-test conference can be used first, to *acknowledge* the gifted abilities that the student has already developed and second, to *focus* on those abilities at the near-gifted level that could be improved before the next qualification testing occurs. This positive approach to near-miss identification is not possible without a differentiated test like the SOI.

Identification for Special Gifted Programs. Many schools districts (and some states) have seen the need to expand their gifted programs to include groups that have been systematically excluded (or severely underrepresented) by the identification criteria that have been used. The SOI system has been used as a means of drawing in these atypical groups without simply lowering standards of admission.

The first thing we need to do in expanding the criteria for identification is to understand why the traditional methods have systematically penalized certain groups. Traditional methods are semantically oriented; as a consequence any student (or group of students) who is weak in semantic abilities, will not qualify. Once this fact is evident there are three alternatives: (1) continue with the traditional identification procedures and continue to exclude non-semantic students, (2) modify the selection procedures to compensate those students who, by reason of socio-economic circumstance, have not had the opportunity to develop semantic abilities (this is usually done by giving "compensation" points for socio-economic circumstance), or (3) expand the assessment of abilities so that non-semantic candidates have the opportunity to show their gifts in other areas.

SOI lends itself to the third of these alternatives since it offers a full range of non-semantic (figural and symbolic) abilities to test. This, in fact, is the focus of the SOI Atypical Gifted Screening Test, but other SOI tests can be used in the same manner, that is, by focusing on the non-semantic abilities.

The value of expanding the scope of assessment to encompass the atypical gifted is that it makes the conceptual framework of the atypical program explicit so it is less likely that a student will be specially qualified and then put into a traditional, semantically-oriented program. This, of course, will lead to very undesirable consequences despite the good intentions of the program. In other words, an atypical gifted program that only opens the doors to qualification and then puts the student into a typical program — *atypical* as to qualification but typical as to program — will be detrimental to the very group it is trying to help. To be successful the program must take the students where they are and lead them from there to the goals of the program. The SOI test makes it clear where the student is because it gives a profile of abilities; in that sense it defines the starting point for each student in an atypical program so it is less likely that the program will be grossly mismatched to the students' entry abilities.

This, in fact, brings us to the other use of the SOI System in gifted programs, namely, using Structure of Intellect concepts and SOI materials for training intellectual abilities.

Training

Guilford's original research was a process of finding the different intellectual abilities — mapping the structure of the intellect. The original researchers did not consider the possibility of training abilities; the SOI system has extended the original research in this direction — training and developing structure of the intellect abilities.

The concept of training intelligence (thinking skills, cognitive abilities, etc.) is not nearly as contentious today as it was twenty-four years ago (Meeker, 1962) when SOI was first proposed for intelligence training. In the intervening years a wide range of materials have been developed for abilities training, and many studies have documented the fact that abilities can be trained. SOI has contributed to the current conventional wisdom that thinking abilities, more fundamental than curricular skills, can be trained and developed.

The SOI approach to training intellectual abilities is very direct: the abilities had already been defined by the SI model; the SOI system, then, produced materials for training each of the ninety abilities. Materials have been produced for each of the abilities but some have received more attention than others; not surprisingly, perhaps, the abilities that have received most attention are those that most closely associated with school learning.

The training materials come in two forms: *mini lesson plans* for group teaching, and *self-help modules* for individualized instruction. The mini lesson plans are grouped into books called *Sourcebooks;* each Sourcebook offers more than one hundred lesson plans; each Sourcebook covers all of the abilities related to each of the operations (i.e. a book each for cognition, memory, evaluation, convergent production and divergent production). The modules, on the other hand, are very singular in focus; each module is designed to train one and only one SI ability. Typically, a module contains twelve pages of exercises all concentrating on one ability with ever-increasing degrees of difficulty. The modules require no teacher preparation.

With the availability of these training materials it is possible to devise an SOI program for the gifted that is integrally related to the assessment criterion used for admission into the program. In other words, from the profile of abilities revealed in the qualification assessment, a program of training can be specially designed for the individual student.

The step between assessment and program is *test analysis*. This can be done manually or by computer process; in either case a student's test scores are analyzed in terms of percentile norms which show the student's individual pattern of intellectual strengths and weaknesses. From these patterns or profiles one can prescribe individual programs of training that will optimize the gifted program's goals. Thus if the program's goal is to intensify the student's ability for academic achievement, then an individual program can be prescribed that will develop and/or enhance academically-related abilities. On the other hand, if the program's goal is to make students more intellectually versatile, then an individual program can be prescribed that will seek to bring all of the student's abilities in line with the already gifted abilities. In general, whatever the program goal, it can be translated into a prescribed program of training for each individual.

With this essential link between assessment and training the SOI System offers the possibility of testing to see if the goals of the gifted program are being met. A program that begins with SOI assessment, and prescribes training on the basis of that assessment, can then be reassessed to see whether or not the training has been successful. This possibility of reassessment simply highlights the integrated nature of the SOI System; since identification and training are both rooted in the same SI model there is a direct translation of program goals into operations and an opportunity to test to see whether the goals are being met.

Finally, the SI model provides a vehicle of communication among all parties involved in the gifted program. For instance, in a pull-out program, the regular classroom teacher can be apprised of the student's program and progress in very specific terms and these, in turn, can be related to regular classroom performance and reinforcement. The model thus becomes a means of coordination that is otherwise difficult to achieve. In another regard, the model can be used to communicate goals and progress to parents; SOI has developed parent report forms to translate the student's profile into common sense terms and then relates the student's progress in the same terms. In general, wherever there is need for communication the mode proves to be an effective common denominator.

In concluding this section we offer the observation that the SOI System's approach to gifted education is not disjunct with the SOI approach to special education, the learning disabled or, for that matter, to education in general. We believe that gifted individuals have special needs that are defined by where they are relative to the general population; but "where they are" cognitively can be defined in Structure of Intellect terms and the educational programming for them can be defined in the same terms. The same can be said for the learning disabled — they have special needs defined by where they are relative to the general population and "where they are" can be defined in Structure of Intellect terms and the educational programming for them can be defined in the same terms, and likewise for other specially identified populations. This is not to discount the differences in social-emotional needs among such populations, but it does, as it should, help to eliminate the mystery of boundaries that tend to grow between specially defined groups.

How Schools Have Used the SOI System

In the previous section we described the basic components of the SOI System. In this section we describe how schools have chosen to use various parts of the SOI system to implement their programs for gifted education. In selecting the example programs we want to provide both an historical perspective and a sense of the diversity of use.

Increasing Intellectual Giftedness

Under the leadership of Margaret Hibbits, the Lompoc School District was one of the first districts (1963) to design an SOI program for gifted elementary students. To qualify, students were identified by the Binet (IQ score 130 plus); with scores at the ninety eighth percentile in reading and arithmetic on the California Achievement Test. They were motivated, high achieving learners who needed more than an enriched or advanced standard course of study to keep them busy and interested. Hibbits and her teachers used SOI to identify the intellectual strengths and any weaknesses for each student. Since this process occurred long before computer use in school, these teachers developed flow charts in order to group students for their experiences in SOI. We learned how different were the intellectual profiles (Meeker, 1963, 1969), even among same-aged students who had the same IQ scores. We also learned which gifted students had average and even low specific abilities.

Method. Students were grouped according to their SOI strengths for one hour a week and for their SOI weaknesses another hour a week. Hibbits, a school psychologist, re-tested the students at the end of the first year and found surprisingly that all of the students had increased their IQ scores from 16 to 30 points. In 1963 the general assumption was that IQ's were fixed, beyond the standard error (6-7 points). The following year students were regrouped according to their new SOI profiles and SOI exercises were continued.

Hibbits compared pre- and post-Binet scores of gifted students in a neighboring district, where the program consisted of enriched academics, i.e., higher grade level texts. Their scores did not increase and, in fact, some went down due to the maturation factors built into the IQ tables.

Conclusions. At a time historically when IQ scores were considered immutable, this study showed that even for identified gifted students, intelligence, as measured on IQ tests, could be increased through the use of SOI training materials. Furthermore, this was accomplished with a program of only two hours training each week. The efficacy of the program was attributed to the fact that weaknesses could be identified from the SOI profiles and addressed through SOI training. Without the differentiation of intelligence that SOI offers, this would not be possible.

The information gained through this first two-year study led other educators to design programs to replicate the findings reached in Lompoc. In the intervening period since 1963, this study has been repeated, with minor variations, many times. This is so, despite the fact that it is a rather expensive study for a district to undertake because it requires individual pre- and post-IQ testing. In almost every instance in which this study design has been implemented the result has been the same: a focused program of SOI training will increase intelligence as measured by standard IQ tests.

Developing Creativity Responses and Creative Thinking

By 1965 school districts throughout California were engaged in identifying their gifted. Under Stuart Mandel's leadership in the East Whittier Schools, Eleanor Manning coordinated a gifted program for several elementary schools. Students were still identified by IQ scores, and the only information available to the teachers for use in program design was the IQ and achievement test scores.

Method. Manning was particularly interested in creativity for the gifted. Dr. Upton, a prominent semanticist at Whittier College had authored *Creative Analysis* in which he adopted the Guilford Divergent Production concepts as operational definitions of creativity. He and some of his students modeled the exercises after Divergent concepts in an effort systematically to lead the user into thinking beyond "knowledge." Manning felt strongly that gifted children should experience similar thinking experiences.

In concert with Guilford and Meeker she designed a Title III, ESEA proposal in which gifted students from four elementary schools were matched by IQ score, sex and grade. The first school had the traditional enriched curriculum. The second program consisted of a special science laboratory in which interests would lead to advanced science teaching. The third program had a Divergent Production program using SOI sourcebook exercises (Meeker, 1963) as a basic model from which to design more divergent exercises. The fourth program was individualized by addressing the strengths and weaknesses of each student based on his or her SOI-Binet profile (Meeker, 1969). The study was funded for 490 students over a three year period. The Torrance Tests of Creativity (1974) and the Meeker SOI Creativity Rating Scales (1970) were used as pre- and post-measures on all of the groups.

Special teachers were *not* employed for this project. The district had a waiting list of teachers who had applied for jobs in the district, and were obligated to take the next five teachers in line. None of the teachers had special course work for teaching gifted children, so staff development was planned to cover the psychology of giftedness as well as inservice training on the SOI. These teachers worked under the direction of Marilyn Brown and Eleanor Manning. Resulting post-test scores from each group were to be compared for the Stanford Achievement Tests, Binet, Torrance and SOI Creativity Scale. The program considered most successful would be the one which produced the highest achievement test scores.

Findings. Each of the four groups had two measures of improvement, creativity and achievement. Only one group showed a significant increase in creativity and that, of course, was the group that received creativity training. On the achievement measures two groups showed significant increase: the first was the SOI-abilities trained group and the second, surprisingly, was the group that received creativity training. The traditional enrichment group and the advanced science group showed no significant increase in either creativity or achievement.

Conclusions. This study showed, first, that it is possible to teach creativity; those who received the creativity training gained significantly in creativity measures; none of the other groups gained in creativity. This study showed, second, that training SOI-abilities will lead to greater increases in achievement than programs that are achievement-oriented. This study showed, third, that creativity and achievement are not antithetical: one need not sacrifice achievement for creativity training. On the contrary, well-focused creativity training can produce achievement gains.

Identifying Gifted Among the Culturally Diverse and Designing a Gifted Program for Their Needs

Tom Hengen, a coordinator for gifted in Regina, Canada, wanted to design a program that would include — not systematically exclude — native Indians. His program is notable not only for its identification of gifted among the Indians, but more so for its sensitivity to needs once they were in the program.

Method. Hengen used the SOI-LA test to identify gifted students; the same test was used for those students who were mainstream culture and those who were culturally diverse. In other words, the criteria for admission into the program were the same for both groups. The Indians were able to qualify for the program because the SOI-LA test is not semantically biased; or, put another way, the Indians were able to qualify for the program because the SOI-LA test recognized the area in which they were as a group most gifted, namely, the figural-spatial area.

Having qualified many of the Indians for his gifted program, Hengen knew that they would flounder in the semantically-oriented program that was appropriate for the mainstream gifted. He knew that he would need to devise a figurally-oriented program to match their strengths, but he also knew that the program would have to be as demanding as a semantically-oriented program. The program that he devised was based in large measure on the tasks presented in the SOI Sourcebooks. He trained critical (higher-order) thinking skills; the only difference was that he did so almost exclusively in the figural domain.

Findings. The program was successful on three different levels. First, the Indians made greater gains in their abilities training than the mainstream students did. (It was possible to make this evaluation because each participant had an entering profile of abilities, a program of training, and a resulting profile of abilities; the Indian group made more gains relative to their training than the mainstream group did.) The first result produced a second result, namely, the Indians were experiencing success with very demanding exercises. This was a novel experience for most of them and it provided convincing proof to them that they were "smart." With this realization came all of the attendant benefits: higher motivation, longer time on task and improved self-concept. This second result produced a third, namely, the Indians began to improve in the semantically-oriented curriculum outside the gifted program.

Hengen has subsequently worked on a "transition" program that will bridge from the figurally-oriented to a semantically-oriented program. The ultimate goal of his program is to bring the culturally diverse gifted through their strengths to the mainstream (Hengen, 1983).

Conclusions. Programs for the atypical gifted, whether culturally diverse or economically disadvantaged, must not only broaden the criteria for admission into the program, but must also follow this with programming that matches the gifts that gained them admission. Programs that are diverse but otherwise no less demanding are available through the SOI System because it provides a framework for redirecting the program to the participants' areas of strength.

Counseling Gifted High School Students for Careers

Programs for gifted students at the high school level often pose problems: by the time that many of the students have been involved in gifted programs at the elementary and intermediate levels they have already been exposed to many types of enrichment and even much of the secondary curriculum.

Bob Swain faced this sort of problem in the San Juan Carmichael district in California; advanced placement in the State University of California at Sacramento offered some opportunities, but not as focused a program as desired. Most educators of gifted have observed that frequently some gifted students decide on careers at an early age; others, however, are so capable in so many curriculum areas, and their interests range so far and wide, that interest-based measurements offer minimum help.

Method. In conjunction with SOI, a career exploration program was designed for gifted students. Upon entry to high school, SOI test scores were submitted for career analyses rather than for educational analyses. Students received a listing of occupations which best fit their unique pattern of intellectual abilities. This list answered the question of what careers their abilities suggested for consideration and study. They received a print-out listing 20 to 30 possible occupations from which to select. Counselors helped them with additional information from the Dictionary of Occupational Titles (DOT), suggesting various college programs that fit their career interests. Students learned how their profiles of abilities fit the requirements of careers that they were considering. Through this program they were given the opportunity to improve those abilities that would otherwise be inhibiting to their career goals.

Conclusions. The program proved to be an effective method of revitalizing a high school program for the gifted. Career prospects were a highly motivating factor for abilities training.

Other schools, colleges and districts have designed similar abilities-based career options programs for their gifted. Marlborough High School, a private school for girls in Los Angeles, has used the SOI-LA tests and computer analyses since 1980 for career counseling as well as for educational planning. Under the leadership of Head Counselor, Tony Hall Hayes, their program consists of first, testing incoming seventh graders in order to identify any intellectual abilities which may not be well developed, so that students can work on SOI modules in study hall; and second, post-testing eleventh graders to help them in selecting several careers to investigate from their personal computer analyses. Using SOI testing for both educational planning and career counseling has had mutually reinforcing effects.

Screening Preschool and Kindergarten Aged Children for Potential Giftedness

Dr. Arthur Pober (1984) designed the EAGLE program for primary and elementary gifted in the Brooklyn School District 22, but he also wanted to identify entering four year-olds with potential giftedness. The population is culturally diverse ethnically and linguistically, encompassing 28 different cultures. Using the SOI Reasoning Readiness Test as a screen, they were able to nominate 400 out of 4,000 children tested. [Renee Bonne (1985), in a Bronx district, was able to screen and identify 200 out of 2,000 kindergarten students. These studies were independent of each other; each identified ten percent of the children tested as potentially gifted.]

Method. Entering four year-olds were tested with a shortened version of the SOI Reasoning Readiness Test. The children were tested by kindergarten teachers in groups of two or three. This short version of the test was used for screening students. Performance criteria were established for each of the tests and those children who tested at criteria were then given the remainder of the Reasoning Readiness Test as a means of evaluating the effectiveness of the screening procedure. The procedure selected about ten percent of the population for further testing, and the further testing produced a ninety percent confirmation rate.

Conclusions. The screening procedure proved to be an efficient and effective way of screening an entire preschool population. This answers a need for (especially large city) programs where preschool has become mandatory and all special education programs, including the gifted, are being applied to the preschool level.

Summary

In this section we have presented a sampling of gifted programs that use the SOI System; it can only be a sampling because there have been numerous programs and studies since 1962. The SOI Institute serves as a clearinghouse for SOI-based studies, and it produces a number of publications that describe and document the use of the SOI System in the field.

How the SOI System Has Helped Gifted Students

It is important for teachers of gifted to understand the psychology of giftedness. Gifted children are *children* first and *gifted* second. They share, in common with all children, normal expectancies of growth in emotional, physical and social aspects. The exceptions to this are the physically talented in music, arts, athletics, dance and/or extraordinary leadership characteristics (who may or may not be intellectually, academically or linguistically gifted). Nevertheless, teachers who understand the broader functioning of gifted children can better adapt curriculum for their gifted. The paradigm below offers teachers and psychologists a description of the many facets and functions which affect gifted performance.

The Meeker paradigm (Meeker, 1975) is used at the SOI Testing Center in El Segundo, California as a base for each case study. Depending upon the presenting problem (which may be as simple as *"Is my child gifted?"* to *"Why doesn't my child perform?"*) specific tests, observations or screening procedures are used for the dimensions which may be involved in the presenting problem. After these procedures are completed we develop a program for at-home tutoring or in-school experiences which will meet the specific gifted needs whether in Area I, II or III.

The teacher who organizes information about each gifted child in the manner indicated in Figure 2 will be able to teach much more effectively, will be able to understand *what* and *where* the gifts are and will be able to plan group and individual programs for their students' needs. The teacher who has this broad, in-depth information in the cumulative folder is also able to counsel with parents about an individual child and make recommendations which go beyond the teaching of accelerated curriculum. In the following section we present three case studies to illustrate how the SOI System can be used to meet individual student needs.

Case I: Math Anxiety

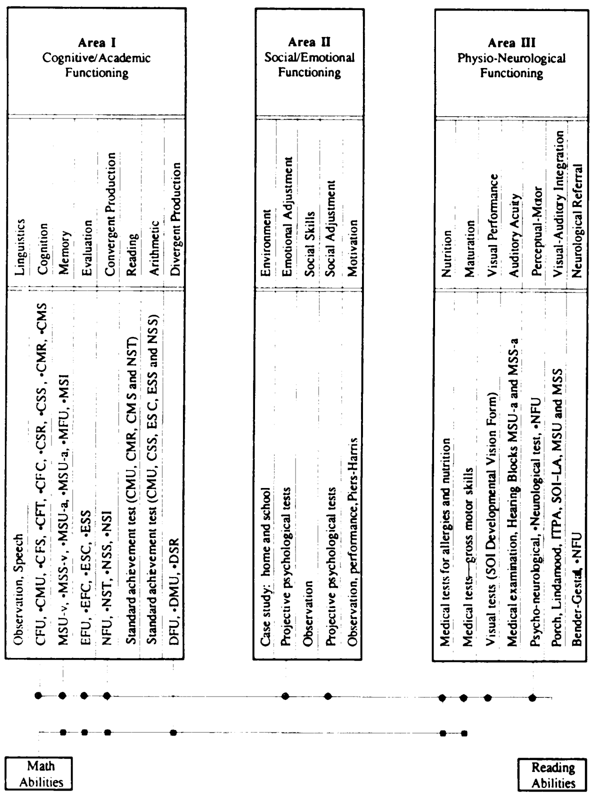
Mark is a ninth grader who is gifted, scoring at the 99th percentile on language assessments and at the 75th percentile in quantitative tests. He is a high divergent producer, and his giftedness is shown in the writing of poetry, stories and plays. He works on the school paper and performs in the drama club. He has just been placed in an advanced math class for geometry and hates it. He gets stomach aches before geometry and is so loaded with math homework that he can't find time to write or do his other homework. His parents, at the request of the geometry teacher, got a tutor for him. Mark, who has always been popular and a leader, mature and responsible is found crying frequently, something he has not done for years. He has announced to his parents that he wants to change schools.

The paradigm below puts the SOI-LA test assessments in the broader context of total human functioning. The paradigm presents three different areas:

Each column can be assessed.

MEEKER PARADIGM*

Three Major AREAS for Assessing Functioning



Curriculum can be based on findings within each of the columns above.

- Area I — encompasses language, structure of intellect learning abilities, and academic performance. Scholarship and creativity show up here with high functioning.
- Area II — encompasses social and emotional functioning; sometimes called affective functioning by educators. Leadership shows up here.
- Area III— encompasses physiological and neurological functioning. Talent shows up here.

The academically gifted are, of course, performing at a gifted level in Area I. Typically they are excellent convergent producers whose gifted memory abilities bring them to the attention of their teachers. Individual Educational Plans (IEP's) can be made for all students in each one of the Area I columns using the SOI Sourcebooks, Task Cards, and standard curriculum.

Figure 2. Meeker Paradigm

Taken from* **The State of the Art, *BEH, Office of Education, Washington, D.C., 1975 and* **The Teachers' Guide for Interpreting SOI Test Results,** SOI Institute, 1980 Meeker, M.

His counselor administered the SOI Test. Mark scored at the 16th percentile in the two math intellectual prerequisite abilities (CFS and CFT). But more than that, now, besides having two cognitive disabilities, he has developed classical math anxiety. Assessment in Area II (see Figure 2) shows Mark to be a sensitive boy who has good social adjustment. Area II shows no problems. Area III screening indicates he is a slow maturing boy. Screening tests in vision and hearing indicate excellent integration. He has no allergies.

Investigation showed that he had a devastating arithmetic experience in the third grade. The teacher was absent a lot; he was severely criticised when his arithmetic papers were neither as neat nor as correct as his reading performances. His sensitivity and pride led him to be persistent and his gifted comprehension enabled him to keep up, until he faced the spatial figural aspects of mathematics. Mark seldom participated in sports beyond recess games. Both his mother and father worked in intellectual jobs and neither was sports oriented.

The first recommendation was to reduce the stress from math by removing him from the advanced class to a regular math class. His counselor delayed scheduling him for college-bound requirements of geometry and trigonometry until his junior and senior years. While he was given this respite, he was tutored, not in arithmetic, but in the math-related SOI abilities that he did not have. He was placed in Kung-fu classes so that he could internalize spatial systems and learn the geometry of his own body in space. He dealt with his math anxiety in other ways, too. At the beginning of his sophomore year, he was retested to see whether the math abilities improved. They had, but not yet to the gifted level. His SOI program was continued at school during his homeroom period. Math anxiety is not easily eradicated, but by letting Mark understand the role of his intellectual abilities and by giving him a rest while he gained control of his own development, he overcame his fears and the pain of failure. He does not see his future in math oriented careers anyway, because he wants to be a playwright or in the field of writing where his talent and interest lie.

The sensitivity of gifted children and their desire to be excellent in every subject can sometime lead to maladaptive coping strategies. Educators who group gifted students according to their strengths offer them success experiences for which they can receive praise while protecting them during the difficult adolescence years. Had the counselors received an SOI profile on Mark at his entrance to high school, the profile would have allowed teachers to place Mark more efficiently and would have prepared him, before high school, for any abilities not yet well developed. (See Figure 3.)

We often assume that boys are math oriented because so many do seem to be. (See the Benbow chapter in this book for difficulty in matching boys to girls for gifted math problems). Roughly 50% of gifted girls have profiles like Mark's and it is very typical of the profile of gifted children who do well in arithmetic but have great difficulty in mathematics. Early SOI intervention programs would thwart this situation. We recommend that by third grade teachers know the SOI profiles of their gifted girls and boys so that undeveloped abilities can become part of the curriculum. Our research here and that of the LSIE schools in Japan shows that unlike American and Canadian girls, oriental girls have high figural abilities. The Stanley-Benbow research has shown that until oriental girls were sought, math oriented girls were few and far between. We know that figural intelligence can be increased with early SOI intervention.

HOW TO USE: For within the grade evaluation; using band of grade scores, place students score by reading from top down, to nearest matching score; look to left column for evaluation. Then, using the following system of symbols:

'+ +' for Gifted   '+' for Superior   'o' for Average   '-' for Limiting   '--' for Disabling

transfer the appropriate symbols to the form below; this will relate the performance level of the student to reading, arithmetic, writing, and creativity areas of school learning.

LEGEND: Gifted—94% tile   Superior—84% tile   High Average—66% tile
GRADE—50% tile   Low Average—34% tile   Limiting—16% tile   Disabling—6% tile

READING (Foundation abilities):

- + CFU—Visual closure
- ++ CFC—Visual conceptualization
- ++ EFU—Visual discrimination
- + EFC—Judging similarities and matching of concepts
- ++ MSU (visual)—Visual attending
- ++ MSS (visual)—Visual concentration for sequencing

READING (Enabling skills):

- ++ CMU—Vocabulary of math and verbal concepts
- ++ CMR—Comprehension of verbal relations
- ++ CMS—Ability to comprehend extended verbal information
- + MFU—Visual memory for details
- ++ NST—Speed of word recognition

WRITING:

- + NFU—Psycho-motor readiness

ARITHMETIC:

- − − CFS—Constancy of objects in space (Piaget)*
- − − CFT—Spatial conservation (Piaget)*
- + CSR—Comprehension of abstract relations*
- + CSS—Comprehension of numerical progressions
- 0 MSU (auditory)—Auditory attending
- 0 MSS (auditory)—Auditory sequencing
- 0 MSI—Inferential memory*
- + ESC—Judgment of arithmetic similarities
- + ESS—Judgment of correctness of numerical facts
- 0 NSS—Application of math facts
- 0 NSI—Form reasoning (logic)*

*pre-math abilities

CREATIVITY:

- ++ DFU—Creativity with things (figural-spatial)
- + DSR—Creativity with math facts (symbolic)
- ++ DMU—Creativity with words and ideas (semantic-verbal)

Figure 3. Mark's Ninth grade SOI profile

Case II: Non-Performing Gifted

Leanne was a highly gifted ten year old. She was also one of the most sociable little girls who ever entered fifth grade. She liked everyone and everyone liked her. She was easy to get along with, had a marvelous sense of humor and a ready wit. As early as first grade she made up stories which children loved to hear and she organized them as plays for everyone to act in. She played the piano, guitar and banjo all by ear, and she sang harmony faultlessly without ever having had lessons. She was talented in art; she copied well, designed well. She was responsible and a delight to all of her teachers, but she would not study. Learning came too easily to her for her to spend time studying.

Leanne was the third of six children. Neither parent had a high school education, and they were not nearly so concerned about her achievement as were her teachers. She was one of the students screened for the gifted program and was admitted on the basis of her SOI test results, scoring at gifted levels in 12 of the sub-tests and superior on 10. None of her scores fell below average and the three divergent tests were all at the ceiling — she was a rare gifted child — creative, talented with scholastic potential for academics, and she was a leader.

Like many elementary schools, the program in Leanne's school had limited offering for creativity and talent. This was not surprising because gifted creative potential and talent are much more rare than are intellectual and academic giftedness. The admission committee decided that Leanne needed motivation in order to develop her academic knowledge and to use her intellectual potential. Two steps were taken for an individualized program. She was placed on contracts first to cover the basic curriculum, then to maintain her gifted SOI abilities. Once those contracts were met, a contract would be made for horizontal enrichment in academics. Basic curriculum contracts were taken care of in her regular classroom. When she completed her week's assignments, her SOI and enrichment took place in the library for one hour weekly. One afternoon a week she was sent to the high school art department to be with a teacher who volunteered to include her in her classes. Leanne's parents were encouraged to enroll her in a community parks and recreation program for drama and musicals. It is important to clarify that parents are often in need of special enlightenment about the meaning of giftedness.

As Leanne was challenged her attitude changed. She enjoyed the freedom to explore advanced reading material in new areas of interest. She really had been bored and later quipped *"I guess I discovered the slow-down strike!"* She maintained her gifted SOI functions and made even more friends at the high school where one of her older siblings attended. Her grades improved and she maintained her social involvement.

We frequently see gifted children who really are people oriented, socially gifted and service oriented. Leanne intends to be the first college graduate in her family and plans to become a preschool teacher. Her academic career has been so successful that as of this writing at the age of sixteen she sees scholarships on the horizon. Many gifted students become bored with a slowly paced curriculum, lose motivation and do a "slow down" strike.

Case III: Figural Gifted

By far the most unusual gifted child is the figural-creative one who is also a loner. David was such a child. He came from an affluent background, the youngest of three children. David was tested for the gifted program when he was five. His Binet score was 153. Unlike many gifted children, he had not learned to read. This system was strictly academic and their procedure was "succeed, compete or dropout." He was placed in a combined kindergarten-first grade and was put into a semantic reading program, a basal reader known for its difficulty. Within two months David was failing. His parents were called in for a conference by the teacher who informed them that she was placing David on probation in the gifted room, and if by Christmas there was no progress he would be placed in the regular kindergarten for the spring semester.

The parents brought David to the SOI Testing Center for an evaluation. The SOI testing confirmed the high Binet score and the parents were told that at the early levels of the Binet, the responses were appropriately those of figural intelligence and that on the SOI he did indeed score at and above gifted on all but two of the figural sub-tests. But, at the same time, he scored only average and below average on the semantic tests. In particular, his performance on the tests for verbal sequencing (CMS) indicated that he should not have been placed in a semantic reading program such as a basal reader. His learning style was that of a figural-symbolic learner; this was a classic case of mismatch between learning style and teaching method.

David also made below-average scores on two of the tests which are visual indicators (that is, sub-tests which are cognitive representations of visual-physiological processes), indicating that there was a possibility that David had some visual dysfunctions which needed to be examined by an optometrist or ophthamologist who respected the difference between sight (20/20) and learned vision functions or a developmental or visual therapist. David did have twenty-twenty sight. These visual indicators include visual closure and visual discrimination, and fall under the sub-set of abilities required for beginning reading processes (see Figure 2). So we were able to understand why he was not progressing in reading at a time when he should have been making spectacular gains.

Vision functions interact heavily with reading processing and if any of these functions are not well developed, then, when combined with low semantic abilities, this dictates that the student should be taught reading with a method other than semantic basal readers or the symbolic-notational-auditory phonetics systems. We developed an at-home program for David with an SOI *"traveling tutor"* and recommended the vision examination of ten known vision functions. We learned subsequently that David's eyes saw two objects separately and that each eye focused at a different point and tracked independently of each other. These problems were taken care of through professional training while we concentrated on the SOI materials and books listed in Figure 2 under *Reading (Foundational abilities)*.

It is unfortunate that in this particular district, gifted programs are still offered only to high academic achievers and there was no acceptance of a child who does not fit that mold no matter how gifted in other dimensions of intelligence. David is now in a private highschool which appreciates his extraordinary creative design ability and challenges him conceptually. His reading speed is average, but he has developed verbal sequencing to a gifted level. He frequently calls his tutor at SOI to find out what new SOI modules are available so he can *"exercise his mind."* David has maintained his gifted figural intelligence and spends his spare time inventing, designing models and exploring photographic media to make movies. He fully intends to go into TV production in order to make it a "science."

There are three boys in this particular family, each highly gifted and each with a different pattern of SOI strengths. One is gifted symbolically; the other is gifted semantically. Though it may be of academic interest to speculate and wonder how children in the same family can have such different profiles, yet score within three IQ points of each other, the teacher's role as practitioner is enhanced when he or she is *"armed"* with a profile of each student's intellectual abilities.

Conclusion

The understanding of the *kinds* of giftedness allows teachers to plan enhancing programs for the students but it allows them also to conference with parents to accept and act upon their child's uniqueness in a nurturing fashion. There is no better way to help a student than to be able to understand him or her. The SOI system offers you a means of understanding students by showing you profiles of their intelligence and methods for using them to greatest advantage or changing them to greatest need.

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Discussion Questions

1 Relate the dimensions of the Structure of Intellect to Bloom's Taxonomy or to Piaget's schema and compare the two in terms of their application to gifted programs.

2 Using self-rating procedures, construct your own personal SOI profile. Determine your best and worst abilities on each of the major dimensions of Operations, Contents and Products. Then rank the other abilities in between. Discuss the pros and cons of your own perception of your intellectual strengths, i.e., a self-report instrument and the assessment of a standardized instrument, such as an SOI test.

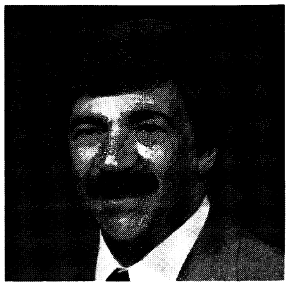
3 In SOI abilities terms, which do you think are the most representative characteristics of the gifted and which are the least representative? How could intellectual characteristics which are rewarding in scholastic pursuits possibly be less appropriate in a career? Contrast a convergent occupation(s) with a divergent one(s).

4 Relate the SOI content abilities (Figural, Symbolic, Semantic) to current discussions of right-brain/left-brain functions. (Select either popular educational treatments or neurological reports of findings.) Relate and contrast the one you select to selection of reading programs, and/or methods of reading, in cultures using alphabetic languages (such as ours) and in cultures that use cuneiform or glyph type languages (such as Japan or Arabic countries).

5 In order to teach divergent thinking, teachers must relinquish the comfort of known responses. Why do you think it is easy for educators to appreciate divergent thinking but so hard for them to deal with creative responses in the classroom?

6 Using rulers and colored pens, diagram a classroom in which students can flow from one learning center to another. Each learning center must be a station for one dimension of SOI abilities.

Joseph S. Renzulli



IX

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Summary

The Enrichment Triad/Revolving Door Model: A Schoolwide Plan for the Development of Creative Productivity

The Enrichment Triad/Revolving Door Model is a comprehensive plan for schoolwide enrichment that is designed to overcome many of the problems that have hindered special programs for highly able students in the past. The model is based on research about the characteristics of creative and productive individuals. This research, which has been summarized under the title, *The Three-Ring Conception of Giftedness*, has resulted in placing emphasis on the development of gifted behaviors and the labeling of programs and services rather than students.

Two types of identification are used in this model. *Status information* is used to form a Talent Pool that varies in size according to local school populations, resources and the involvement of both specialists and general faculty. The second type of identification is based on the concept of *action information* and involves having students "revolve into" advanced level enrichment and acceleration services as a result of their response to opportunities provided through the general enrichment components of the model.

In addition to a number of organizational and administrative components, the Enrichment Triad/Revolving Door Model is based on the following five service delivery components: (1) the *Assessment of Student Strengths*, including abilities, interests and learning styles; (2) *Curriculum Compacting*, which involves modifications of the regular curriculum for students with advanced abilities, (3) *Type I Enrichment*—General Exploratory Activities—that introduces students to a wide variety of topics or areas of study not ordinarily covered in the regular curriculum, (4) *Type II Enrichment*—Group Training Activities—that develops students' cognitive and affective skills, learning-how-to-learn skills, research and reference skills and communication skills and (5) *Type III Enrichment*—Individual and Small Group Investigations of Real Problems—which entails having students pursue areas of study using the *modus operandi* of first-hand inquirers.

The Enrichment Triad/Revolving Door Model: A Schoolwide Plan for the Development of Creative Productivity

The plan for a schoolwide enrichment program described in this chapter is based on a model that was specifically developed to serve high potential students. The model, entitled The Enrichment Triad/Revolving Door Model (Renzulli, 1977c; Renzulli, Reis & Smith, 1981), was developed and field tested over a ten year period in schools that varied widely in size, socioeconomic status and student population. Although it may initially appear unusual to offer a schoolwide enrichment program as a plan for serving high potential students, we hope that the information presented below will point out the reasons and the logic underlying this approach. These reasons are based on two major issues that will be discussed in the sections that follow. The first issue deals with the conception of giftedness that guides our work, and the second is concerned with the ideal and the reality of models for educational change.

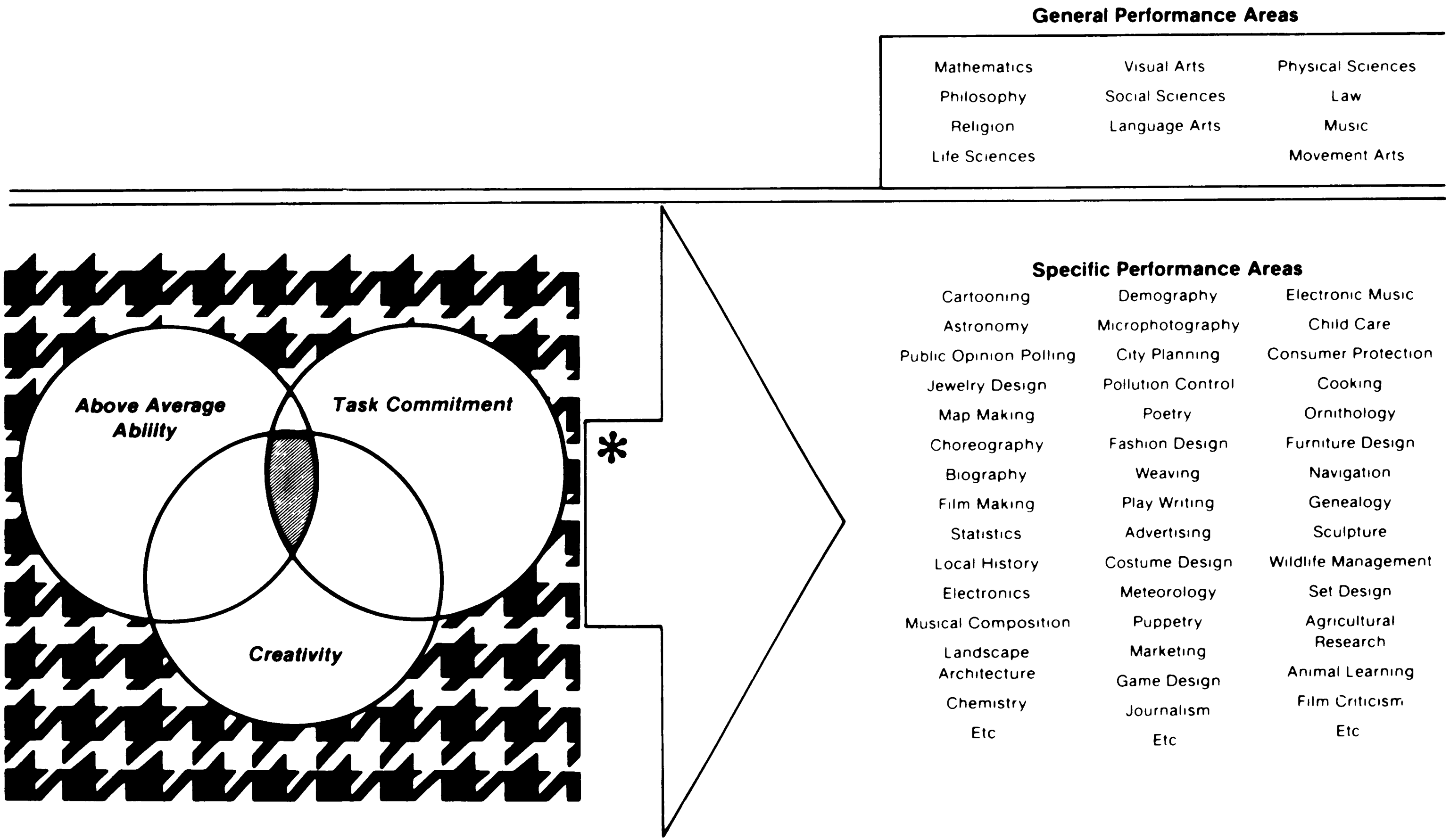
A Non-Elitist Meaning of the Term "Gifted"

Research on creative/productive people has consistently shown that although no single criterion can be used to determine giftedness, persons who have achieved recognition because of their unique accomplishments and creative contributions possess a relatively well defined set of three interlocking clusters of traits. These clusters consist of above-average, though not necessarily superior ability, task commitment, and creativity (see Figure 1). It is important to point out that no single cluster "*makes giftedness.*" Rather it is the interaction among the three clusters that research has shown to be the necessary ingredient for creative/productive accomplishment (Renzulli, 1978). This interaction is represented by the shaded portion of Figure 1. It is also important to point out that each cluster plays an important role in contributing to the display of gifted behaviors. This point is emphasized because one of the major errors that continues to be made in identification procedures is the over-emphasis of superior cognitive abilities at the expense of the other two clusters of traits.

Space does not permit a thorough description of the research that supports this conception of giftedness; however, the reader is referred to a chapter in ***Conceptions of Giftedness*** (Sternberg & Davidson, 1986), entitled "The Three-Ring Conception of Giftedness: A Developmental Model for Creative Productivity." At this point we can only summarize by saying that although no single statement can effectively integrate the large number of studies reviewed in the above mentioned chapter, the following definition of gifted behavior reflects the major conclusions and generalizations resulting from our review research:

Gifted behavior reflects an interaction among three basic clusters of human traits—these clusters being above average general and/or specific abilities, high levels of task commitment, and high levels of creativity. Individuals capable of developing gifted behavior are those possessing or capable of developing this composite set of traits and applying them to any potentially valuable area of human performance. Persons who manifest or are capable of developing an interaction among the three clusters require a wide variety of educational opportunities and services that are not ordinarily provided through regular instructional programs (p. 73).

 This conception of giftedness suggests that gifted behaviors can be developed in a



*This arrow should be read as " brought to bear upon "

Figure 1. Graphic representation of the three-ring definition of giftedness.

far broader spectrum of the school population than the small percentage of students who are usually identified by high scores on intelligence or achievement tests. It clearly and unquestionably recognizes such obvious abilities as those displayed on intelligence and aptitude tests, but it also recognizes several other factors that contribute to the development of gifted behaviors. These factors include many types of abilities and potentials that cannot be measured as precisely as IQ and scholastic achievement. The fact that these abilities can be developed to varying degrees in larger segments of the population than is usually included in special programs makes it imperative that we reconsider the entire concept of *"giftedness"* and the ways in which we go about developing a service delivery system for the best possible education for students with various and multiple potentials. The Triad/Revolving Door Model does not *"forget about"* those students who earn high scores on traditional measures. But it also does not assume that high scores automatically *"make"* a person gifted, nor does it assume that gifted behaviors can only be displayed by persons with extremely high scores.

There is a threefold rationale underlying the Triad/Revolving Door system. The first part of the rationale we have already referred to; that is, the vast amount of research that supports a more flexible definition and related programming practices. This research represents nothing short of the classic studies that have been conducted about gifted and talented individuals over the past hundred years. Taken collectively, these research studies are the most powerful argument that can be put forth to policy makers who must render important decisions about the regulations and guidelines that will dictate identification practices in their state or local school districts. An examination of this research clearly and unequivocally tells us that gifted behaviors can be developed in persons who are not necessarily those individuals who earn the highest scores on standardized tests. The two major implications of this research for identification practices are equally clear. First, an effective identification system must take into consideration other factors in addition to test scores and these factors must be given equal weight in the selection process. Respect for this consideration means that we can no longer give lip service to non-test criteria nor believe that because tests yield *"numbers"* they are inherently more valid and objective than other procedures. As Sternberg (1982) has pointed out, quantitative does not necessarily mean valid. When it comes to identification, it is far better to have imprecise answers to the right questions than precise answers to the wrong questions.

The second research-based implication will undoubtedly be a major controversy in the field for many years, but it needs to be dealt with if we are ever going to defuse a majority of the criticism that has been justifiably directed at our field. Simply stated, we must reexamine identification procedures that result in the total *pre*-selection of certain students and the concomitant implication that these youngsters are and always will be *"gifted."* This absolute approach (i.e., you-have-it or you-don't-have-it) coupled with the almost total reliance on various test scores is not only inconsistent with what the research tells us, but almost arrogant in the assumption that we can use a one or two hour segment of a young person's total existence to determine if he or she is *"gifted."*

The alternative to such an absolutist view is that we may have to forego the *"tidy"* and comfortable tradition of *"knowing"* on the first day of school who is gifted and not gifted. Rather, our orientation must be redirected toward developing *"gifted behaviors"* in certain students (not all students), at certain times (not all the time) and under certain circumstances. The trade-off for tidiness and administrative expediency will result in a much more flexible approach to both identification and programming and a system that not only shows a greater respect for the research on gifted and talented people, but one that is both fairer and more acceptable to other educators and the general public.

The second part of the rationale is concerned with the practical aspects of identification. Extensive research studies and field tests have shown that the model is easy and inexpensive to implement and that it is highly effective in achieving the four major goals described earlier. It is very easy for gifted programs to become *"victims"* of complicated and indefensible identification procedures that sometimes become so complex that they actually overshadow the major purpose of providing high quality services to students. Through careful field testing and modifications based upon feedback, we have streamlined our identification procedures with a careful eye toward what is reasonably practical within the context of any school setting.

The third part of the rationale is common sense! Teachers, students, parents and administrators can easily understand and relate to all major components of this model. Indeed, one person has referred to this approach as *"elegant common sense."* This part of the rationale is considered to be important because, if professionals and lay persons do not understand the why and how of any particular approach to identification, they are likely to view it with caution and perhaps even suspicion. Although common sense alone will not suffice as an appropriate rationale for any educational practice, it becomes a very powerful ingredient for obtaining program support when combined with the research and practical aspects of the rationale discussed above.

The Ideal and the Reality of Models for Educational Change

The second major issue underlying our work is concerned with the process of educational change and the ways in which a model for change can be used to promote schoolwide excellence in both students and teachers. One of the most important features of this model is that it has been purposely designed to create a variety of important roles and responsibilities for classroom teachers and other school personnel. This pattern of organization was developed for three major reasons. First, in the popular pull-out or resource room approach to serving high ability youth, these students spend the vast proportion of their time in regular classrooms, under the direction of classroom teachers. The advanced abilities that brought these students to our attention in the first place certainly justify making some modifications in the regular curriculum and in activities that go on in regular classrooms. It is illogical to assume that targeted students are only capable of displaying gifted behaviors during the few hours per week when they are participating in a special program. A youngster with extremely high mathematical reasoning ability, for example, is most likely to display this strength during his or her regularly scheduled *math* class. Although some math enrichment might be warranted as part of a special program, it is nothing short of foolish to ignore the advanced ability in regular math class.

Second, many of the enrichment experiences emphasized in special programs can benefit other students. Process oriented activities such as thinking skills based on Bloom's (1956) ***Taxonomy of Educational Objectives*** and other models are clearly appropriate for most students.* Such activities should, therefore, be integrated with regular curricular activities whenever possible. The fact that these processes have not been included in regular curricular experiences is not a sufficient rationale for assuming that they are only good for *"the gifted."* Such integration is indeed one of the goals for general educational change that we are attempting to achieve in the Triad/Revolving Door Model.

**For a detailed discussion of this issue, see Renzulli, 1977c, pp. 1–13.*

The third reason that we have sought to develop an integrated rather than exclusory model is to help eliminate the *"condition of separateness"* that is almost universal in schools that provide special programs for the gifted. Distrust, competitiveness, suspicion and even outright hostility often exist between special program personnel and members of the general faculty. These negative attitudes often lead to subversion, a loss of public confidence and, in many cases, the ultimate elimination or reduction of special services. A good deal of this condition of separateness is a direct result of the ways in which programs have been organized. The unintentional but nevertheless self-defeating steps that have been taken to exclude classroom teachers from what might best be called *"enrichment teaching"* have limited opportunities for both student growth and the general improvement of teaching skills. There are many ways in which classroom teachers and special program personnel can share and exchange individual interests and talents, teaching strengths, special training, enrichment materials, community resources and time. Such an exchange will benefit all students who are potentially able to display gifted behaviors. This model has been designed to provide an organizational plan for achieving these goals through the maximum utilization of both specialists and the general faculty.

The Triad/Revolving Door Model was purposefully designed to overcome many of the problems and pitfalls that have hindered previous national efforts to serve our most able youth. One of the major reasons why the gifted student movement has failed to gain acceptance on the part of general educators and the public at large is that every time the movement becomes popular, we fall prey to the same ineffective identification methods that have been the target of so much criticism in the past. If the history of gifted education tells us anything it should be that repeated failures to gain acceptance require us to explore new ways of both identification and programming.

The Triad/Revolving Door Model grew out of a concern for history and an effort to make enrichment programs an integral component of the total educational enterprise. To this end, we have formulated the following four general goals to guide the implementation of this model:

1. To provide various types and levels of enrichment to a broader spectrum of the school population than the 3 to 5 percent usually served in traditional programs for the gifted.
2. To integrate the special program with the regular classroom and to develop a cooperative, rather than competitive, relationship between classroom teachers and personnel who have been assigned to the gifted programs.
3. To minimize concerns about elitism and the negative attitudes that are often expressed toward students participating in special programs for the gifted.
4. To improve the extent and quality of enrichment for all students and to promote a *"radiation of excellence"* (Ward, 1962) throughout all aspects of the school environment.

We would also like to emphasize that there is no such thing as a *"pure"* Triad/Revolving Door program. Each school district must examine its own philosophy, resources and administrative structure and then adopt or adapt those parts of the model that take into account the unique aspects of each local school and district. A flexible approach to both identification and programming is necessary for two important reasons. First, local conditions and resources must be considered in order to prevent a model from becoming a straightjacket. Second, unless a certain amount of flexibility is encouraged, a model can easily inhibit local innovations that ultimately might result in better ways of identifying and serving high ability youngsters.

Structure of the Triad/Revolving Door Model

Our experience has shown that successful programs are always based on plans that clearly delineate two major dimensions of a programming model. In the Triad/Revolving Door Model we refer to these dimensions as **Organizational Components** and **Service Delivery Components.** By organizational components we mean those non-instructional activities that lead to putting the program *"in place."* Examples of organizational components include the guided activities of planning teams, conducting needs assessments, staff development, materials selection and program evaluation. Service delivery components refer to direct instructional activities and the many and varied *"things"* that teachers do *with students* in order to fulfill the major objectives of the overall programming model. Included in this domain are lessons designed to promote the development of thinking processes, procedures for modifying the regular curriculum, and the specific steps involved in guiding students through independent study activities.

Although the real payoff of any special program is the extent and quality of services that have a direct impact on students, there are a number of other components that are necessary for organizing and implementing service delivery activities. These planning and organizing components not only help us to respect the best theory and research underlying special programs, but they also help to provide a common vocabulary, a frame of reference, and a clarification of the roles and responsibilities of all persons involved in the special program. As such, the organizational components have the potential for introducing a remarkable element of efficiency into the overall process of program planning and implementation.

Because of space limitations, this chapter will focus primarily on the major service delivery components of our model. A detailed description of the organizational components and the procedures for implementing them can be found in the book-length implementation manual entitled ***The Schoolwide Enrichment Model: A Comprehensive Plan for Educational Excellence*** (Renzulli & Reis, 1985). At this point, however, we would like to present a brief description of one of the organizational components that deals primarily with the involvement of classroom teachers, parents and administrators.

The Schoolwide Enrichment Team

One of the best ways to expand the full range of services that might be made available to advanced level students is through the development of a schoolwide Enrichment Team. An Enrichment Team is not a policy-making body nor an advisory committee, but rather a working group of faculty members and parents who have specific responsibilities for organizing the overall enrichment effort for an entire school.

There are two important reasons for establishing an Enrichment Team, the first of which addresses the question, *"Is enrichment only good for the gifted?"* (An affirmative answer to this question would certainly relegate the regular school program to a meager diet of basic skills and routine learning experiences.) There are few, if any, educators of bright students who would not insist that *all* youngsters should have opportunities for various types and levels of enrichment. It can further be argued that many of the general enrichment activities used in programs for the gifted can also be used with a broader segment of the school population.

The second reason deals with the essential role of faculty involvement in a schoolwide enrichment program. Too often, a sad but not uncommon by-product of traditional gifted programs, whether they are accelerated mathematics classes or resource rooms as we have advocated, is that classroom teachers falsely assume that all of the needs of identified students are being met by the special program. In many districts where a program for advanced level students is started, classroom teachers continue routinely assigning regular curriculum work to their brightest students. Quite often, resource teachers have little or no interaction with classroom teachers or with the regular curriculum, and thus the two programs frequently exist side-by-side but as essentially separate entities. One way to avoid this often unfortunate by-product of establishing resource programs is to organize a schoolwide Enrichment Team which will immediately begin to develop a sense of faculty and community *"ownership"* in the enrichment program. We have found that when classroom teachers are encouraged to actively become involved in the program, they eventually come to regard efforts to meet the needs of bright students as a joint venture to be shared by all faculty members.

Over the last several years many school districts have implemented outstanding enrichment programs. In almost every case, the first step after the model was selected and administrative support sought, was the organization of an inservice program to orient staff with the definition, identification and programming model *and* the establishment of an Enrichment Team. This Team is then able to work cooperatively to achieve the major objectives of Type I and Type II Enrichment, including enriching the lives of all students by expanding the scope of experiences provided by the school. This gives teachers direction in making meaningful decisions about the kinds of process oriented enrichment activities that should be organized for particular groups of students and stimulating new interests that might lead to more intensive follow-up (Type III) activity by individuals or small groups of students.

The most effective way to begin organizing an Enrichment Team is to recruit members from various segments of the school and community. The Enrichment Team should include parents, community resource persons, administrators, classroom teachers (who represent primary, middle and upper grades at the elementary level), art/music or physical education instructors and the librarian or media specialist (if one exists). At the secondary level, the Enrichment Team can include representatives from each department (if the high school or middle school is small) *or* separate enrichment teams can be organized for each department. Representatives from each departmental team can then meet on a periodic basis with the schoolwide Enrichment Team. It can also be effective to include students on the Enrichment Team. One reluctant community resource person, for example, indicated that he could have easily refused an adult's invitation to present a 45 minute workshop on his specialty area, but it was impossible for him to refuse the request when it was made by an excited fifth grader.

The key to successful functioning of the Enrichment Team is specificity of tasks and a division of labor among Team members. In the next section, we will describe how the Action Form concept can help provide task specific direction to Enrichment Team activities. Since Team members can only devote relatively small portions of their time to this endeavor, it is essential that tasks be broken down into targeted activities that can be carried out with minimal expenditures of time. If a resource teacher or enrichment specialist is not present in the school, we recommend the appointment of someone who will serve as chairperson who is organized, efficient and gets along with other faculty members. We strongly advocate that this person have some release time in addition to his or her regularly scheduled planning time to spend organizing this effort. One hour a week that an administrator can arrange for the chairperson of the Enrichment Team to use as planning time communicates a very important message to the chairperson and the entire faculty. Simply, that message is: We value what you are doing and we support your efforts to complete this task.

Finally, no one should ever be forced to serve on the Enrichment Team. We strongly advocate the inclusion of a building principal even if he or she only attends meetings on a periodic basis. But no one should serve on the Team who truly does not want to be involved. We have found that once the benefits of the various types of enrichment experiences become obvious, more faculty members become interested in joining the Team in subsequent years.

Other Organizational Features

Throughout several years of experience and research in Triad/Revolving Door Programs, we have attempted to identify certain major activities that are necessary for the planning and implementation of this model. Each of these activities relates to one or more of the specific objectives that will be described in the sections that follow. In each case, we have developed a planning guide (Action Form) and/or a Teacher Training Activity (SIMSIT). We have also developed strategies for evaluating each component of our model.

Action Forms

The purpose of Action Forms is to break down programming activities into their component parts in order to achieve a division of labor and time management objectives. In some ways, the Action Forms might be thought of as "gentle enforcers." That is, the forms themselves concentrate and focus energy and activities to enforce the objectives set forth for various components of the model. This approach helps to maximize the impact devoted to any program activity, while at the same time, minimizes the amount of time that might be wasted in organizing the effort that is necessary for the accomplishment of any given objective.

Each form is designed to accomplish one or a combination of three important objectives of overall program development. First and foremost, the forms are intended to be guides or roadmaps in the accomplishment of particular tasks. Second, the forms will help to give direction to the decision-making process by providing a list of the alternative resources or activities from which specific selections might be made. This visual display of alternatives simply allows us to review all possible courses of action at a single glance, and thus helps us to avoid possible omissions, duplications or conflicting activities. Third, the forms will serve as vehicles for the documentation of program activities, and in this regard, information included on the forms will provide a ready-made set of data for program evaluation. In addition to helping us enforce the implementation and maintenance of key program components, the forms themselves serve as a repository of vast amounts of information that can easily be drawn upon in the preparation of evaluation reports and for use in subsequent year program planning.

Teacher Training Activities (SIMSITS)

Each component of our model also includes one or more teacher training activities called SIMSITS (Simulation Situations). The SIMSITS were designed to fulfill an important function in the training of teachers who are providing enrichment services to various groups of youngsters. Although a comprehensive knowledge about the content of any field is considered to be a major part of the overall training of professionals, the ability to *apply* one's knowledge in practical situations represents the real payoff so far as effective training is concerned.

Simulated learning experiences represent an intermediary level of involvement that lies somewhere between textbook learning and the actual application of knowledge in on-the-job situations. Simulations are abstractions from real life that are designed to approximate the types of experiences that one is likely to encounter in real life situations. Simulation is an especially effective teacher training technique because it provides opportunities to practice on-your-feet thinking skills for situations that will always vary when they are encountered in the real world. No two encounters between a teacher and a pupil, for example, are exactly alike; and therefore, we cannot program ourselves to respond in a mechanical or precise fashion to the many types of interactions that will be encountered as we go about working with a wide variety of personalities, learning environments, available resources, and the many things that make teaching an artistic endeavor as well as a scientific and technical skill.

For these reasons, numerous SIMSITS were developed as a result of several years experience in the use of this programming model. As Triad and Revolving Door programs grew in popularity, we had the opportunity to study teacher training needs and the "critical incidents" in which certain kinds of highly specific implementation skills were involved. These actual experiences in programming helped us to learn the important skills necessary for teachers planning to effectively implement particular components of the model. Some of the skills relate to direct work with students, while others are more concerned with program organization and development activities, public relations concerns, and the overall management skills required by coordinators.

Program Evaluation

In addition to Action forms and SIMSITS, our model also contains information about procedures for evaluating the objectives set forth for each service delivery component. All evaluation instruments and procedures have been developed as a direct reflection of the objectives set forth on the summary sheet of each chapter. After policy decisions have been made with regard to the adoption of the overall model and the objectives of the respective delivery components, the correlated evaluation instruments provide "*a neat little package*" of ready-made instruments and procedures.

The evaluation forms should be thought of as a "*supermarket*" of software from which you can make selections according to the degrees of emphasis within your own program. Once your administrators, board members and other decision makers have accepted the objectives for a particular service delivery component, it then becomes contingent upon you to show evidence of the fact that we have provided the intended service. The evaluation instruments have been purposely developed to analyze the stated objectives on the summary pages. As such they provide a ready-made and built-in evaluation system that can be presented whenever persons request information about the effectiveness of your respective service delivery components.

Procedures for Implementing a Triad/Revolving Door Program

First level Identification—Forming the Talent Pool

The first step in implementing a Triad/Revolving Door program is to identify a group of students that will be designated as the **"Talent Pool"** (see Figure 2). This group consists of the top 15 to 20 percent of the school population in general ability or any and all specific performance areas that might be considered high priorities in a given school's overall programming efforts. Procedures for forming the Talent Pool are not unlike traditional screening procedures used in more traditional identification systems; however, the major difference is we do not throw away the majority of this group in favor of a

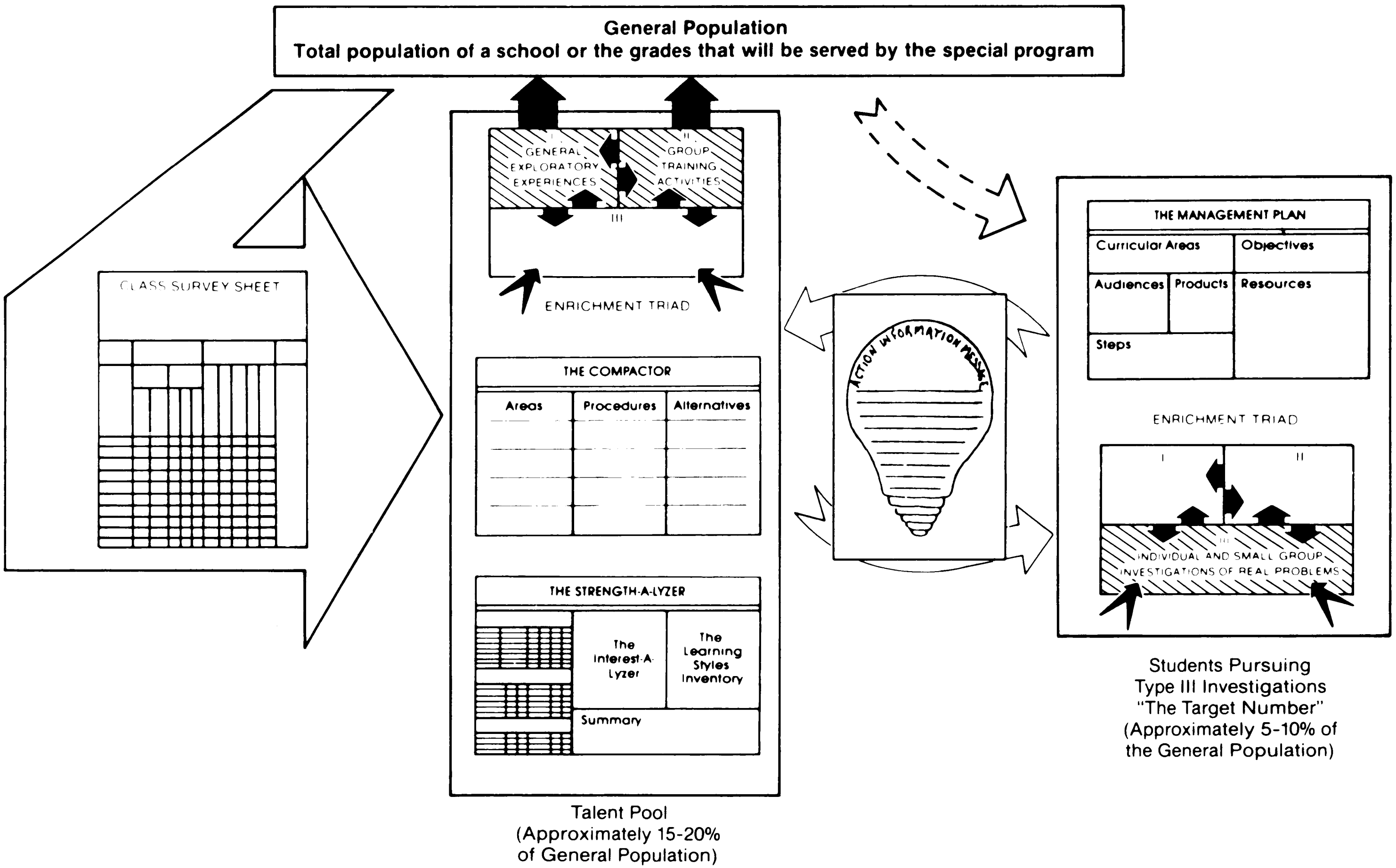


Figure 2. Relationship among the general population, talent pool and students pursuing Type III investigations.

finally selected 2 or 3 percent that is ultimately selected for inclusion in the program. There are three reasons why a Talent Pool of 15 to 20 percent is recommended. First and foremost, the research tells us that it is from this group that we can expect to identify those persons who will ultimately engage in high levels of creative productivity. Research on the *"threshold effect"* (MacKinnon, 1961; Barron, 1963; McNemar, 1964; Torrance, 1962; Wallach, 1976) has consistently shown that students who possess well above-average (but not necessarily superior) ability and who also have the potential for developing task commitment and creativity are the persons who have the highest probability of displaying gifted behaviors. This group unquestionably includes those persons with the highest IQ's, but it also is open to others who show equal potential for creative production.

A second reason for the recommended size of the Talent Pool is that most of the activities typically used in gifted programs that serve the top 2 or 3 percent have generally been found to work effectively with this larger group of youngsters. There is no defensible reason why accelerated curriculum or enrichment experiences based on thinking process models such as Bloom's ***Taxonomy of Educational Objectives*** (1956) and Guilford's ***Structure of Intellect*** (1967) cannot or should not be used with larger groups of students. Indeed, most of the students in the nation's major universities and four year colleges come from the top 15 to 20 percent of the general population. Are we making any sense when we exclude them from a high school honors course or an enrichment activity based on Bloom's or Guilford's models? A third rationale for Talent Pool size is that, by definition, students working at the 80th or 85th percentile are clearly capable of showing high degrees of mastery of the regular curriculum and therefore both regular curricular modifications and enrichment experiences are clearly warranted.

There are several factors that serve as guides in determining the final size of the Talent Pool. The availability and experience of resource teachers and the ways in which they allocate their time is the first consideration. A second consideration is the extent of involvement on the parts of classroom teachers and the degree of administrative support and training that will facilitate such involvement. Finally, the ability levels of general populations differ from district to district and oftentimes within districts. It is therefore necessary to make adjustments that will accommodate these differences, especially if we ever hope to identify the most potentially able students in our disadvantaged and minority group populations. This final factor might result in some variations in programming that are reflections of the general level at which the regular curriculum is geared in any school or district. The top 20 percent in an inner city school may consist of a different ability level (as measured by tests) than the top 20 percent in an affluent suburb; however, *both* groups are clearly in need of some differentiation from those educational experiences provided to the school population at large.

Four families of information are used to identify the Talent Pool. *Psychometric Information* is derived from traditional tests of intelligence, aptitude, achievement and creativity. *Developmental Information* is obtained through the use of teacher, parent, and self-nomination and rating scales. *Sociometric Information* is derived from peer nominations and ratings and *Performance Information* is based on actual examples of previous accomplishments in school and non-school settings. The model allows a great deal of flexibility with regard to the number of criteria used and the exact instruments that might be selected by a given school or program. A step-by-step decision-making format described in detail in the ***Revolving Door Identification Model*** (Renzulli, Reis & Smith, 1981) is used to process all information and make final Talent Pool selections. A *"safety valve"* entitled Special Nominations is also used as a final check to help minimize the chances of excluding potential Talent Pool members who might have been overlooked in the final steps of the process. A procedure for resolving discrepancies between and among any of the four families of information is recommended, as are follow-up reviews and opportunities for youngsters to enter the Talent Pool after the initial selection process.

Experiences with districts using Revolving Door have shown that the Talent Pool can be formed quickly and easily and without the agonizing decisions that are associated with identification procedures that are trying to weed out all but the top 3 or 5 percent. Individual testing is only used in cases where discrepancy information is present and complicated formulas and additional testing are avoided. All Talent Pool students are considered to be members of the program and they receive certain types of services on a regularly scheduled basis. They do not revolve in and out of the program, but rather revolve into and out of different types and levels of enrichment based on the ways in which they respond to general enrichment services. We do not subdivide them into absurd categories such as the *"truly gifted"* and the *"moderately gifted"* because we really don't know at any given time which students will revolve into the most advanced levels of experience that can be offered by a particular program.

At this first level of identification we are cautious about the use of the term *"gifted"* and we avoid treating giftedness as an annointment or act of nature. As a result of participating in an orientation session, students know they are well above average in ability, that they are members of the Talent Pool, and they know what these things mean so far as services and opportunities are concerned. They also know that the program is attempting to develop gifted behaviors and that in a certain sense, students *earn* a designation of giftedness rather than having it bestowed upon them. Students are provided with a detailed orientation to all aspects of the model and especially the concept that the special program is a place where one earns the opportunity for higher and higher levels of involvement and the display of gifted behaviors. This approach helps to avoid the snobbishness and elitism that often are found by young people (and their parents) when they are led to believe that giftedness is bestowed rather than earned.

Services to Talent Pool Students

Before describing the four types of services that are regularly provided to Talent Pool students it is important to point out a major function of these services *beyond* their obvious enrichment and/or acceleration purposes. The actual involvement of students in both regular and special program activities and their reactions to such involvement form the basis for the second level of identification in the Revolving Door Model. In other words, the services in and of themselves are considered to be valuable activities for advanced students. At the same time, these services provide the *performance-based learning situations* that wil help us identify which individuals and small groups should revolve into advanced level experiences based on interests in particular topics or problem areas.

Two types of General Enrichment are provided for Talent Pool students on a regularly scheduled basis. Whenever possible, these enrichment experiences or ones of similar design and purpose are also made available to students in the general population. Decisions regarding which students (in addition to Talent Pool members) will participate in General Enrichment are based upon factors such as the difficulty level of the material, its relation to the regular curriculum, the size of the group that can be accommodated, and the interests of students in the general population. In many cases, General Enrichment is offered on an invitational basis and it is frequently planned in conjunction with regular curriculum topics. This approach helps to minimize concerns about elitism, integrate special program services with the regular curriculum, and achieve the radiation of excellence effect that is one of the overall goals of Triad/Revolving Door programs.

In addition to participating in general enrichment experiences, all Talent Pool students receive two additional services within a Triad/Revolving Door program: (1) Interest and Learning Style Assessment and (2) Curriculum Compacting. In the following sections, we will describe each of these services, beginning with interest and learning style assessment and working our way through the two types of general enrichment that we briefly discussed above.

Service No. 1: Interest and Learning Style Assessment

Interest Assessment

Building educational experiences around student interests is probably one of the most recognizable ways in which schoolwide enrichment programs differ from the regular curriculum. In numerous evaluation studies when bright students were asked what they like best about being in a special program, the first response almost always dealt with the greater freedom allowed for selecting topics of study. Conversely, when asked about their greatest objection to the regular curriculum, students' comments frequently referred to the limited opportunities to pursue topics of their own choosing. Indeed, high ability students' views of the regular curriculum so far as freedom of choice is concerned are extremely negative. As one youngster so ably put it, *"They tell us what book we have to use, what page, paragraph, and problem we should be on, and how long we should spend on that problem."*

Although special resource programs are generally characterized by less rigidity than this statement implies, there is nevertheless much evidence of similar types of teacher-imposed structure in programs for highly able students. While many group activities in special programs do in fact require whole class teaching and similar types of involvement on the parts of students, we must raise some serious questions about freedom-of-choice when every youngster in a given group is preparing a ritualized report on Houses of the Future, Life in a Colonial Village or The Rocks and Minerals of Colorado. This is not to say that every independent study situation should be *"wide open."* The teacher's own strengths and interests may lead him or her to place certain restrictions on general areas of study (e.g., Futuristics, Colonial History, Geology) but *within* these broad areas a great deal of freedom should be allowed in the selection of specific topics or problems. In other words, there is nothing wrong with focusing on a general theme such as Futuristics, but there are numerous topics, issues and methodologies within Futuristics that should be explored by individuals or small groups.

A second consideration in assessing student interests is related to the *intensity* of an interest and *the way* in which a child is interested in a particular topic. One of the major responsibilities of teachers in interest identification is to make certain that they do not push a child into an independent study or other educational activity at the first sign of an interest in a certain topic, person or subject. Regardless of how much enthusiasm a youngster displays about a particular interest, the possibility of following up such initial interest with more intensive study should be handled with great delicacy. Students should be encouraged to do further independent *exploratory work* about various ways that an area of interest can be investigated, the amount of time, materials and resource personnel that might be required for such an investigation, and, most importantly, whether or not the early expression of interest was more than a superficial or romanticized notion about what actual in-depth involvement with a particular problem area involves.

A planned strategy for helping students to examine their present and potential interests is based on an instrument called the ***Interest-A-Lyzer*** (Renzulli, 1977a). This instrument is a thirteen item questionnaire that is designed to assist students in exploring their individual areas of interest. The Interest-A-Lyzer has been used with students in grades 4-9 and it has also been adapted for use with younger children (McGreevey, 1982) and adults (Renzulli, 1977b). The items consist of a variety of real and hypothetical situations to which students are asked to respond in terms of the choices they would make (or have made) were they involved in these situations.

The Interest-A-Lyzer serves to open up communication both within the student and between the student and his or her teacher. It also is designed to facilitate discussion between groups of children with similar interests who are attempting to identify areas in which they might like to pursue advanced level studies. The major interest area patterns that might emerge from the instrument are as follows: (1) Fine Arts and Crafts, (2) Scientific and Technical, (3) Creative Writing and Journalism, (4) Legal, Political and Judicial, (5) Mathematical, (6) Managerial, (7) Historical, (8) Athletic and Outdoor Related Activities, (9) Performing Arts, (10) Business and (11) Consumer Action and Ecology Related Activities.

It is important to keep in mind that (1) the above items represent *general* fields or families of interest and (2) there are numerous ways in which an individual might be interested in any particular field. Thus, identifying general patterns is only the first step in interest analysis. General interests must be refined and focused so that eventually students will arrive at relatively specific problems within a general field or a combination of fields.

Learning Styles Evaluation

Although numerous definitions of learning style can be found in the educational and psychological literature (Smith, 1976), the definition we recommend for use in designing individualized educational programs is one which focuses on specific and identifiable learning activities. Our definition considers learning styles to be one or more of the following nine instructional strategies most preferred by individual students as they interact with particular bodies of curricular materials: (1) Projects, (2) Drill and Recitation, (3) Peer Teaching, (4) Discussion, (5) Teaching Games, (6) Independent Study, (7) Programmed Instruction, (8) Lecture and (9) Simulation.

The ***Learning Styles Inventory*** (LSI, Renzulli & Smith, 1978b) is a research-based instrument which was developed to guide teachers in planning learning experiences that take into account the learning style preferences of students within their classrooms. The instrument requires approximately thirty minutes to complete and provides descriptive information about student attitude toward the above listed nine general modes of instruction. The Inventory consists of a series of items which describe various classroom learning experiences, and students are asked to respond in terms of how pleasant they find participation in each one. The directions emphasize that the LSI is not a test in the traditional sense of the term, but rather seeks to identify the ways in which individual children would like to pursue various types of educational experiences. Students are told that there are no "*right*" or "*wrong*" answers and that the information gained from the Inventory will be used to help plan future classroom activities.

One of the innovative components of this instrument is the teacher form which accompanies each set of student materials. This form is designed as a tool for teachers to look at the range of instructional strategies used in their own classrooms. The items included on this form parallel those on the student form but in this case, teachers respond in terms of how frequently each activity occurs in the classroom. The profile of instructional styles resulting from this procedure can be compared to individual student preferences and can serve to facilitate a closer match between how teachers instruct and the styles to which students respond most favorably. Research has shown that this matching of styles not only enhances student learning but promotes a more positive attitude toward school.

This is not to say that instruction should be guided solely by learning style preferences. Rather, it indicates that teachers should be in the position to make informed decisions about the areas or units within which style differences *can* be incorporated. Indeed, unless at some point in the school day or week teachers are organizing activities that accommodate the varying learning style preferences of their students, it is not likely that a comprehensive individualization program is actually taking place.

Service No. 2: Curriculum Compacting

Curriculum compacting is a system designed to adapt the regular curriculum to meet the needs of above-average students by either eliminating work that has been previously mastered or streamlining work that may be mastered at a pace commensurate with the student's ability. The time that is gained through this system may then be used to provide students with appropriate enrichment and/or acceleration activities. Curriculum compacting has three major objectives: (1) to create a more challenging learning environment, (2) to guarantee proficiency in the basic curriculum and (3) to "*buy time*" for more appropriate enrichment and/or acceleration activities (see Figure 3).

Rationale for Curriculum Compacting

One need only enter any classroom in the country and observe the above-average students to realize that the work being assigned is oftentimes too easy. A recent research study conducted by the Educational Products Information Exchange Institute (1980–81), a nonprofit educational consumer agency, revealed that 60% of the fourth graders in some of the school districts studied were able to achieve a score of 80% or higher on a test of the content of their math texts *before* they had opened their books in September. Similar findings were reported in content tests with fourth and tenth-grade science texts and in tenth-grade social studies texts.

A major problem facing educators with high ability students in their classrooms is that textbooks have dropped two grade levels in difficulty over the past 10 to 15 years. Kirst (1982) reports: *"According to the Los Angeles Times, when Californians tried to reserve two slots on the statewide adoption list for textbooks that would challenge the top one-third of students, no publisher had a book to present. They could only suggest reissuing textbooks from the late sixties (now unacceptable because of their inaccurate portrayals of women and minorities) or writing new ones, a three to five year project."*

As a result of this change on basic textbooks and because repetition is built into all curriculum programs to reinforce learning, many bright students spend most of their time in school doing things they already know. By initiating the curriculum compacting process, we can remedy this situation by increasing the challenge level of the work that students are expected to complete while also providing enrichment experiences and

DEFINITION:	Modifying or "streamlining" the regular curriculum in order to eliminate repetition of previously mastered material, upgrade the challenge level of the regular curriculum, and provide time for appropriate enrichment and/or acceleration activities while ensuring mastery of basic skills.
TARGET AUDIENCES:	1. All Talent Pool students (according to Individual Strength Areas), especially when involved in a Type III activity. 2. Any non-Talent Pool student who has previously mastered portions of the regular curriculum or who is capable of mastering such material at an accelerated pace.
OBJECTIVES:	1. To create a challenging learning environment within the context of the regular curriculum. 2. To guarantee proficiency in basic curriculum. 3. To "buy" time for enrichment and acceleration.
KEY CONCEPTS:	Modification of the regular curriculum through an assessment of student strengths. Elimination or acceleration of skills activities in strength areas following assessment. Systematic planning of enrichment and/or acceleration activities to replace skills students have already mastered *or* can master at a faster pace.
ACTION FORMS:	The Compactor

Figure 3. Curriculum Compacting Summary Sheet

opportunities for independent and small group work that is commensurate with their abilities.

We say this while recognizing the fact that we live in a *"credentialing"* society, a society that measures progress by achievement tests, entrance examinations and measures of competency in basic skills. Mastery of such skills is considered by many persons to be the major indicator of progress in traditional areas of the curriculum. The *"back-to-basics"* movement and the recent interest in competency-based testing are deterrents to educators who are attempting to broaden the school experiences of our most able youngsters. However, if we can clearly demonstrate that a bright student has mastered a great deal of the regular curriculum that is to be taught to his or her peers, it is simply unfair for us not to acknowledge that this student *has mastered* these basics and is therefore eligible for a different curricular experience. Most of the elementary mathematics and language arts systems include a wide assortment of pretests, unit tests, level tests and final yearly assessments. These and other teacher-designed assessments (especially at the secondary level) can be used to document the proficiency that will allow us to prove mastery of the basic skills for our brightest students. This will enable them to become involved in more challenging work while their peers are mastering the same regular curriculum work that they mastered days, months or years ago.

If curriculum compacting is utilized and explained to students, they will realize that demonstrating proficiency in the basic curriculum can earn them the opportunity to become involved in work in which they may have an interest. This process may also eliminate one of the major problems faced by students participating in resource programs: making up all of the work that their peers have completed during a time that they have been involved in the resource program. Curriculum compacting can provide a vehicle which allows them to participate in the resource program during their curricular strength times and therefore eliminate the problem of students being greeted by their classroom teacher at the door and handed the fifteen worksheets that were completed by other students in their absence.

How to Use the Compacting System

Curriculum compacting is designed around an Action Form called ***The Compactor*** (Action Form 2, Renzulli & Smith, 1978a). This form should be completed cooperatively by classroom teachers and resource teachers and should be maintained as part of the student's individual record. Every effort should be made to revise and update the form on a regular basis, and it should serve as a means for joint planning by the regular classroom teacher and the resource teacher.

The Compactor is divided into three columns: Curriculum Areas To Be Considered For Compacting, Procedures For Compacting Basic Material, and Acceleration and/or Enrichment Activities. It can be completed when a classroom teacher identifies the strength areas of an above-average student, details how the child has proven that the skills within the strength area have been mastered, and then suggests the appropriate enrichment and possible acceleration activities which will provide advanced learning experiences.

Many good classroom teachers already use a form of curriculum compacting as part of their daily tasks. If a teacher knows that a certain student has mastered a skill that other students require one or more review worksheets to understand, that classroom teacher in many instances will substitute more challenging work for the student who has mastered the skill. This procedure is "compacting" in its simplest form.

The two essential requirements for successful compacting are (1) careful diagnosis and (2) a thorough knowledge of the content and objectives of a unit of instruction. Once these requirements have been met, the actual procedures for carrying out the process are quite simple.

Teachers must first identify the curricular strength areas of students who are eligible for curriculum compacting because they are in the Talent Pool and any other student who has demonstrated mastery of the basic curriculum. Column One of The Compactor (Curriculum Areas To Be Considered for Compacting) is used to record general and specific indications of student strengths. Information included should answer the questions:

- What are the general indications of student strength in this area?
- What content and/or objectives of the specific unit to be taught have already been mastered?

General indications of strength can be found in student records, standardized tests, classwork or teacher observations. They are used to identify the subject area(s) in which a student might be considered for compacting. One of the best ways to determine in what areas a student has strengths is to ask the teacher who had the student in his or her class the previous year. Additionally, by careful observation classroom teachers can train themselves to spot curricular strength areas and students in need of curriculum compacting. Teachers should watch students who finish tasks quickly and well, and also students who finish reading assignments first. Teachers should also try to watch for

Action Form 2
THE COMPACTOR
(Actual Size: 11" x 17")

INDIVIDUAL EDUCATIONAL PROGRAMMING GUIDE
The Compactor

Prepared by Joseph S Renzulli
Linda H Smith

NAME ____________ AGE ____ TEACHER(S) ____________

SCHOOL ____________ GRADE ____ PARENT(S) ____________

Individual Conference Dates And Persons Participating In Planning Of IEP
____ ____ ____ ____

CURRICULUM AREAS TO BE CONSIDERED FOR COMPACTING Provide a brief description of basic material to be covered during this marking period and the assessment information or evidence that suggests the need for compacting.	PROCEDURES FOR COMPACTING BASIC MATERIAL Describe activities that will be used to guarantee proficiency in basic curricular areas	ACCELERATION AND/OR ENRICHMENT ACTIVITIES Describe activities that will be used to provide advanced level learning experiences in each area of the regular curriculum

☐ Check here if additional information is recorded on the reverse side

students who appear bored during instruction time and who consistently daydream in class.

Once the general strength area(s) have been selected, a specific diagnosis of the skills to be taught must be provided. Diagnostic instruments in the basic skill areas (reading, language skills and mathematics) are usually readily available in the form of pretests, end-of-unit tests or summary exercises that contain a sampling of the major concepts presented in a designated unit of instruction. Such tests are usually keyed to specific pages and/or skills activities, allowing appropriate prescription of activities for needed skills. In subject areas without these tools, teachers must ask themselves:

- Why am I teaching this?
- What are my goals?
- Do any of my students already know this material?
- How will I evaluate whether my students have mastered this material?

In most cases, the evaluation planned for the end of an instructional unit can also be used as a pre-assessment to identify previously mastered content and skills.

Column Two (Procedures for Compacting Basic Material) is used to describe instructional activities that will be used to guarantee proficiency in basic curricular areas. In Column Two, the classroom teacher should indicate any learning activities that will be eliminated because of the proficiencies documented in Column One. This step provides the proof that many teachers need in order to make decisions about work to be eliminated or work that students will be able to master in a fraction of the time that other students need. Some teachers simply make a photocopy of the pre- or posttest used to document proficiency and attach it to the Compactor or even attach the Scope and Sequence Chart with check marks indicating the areas of proficiency. Other teachers use Column Two to indicate for a specific time period, the manner in which previously mastered work will be eliminated. There are many different ways to document proficiency, but it is important to remember that Column Two should be used to document what students already know *or* are capable of learning at their own pace.

The final step in curriculum compacting is to explore a wide variety of acceleration and/or enrichment alternatives. If teachers have been successful in helping gifted youngsters master the regular curriculum in a more economical and efficient manner, then they will have provided some time for these students to pursue advanced level studies. Teachers will also have concrete evidence (test scores) that basic material has been mastered.

The third column of The Compactor can be used to expand the written record of individualization. The first step in completing this column is to make some basic decisions about the subject matter boundaries within which enrichment activities will fall. For example, if several mathematics curriculum units have been compacted, a teacher must decide whether or not the extra time available will be devoted to enrichment or acceleration. The philosophy of a program, the availability of resources, or practical considerations such as scheduling restrictions may influence this decision.

Although practical and organizational concerns may place certain restrictions or limits on enrichment alternatives, the crucial consideration in making decisions about advanced level opportunities is the interest of the student. In the situation described above, there should be no question whatsoever about an advanced mathematics experience if the student is genuinely interested in math. However, a problem may arise if a student is taught advanced math when he or she would rather pursue some other topic or area of study.

One of the best ways to facilitate the completion of the Compactor's third column is to develop a list of all available enrichment and acceleration activities within a given school district. This list may be modest to begin with; however, as resources and special services to advanced level students expand, the list can serve as an important part of the planning and program development process.

Students should be provided with an orientation to the compacting process to enable them to realize that doing their best work in school may earn them time to work on something in which they have an interest. For example, if a youngster can demonstrate proficiency in grammar, he or she may then earn the opportunity to select a novel to read, view filmstrips about famous authors, write original short stories, compose poetry or select an area of interest in language arts. This self-selectivity of what may be done during time in which students demonstrate curriculum mastery often encourages underachieving students *to demonstrate mastery.*

Service No. 3: Type I Enrichment (General Exploratory Experiences)

An overview of Type I Enrichment is presented in Figure 4. This category of general enrichment consists of exploratory experiences that are designed to expose students to new and exciting topics, ideas and fields of knowledge that are not ordinarily covered in the regular curriculum. Type I Enrichment is carried out through a variety of procedures such as visiting speakers, field trips, demonstrations, interest development centers and the use of many different kinds of audiovisual materials (including assigned programs on public and commercial television).

DEFINITION:	Experiences and activities that are purposefully designed to expose students to a wide variety of disciplines (fields of study), visual and performing arts, topics, issues, occupations, hobbies, persons, places and events that are not ordinarily covered in the regular curriculum.
TARGET AUDIENCES:	1. All students (general and periodic). 2. Talent Pool students (general *and* specific—regularly scheduled).
OBJECTIVES:	1. To enrich the lives of all students by expanding the scope of experiences provided by the school. 2. To stimulate new interests that might lead to more intensive follow-up (Type III) activity on the parts of individuals or small groups of students. 3. To give teachers direction in making meaningful decisions about the kinds of Type II Enrichment activities that should be selected for particular groups of students.
KEY CONCEPTS:	Exposure to New Topics Different From Regular Curriculum. Dynamic Activities That Will Stimulate New Interests in Certain Students. "Event" Oriented
ACTION FORMS:	Type I Planning Guide Community Resource Record Resource Directory Cards Type I Resources by Subject Area Form for Recording Sources for Type I Resources Type I Enrichment Documentation Form

Figure 4. Type I Enrichment Summary Sheet

An **Enrichment Team** consisting of teachers, parents and the building principal has the main responsibility for planning a wide variety of Type I activities. The teacher coordinator of the enrichment program works with the Team as a resource person and helps to arrange for and carry out activities planned by the Team. This approach helps to accomplish a number of important objectives. First and foremost, all students are given at least some opportunity to participate in certain enrichment experiences as interest dictates, and the school, therefore, becomes a more exciting and stimulating environment for everyone. Second, this approach avoids the always-difficult task of defending certain General Enrichment activities as being appropriate for gifted students only. Third, the Enrichment Team becomes a vehicle for more effective coordination between the regular curriculum and experiences that are offered as part of the enrichment program. Finally, expanding the scope of the General Enrichment program to the total school population helps to minimize concerns about elitism by making at least some of the enrichment experiences available to larger numbers of students.

Type I Enrichment serves a very special purpose for students in the Talent Pool. Because of their familiarity with the overall programming model, these students are aware that Type I Enrichment represents an invitation to more advanced levels of involvement in topics or areas of study that are especially fascinating to an individual or a small group of students with a common interest. Thus, Talent Pool students self-select those areas in which they may want to pursue a highly intensive research study, creative endeavor or investigative activity. In Triad/Revolving Door programs, we call this process **"revolving"** from a Type I experience into a Type III activity.

Planning and Implementing Type I Enrichment

We have built the Type I planning and implementation process around a series of Action Forms, only one of which will be presented here. The Type I Planning Guide (See Action Form 3) can be completed for a given subject area, grade level or combination of the two (i.e., fourth grade/Social Studies).

The vertical column on the left hand side of Action Form 3 includes several ways in which Type I experiences can be provided for students in the Talent Pool as well as other groups of students who might participate in various Type I activities. You may want to add additional Methods of Delivery or combine and reorganize the items that are already listed on the form. In many ways the Method of Delivery represents different teaching/learning styles. One of the goals of this approach to planning is to help us introduce some variety into the ways in which we bring Type I experiences to the attention of students. Because of differences in students' learning style preferences, whenever we vary the Method of Delivery of a particular topic we also enhance the possibility of promoting an interest and positive reaction in certain students who may prefer one approach over another. Variations in Methods of Delivery are therefore the teaching/learning style counterpart to variations in topics. Both types of variations (i.e., topics plus Methods of Delivery) are directed toward the same general goal which is to enhance the possibilities of reaching as wide a variety of youngsters as possible and expanding the potential number of follow-up (Type III) activities on the part of the target population.

The blank spaces across the top of the Type I Planning guide should be completed by various groups and subgroups of teachers (and sometimes students). Standard brainstorming sessions should be organized around a topic or subtopic, and suggestions should be directed toward the major feature of Type I (topics, issues, etc., not ordinarily covered in the regular curriculum).

There are two major considerations that need to be dealt with in completing the

Type I Planning Guides. The first is who should be responsible for working on these

Action Form 3
TYPE I PLANNING GUIDE

Check all that apply:

____ General Matrix ____________

____ Grade Level ____________

____ Subject Area ____________

Methods of Delivery																		
I. Resource Persons																		
Speakers																		
Mini-Courses																		
Demonstrations																		
Artistic Performances																		
Panel Discussion/Debate																		
Other ____________																		
II. Media																		
Films																		
Filmstrips																		
Slides																		
Audio Tapes/Records																		
Videotapes																		
Television Programs																		
Newspaper/Magazine Articles																		
Other ____________																		
III. Other Resources																		
Interest Development Centers																		
Displays																		
Field Trips																		
Museum Programs																		
Learning Centers																		
Other ____________																		

forms and the second deals with locating sources for Type I topics and activities. Guidelines for identifying sources for Type I are described in the schoolwide book, as is the general nature of the planning process in schools that do and do not have special resource teachers for advanced level students.

The major responsibility for *organizing* the overall Type I effort in a school should be that of the Enrichment Team and the sub-group of this team that we will simply refer to as the Type I Committee. Although this committee should plan and organize meetings, the success of this endeavor rests with the specificity of topic/grade level planning and the extent of involvement by teachers who will be affected through such planning.

The focus of a Type I Committee meeting can be either general or specific. We might begin, for example, by simply listing any and all topics and available resources that participants feel would enhance their fourth grade social studies curriculum. Or, we might decide to focus on a specific topic such as the Civil War, Latin American Geography or current events. Using standard brainstorming practices, all topics, ideas and suggestions should be recorded in the initial stages of planning regardless of whether or not they happen to fit into a certain cell on the Type I Matrix. Indeed, it may very well be the list of topics itself that ultimately gives some direction to the final form that the Matrix will take. Certain topics may not bear direct relevance to the focus of any given planning meeting but might be useful for subsequent meetings or even for planning efforts that are directed toward other subject matter areas. For example, a suggestion about a film or television dramatization of a particular aspect of the Civil War might subsequently end up being included as a suggested Type I experience for planning a session dealing with the Arts or with the Language Arts curriculum. Since members of the Type I Committee will have an overview of all of the planning going on in a particular building, they can help to share and coordinate ideas that may emerge at any given meeting. This approach will help to avoid duplication of topics and provide for a well integrated schoolwide Type I planning effort.

The second major consideration that needs to be dealt with in completing the Type I Guide relates to the quantity of resources one should strive to identify. A major factor in determining the success of the Type I dimension of your program will be the extent to which you can locate a large number and variety of resources that are specifically designed to expose the students to topics and areas of study that are not ordinarily covered in the regular curriculum. Fortunately, there are literally thousands of sources to draw upon and our major task in pursuing the Type I objectives of any program is to identify and organize the sources so that they can be effectively utilized in your program.

An important factor to keep in mind as you begin work on identifying Type I sources is that this is a developmental approach that should be accomplished over a long period of time. In other words, you will want to begin your work on a modest scale and attempt to add continuously to the list of beginning sources over a long period of time.

As the number of Type I sources increases over the years, procedures for disseminating information about this dimension of your program should be formalized so that eventually a *"Type I Source Guide"* can be published and distributed on a regular updated basis throughout all schools in your district. The Type I dimension can be a very exciting aspect of your program because it will bring into the schools an almost unlimited number and variety of experiences that are not ordinarily covered in the regular curriculum. This approach holds promise of increasing the number of supporters and advocates of enrichment programming and therefore its payoff can be both in terms of public relations and support as well as the many educational experiences that will be provided for your students.

Note: In ***The Schoolwide Enrichment Model*** (Renzulli & Reis, 1985) we have listed numerous specific sources for Type I Enrichment, procedures for organizing, recording and evaluating these activities, and guidelines for the establishment of interest development centers. Also included are sample forms, dissemination vehicles, recruitment letters, evaluation instruments, and teacher training activities.

Procedures for Evaluating Type I Enrichment

At the conclusion of the school year, the columns and rows of any Type I Matrix can be summed and the figures in all cells can be converted to percentages. This approach enables you to gain a broad perspective about your overall planning effort and provide decision makers with some data about the scope and diversity of Type I experiences. This overview of your Type I effort will be extremely valuable in subsequent year planning. It will also be helpful in documenting and reporting the systematic ways in which you have attempted to provide enrichment experiences for the general school population and for Talent pool students.

A good method for developing your end-of-year evaluation report is to gather appropriate data on a regular basis throughout the year. A few minutes invested to document each Type I at the time it takes place will save many hours later on and will provide a very impressive picture of your overall planning and service delivery system. It is also very worthwhile to capture Type I's on film for use in presentations to parent groups, boards of education and for subsequent inservice training sessions.

Service No. 4: Type II Enrichment (Group Training Activities)

The second category of general enrichment in the Triad/Revolving Door Model consists of activities that are designed to develop cognitive and affective processes. The definition, objectives and related information about Type II Enrichment are presented in Figure 5. Within each objective, the targeted skills exist along a continuum ranging from very basic manifestations of a given skill or ability to higher and more complex applications of any given process. It is for this reason that we have developed a plan for Type II Enrichment that is designed to promote the development of all four objectives in both the general population and in those students that have been selected for participation in the Talent Pool. This approach to a schoolwide enrichment program offers many advantages. First and foremost, it avoids the totally unsupportable assertion that only "*the gifted*" should have an opportunity to develop their thinking and feeling processes. Second, we do not have to spend our time and energy trying to defend which activities are, and which are not, good for high ability students. Since most process activities are open-ended in nature and exist along a continuum of difficulty, these activities provide opportunities for a range of response options and therefore they can be used with groups of varying ability levels. A third advantage of this approach is that it represents a systematic and organized procedure for expanding the scope of the regular curriculum and enriching the learning experiences of all students served by the schools.

Before describing the Action Forms developed to organize Type II training, we should point out that there are three different dimensions of Type II Enrichment that are used within the Triad/Revolving Door Model. The first dimension might best be described as the type of planned, systematic enrichment that can be organized in advance for any given grade level, group or regularly scheduled part of your special program. Although this section will concentrate on this dimension, we would like to discuss briefly the other two dimensions and point out how some of the "*technology*" for Type II Enrichment can be used in all three dimensions.

The second dimension of Type II Enrichment consists of the types of process training skills that can*not* be planned in advance. Process training experiences in this category usually result from student interests arising out of regular curricular experiences, purposefully planned Type I and Type II experiences, or special interests that might arise out of non-school interests on the parts of individuals or small groups of students. In many cases these types of process training experiences may be the result of

DEFINITION:	Instructional methods and materials that are purposefully designed to promote the development of thinking and feeling processes.
TARGET AUDIENCES:	1. All students (basic training). 2. Talent Pool students (basic training plus advanced level experiences according to individual abilities and interests).
OBJECTIVES:	1. To develop general skills in creative thinking and problem solving, critical thinking, and affective processes such as sensing, appreciating and valuing. 2. To develop a wide variety of specific learning how-to-learn skills such as notetaking, interviewing, classifying and analyzing data, drawing conclusions, etc. 3. To develop skills in the appropriate use of advanced level reference materials such as readers guides, directories, abstracts, etc. 4. To develop written, oral and visual communication skills that are primarily directed toward maximizing the impact of students' products upon appropriate audiences.
KEY CONCEPTS:	A Taxonomy of Process and Thinking Skills Development. Group Interaction. A "Scope and Sequence" Approach to Process Development. Methods and Materials Oriented.
ACTION FORMS:	Planning Matrices for Organizing and Teaching Type II Skills. Materials and Activities Selection Worksheets. Enrichment Material Specification Forms.

Figure 5. Type II Enrichment Summary Sheet

previous training and therefore we must remain flexible in making decisions about providing Type II Enrichment that may not have been included in our original formulation for any given year or group of students.

The third dimension of Type II Enrichment training consists of processes that should be taught in connection with a Type III activity that has been selected by one or more students. A major focus of teacher guidance in Type III situations is to provide advanced level training in the methodological and process skills that are necessary for carrying out advanced level investigative and creative production activities. As students begin work on a Type III project, materials should be reviewed for purposes of identifying appropriate process training skills. For example, if one or more students should decide to pursue a Type III experience related to Oral History, you can quickly identify process training activities related to interviewing and other Oral History techniques by examining the titles of enrichment materials related to this skill.

Planning and Implementing Type II Enrichment

A major part of our efforts to prepare a comprehensive plan for process development has been to organize a *Taxonomy of Type II Enrichment Processes.* The Taxonomy is organized around the four major objectives set forth in Figure 5 and 14 subcategories of process training. The general structure of the Taxonomy is indicated in the chart which follows.

Type II Taxonomy

I. Cognitive and Affective Training
   A. Creative Thinking Skills
   B. Creative Problem Solving and Decision Making
   C. Critical and Logical Thinking
   D. Affective Skills

II. How-To-Learn Skills
   A. Listening, Observing and Perceiving
   B. Reading, Notetaking and Outlining
   C. Interviewing and Surveying
   D. Analyzing and Organizing Data

III. Advanced Research Skills and Reference Materials
   A. Preparation for Type III Investigations
   B. Library Skills
   C. Community Resources

IV. Written, Oral and Visual Communication Skills
   A. Visual Communication
   B. Oral Communication
   C. Written Communication

Each of the 14 subcategories is further divided into specific skills that can serve as the basis for planning, and materials review and selection. It can also be used for the construction of a process-oriented Scope and Sequence Chart for any given group, grade level, subject area or total program. The items in the Taxonomy have also been used to construct needs assessment questionnaires and evaluation instruments. The total Taxonomy contains more than 250 specific skills. Space does not permit a complete listing; however, one of the 14 subsections is presented as an example.

Specific Skills
From Objective I: Cognitive and Affective Training

C. Critical and Logical Thinking.

Conditional Reasoning
Ambiguity
Fallacies
Emotive Words
Definition of Terms
Categorical Propositions
Classification
Validity Testing
Reliability Testing
Translation
Interpretation
Extrapolation
Patterning
Sequencing
Flow Charting
Computer Programming

Analogies
Inferences
Inductive Reasoning
Deductive Reasoning
Syllogisms
Probability
Dilemmas
Paradoxes
Analysis of:
   Content
   Elements
   Trends and Patterns
   Relationships
   Organizing Principles
   Propoganda and Bias

The major purpose of the Taxonomy is to serve as a guide in the review and selection of enrichment materials. Over the years we have used this organizational plan to analyze and classify more than seven hundred sets of enrichment activities. This procedure includes general grade-level classifications (primary, middle, secondary) as well as thinking process categories. New materials are reviewed and classified as they become available. The result of this overall effort has been the development of a materials laboratory that is organized by thinking skills objectives and grade levels. Resource teachers and Enrichment Team members use the laboratory to review materials (they may not check the materials out), and then order from publishers those materials that will become a part of their own locally developed scope and sequence plan for process development. Many sets of the materials are accompanied by evaluation information provided by teachers, and brief descriptions of many sets of the materials are provided on Enrichment Material Specification Forms (see Action Form II). These forms are especially useful for persons who may not be able to visit the laboratory, and they also have been used by school districts, regional service centers and individual schools as they go about the process of setting up their own materials laboratories.

Another key Action Form for Type II Enrichment is entitled the *"Materials and Activities Selection Worksheet"* (see Action Form 10a). These worksheets are designed to assist program planners in making decisions about Type II activities that will be used in the resource room and/or the regular classroom. The forms are coordinated with the four major objectives of Type II Enrichment and the specific subcategories of enrichment objectives related to each of the four major areas.

The forms are divided (along the horizontal axis) into two major areas. The first area deals with enrichment activities that ordinarily will be selected by resource teachers for use with Talent Pool students in the resource room. The second category deals with two types of enrichment activities that will be selected for use in the regular classroom.

These forms are designed to be completed over a long period of time and teachers should therefore not be overly concerned about comprehensive coverage of any given cell in the matrix at the beginning of their planning effort. The specific enrichment activities that will be recorded in the cells will grow in number and diversity during the first few years of the program. The result of your overall planning in this regard will be to develop a comprehensive *"Scope and Sequence Guide"* for the Type II Enrichment activities that will be made available to both Talent Pool students and other students at any given grade level and within any given subject matter area. These forms are designed to help facilitate cooperative planning on the parts of resource teachers and classroom teachers. They also provide an opportunity for input and suggestions on the parts of subject matter area coordinators or general curriculum coordinators in the school district. Although initial efforts to complete the forms might begin on a grade level and building-by-building basis, the forms may also serve the purpose of developing a districtwide plan for Type II Enrichment that will be recommended for use at various grade levels and in particular subject matter areas.

Administrative Support and Type II Enrichment

We want to emphasize the key role that administrators play in the overall Type II planning effort. First and foremost, administrators must make provisions for faculty release time for the examination of materials and completion of worksheets. Staff development days, compensatory time after school or during summer sessions, or any other time that avoids making this work an *extra* assignment should be explored. Because this is a team effort, it is important to arrange time blocks when several persons can work together.

Action Form 10a

MATERIALS AND ACTIVITIES SELECTION WORKSHEET FOR PLANNING TYPE II ENRICHMENT

I. Cognitive and Affective Training

Grade ____________

Subject(s) ____________

	Resource Room	Regular Classroom	
		Group Activities	Self Selected Activities
A. Creative Thinking Skills			
B. Creative Problem-Solving and Decision-Making			
C. Critical and Logical Thinking			
D. Affective Skills			

Administrative support is also necessary in the form of financial provisions for the purchase of material and special training or consultant services that might be necessary for the effective use of certain materials. Whenever possible, teachers should be given financial support to attend conferences and workshops where enrichment methods and materials will be presented.

Another major area of administrative support is the development of an attitude that encourages the use of Type II activities. The activities should be considered an important part of "*the basics*" rather than a supplementary "*frill.*" The need to expand the broad range of thinking skills embraced by Type II Enrichment was a major area of emphasis in

Action Form 11
ENRICHMENT MATERIAL SPECIFICATION FORM

________ Major Process Area(s) __________________________________

________ Major Content Area(s) __________________________________

Planning Matrix Classification __________________________________

Title: ____________________	Cost: ____________________
____________________	Order No.: ____________________
Author: ____________________	Grade/Age Level(s): ____________________

Publisher (Address): __________________________________

Brief Description:

For a more complete description see:

Format (Workbook, Flash Cards, Audio Cassette, etc.):

Topics or Units of Study in the Regular Curriculum Related to These Materials:

Thinking and/or Feeling Processes Developed:

Local Resource Person(s) Familiar with Materials (Please check the names of persons who are willing to conduct workshops or demonstration lessons):

Comments:

the reports on educational excellence that have recently been issued by a number of national commissions. These reports pointed out that the "*back-to-basics*" movement should not be interpreted to mean more drill or simply excess coverage of traditional material. If administrators view enrichment as something that regularly competes for time with the regular curriculum, we will never overcome the criticism that is continuously directed toward special programs for advanced level students. Our goal in the development of a Type II scope and sequence is to bring these essential problem solving and other process training skills into the regular classroom as well as the resource program. If Type II activities are used in the regular classroom, students who are not ordinarily involved in the enrichment program will have an opportunity to participate in process training and the classroom teacher can encourage the application of these process skills to other classroom work. This effort will be considerably enhanced if administrative enthusiasm and support is obvious.

Administrators must also be aware of the developmental nature of this Type II planning process. Teachers should not be expected to produce a comprehensive scope and sequence plan overnight! Rather, specific subject matter areas within grade levels should be attacked one worksheet at a time. And within any given worksheet, one or two entries per cell will suffice at the early stages of development. Over a long period of time, additional cell entries will be added and the total number of worksheets will be expanded. By setting modest but regular and periodic goals, a comprehensive plan will emerge that avoids making this process an overburdening assignment for teachers.

Procedures for Evaluating Type II Enrichment

Although space does not allow a full discussion of methods for evaluating Type II Enrichment, we would like to briefly describe one instrument that was specifically designed to assess process skills. The Class Activities Questionnaire (Steele, 1982) was originally developed in connection with the statewide evaluation of the Illinois Gifted and Talented Program. In our opinion, it is one of the best instruments that has ever been developed to evaluate thinking skills and factors related to the instructional climate that should characterize Type II Enrichment. The instrument, which is based on Bloom's ***Taxonomy of Educational Objectives*** (1956), obtains feedback from both teachers and students. It can be used in a comparative fashion to assess various dimensions and factors related to thinking processes and classroom climate. The five major dimensions of instructional climate are indicated in the left-hand column. Each of these dimensions is composed of a number of factors (or scales) which in turn are usually represented by several items in the questionnaire.

This instrument is prepared on optical scanning sheets for computer scoring and analysis. A manual includes reliability and validity data as well as directions for administration and interpretation. Information about the CAQ can be obtained by writing to Creative Learning Press, P.O. Box 320, Mansfield Center, CT 06250.

Additional instruments for evaluating Type II Enrichment, as well as numerous other procedures for implementing a total program for the development of thinking skills can be found in ***The Schoolwide Enrichment Model*** (Renzulli & Reis, 1985).

Second Level Identification—Revolving Into Advanced Level Enrichment and Acceleration Experiences

The question that is raised most frequently about Triad/Revolving Door programs is, "What are the specific procedures for 'revolving' a student into advanced level enrichment experiences?" In other words, how does a student progress from participation in general Talent Pool activities to individual and small group investigations of a more advanced nature? The answer to this important question is based almost entirely on the concept of *action information*. Action information can best be defined as the type of dynamic interactions that take place when a child becomes extremely interested in or excited about a particular topic, area of study, issue, idea or event that takes place in his school or non-school environment. The best way to understand this concept is to begin with the second term—interaction. An interaction (in learning) takes place when a student comes into contact with and is influenced by a particular person, concept or piece of knowledge. The influence of the interaction may be relatively limited or it may have a highly positive and extremely motivating influence on the individual. If the influence is strong enough and positive enough to promote further exploration and involvement (in the topic) on the part of the student, then we may say that a dynamic interaction has taken place. For example, if a student is exposed to the topic of solar energy and this exposure provokes an interest in doing more reading on the topic or perhaps conducting some experiments relating to harnessing power from the sun, we may say that a dynamic interaction has taken place.

An underlying factor in spotting action information and subsequently referring youngsters for possible follow-up activities is that we would attempt to determine if the action information is productivity oriented. By this we mean that it should relate to a child's desire to pursue a topic further and more intensively. One of our major goals in providing enrichment for high ability youngsters is to encourage them to engage in investigative activities that will result in the development of a creative product. Thus, a productivity oriented follow-up experience should focus on a child's desire to *act upon* an interest rather than merely to react to the interest. Action information has four key characteristics:

1 *Action information cannot be gathered at the beginning of a school year by questionnaires, rating scales or checklists.* If we attempt to reduce action information to a checklist or rating scale it will automatically become status information. Certain types of prerecorded status information can certainly give us hints about which children tend to become highly involved in advanced level projects, research studies or other creative endeavors. But one of the main goals in this model is to make judgments about revolving children into advanced level enrichment *at the time* when they express high levels of interest. These types of decisions cannot be made beforehand; and therefore we must keep our identification systems flexible enough to allow students to enter advanced experiences when action information becomes evident. Action information, therefore, always consists of expressions of interests and creativity that are observed *in addition* to prerecorded (i.e., status) information about a child's strengths, interests and creative ability.

2 *Action information is always something that grows out of the interests of children.* This characteristic of action information is the single most important concept underlying the Triad/Revolving Door Model. The sincere interests of children should always serve as the point-of-entry into the special program and the focal point around which we build advanced level experiences. After a general or specific area of interest has been identified, procedures for determining the strength of the interest and the child's willingness to follow up can be pursued. At this point teachers can begin to assist youngsters with strategies for problem focusing and the development of a plan for investigative activity (see Renzulli, 1983).

3 *Action information is more subjective than status information and is highly dependent upon the intuitive thoughts, reactions and observations of the teacher.* A great deal of sensitivity and "the art of teaching" are involved in making judgments about action information. This type of information is almost totally dependent upon sensitive and insightful teachers who know their students, trust their own judgments, and are willing to act on such judgments. Although tests have certain obvious value in the status information of the Revolving Door Model, there are many types of expressions on the parts of children that cannot always be determined or verified by testing instruments. It is precisely these types of expressions that we are seeking to spot in the action information dimension of the model; and therefore, we should place high value on the intuition, subjectivity and our own personal reactions and judgments.

4 *There is no one "best" situation in which the need for action information can be observed.* Action information usually results from one (or a combination) of three types of learning situations. In some cases unusual levels of interest, excitement or creativity will be expressed in response to topics covered in the regular curriculum. Another situation where the need for action information may be observed is during the presentation of specially prepared enrichment activities that are purposefully designed to provoke high levels of interest or creativity (i.e., Type I and Type II Enrichment). The third general category of learning situations where unusual responses on the parts of students might be observed is extracurricular activities and the environment in general. In this situation a sustained interest might be sparked by a particular television program, a news event of local or national interest, a hobby or extracurricular activity, or by an interaction that the student may have with persons in his or her environment.

The main procedure for gathering action information is observation of the reactions of children to the types of situations described above. The vehicle for documenting and communicating our observations is a form entitled the ***Action Information Message*** (Renzulli, 1981). This form is a record-keeping device that will facilitate communication among classroom teachers, resource persons, students and parents. It may be completed by classroom teachers, parents, students or resource teachers and forwarded to the person responsible for facilitating advanced level studies. It has been prepared in the form of a light bulb in order to highlight its role in the Triad/Revolving Door Model. Although this instrument does not yield scores or percentiles, we believe it is the most valid procedure for recording high levels of interest, task commitment and creativity on the part of a student or small group.

Action information is a key feature about this model that makes it different from most other approaches to identification and programming. This use of a second level of identification helps to avoid all of the problems associated with total preselection decisions and, at the same time, helps to respect the concept of differentiated abilities (i.e., high ability youngsters are as different from one another as they are from the population in general).

Type III Enrichment: Individual and Small Group Investigations of Real Problems

Type III Enrichment is the highest level of experience that can be offered in special programs utilizing the Triad Model. An overview of this dimension of the model is presented in Figure 6. In this section we will describe the responsibilities of teachers in initiating, planning and implementing Type III Enrichment experiences. The outline that we will use is based on the rings in Figure 7, and we will work our way through this outline, beginning with the center of the figure and moving toward the outer rings.

Action Information and Follow-Up Procedures

The center of the diagram represents an Action Information Message (AIM), which is an anecdotal comment about a high level interest on the part of an individual or small group. The AIM can originate from a variety of sources (regular curriculum, Types I and II Enrichment, non-school activities, extracurricular involvements), and it can be transmitted on a special elementary or secondary form (see Renzulli & Reis, 1985, pp. 398–399), a verbal exchange, or an informal note. The AIM should be directed toward the

DEFINITION:	Investigative activities and artistic productions in which the learner assumes the role of a first hand inquirer; the student thinking, feeling and acting like a practicing professional.
TARGET AUDIENCES:	Individuals and small groups of students who demonstrate sincere interests in particular topics or problems and who show a willingness to pursue these topics at advanced levels of involvement.
OBJECTIVES:	1. To provide opportunities in which students can *apply* their interests, knowledge, creative ideas and task commitment to a self-selected problem or area of study. 2. To acquire advanced level understanding of the knowledge (content) and methodology (process) that are used within particular disciplines, artistic areas of expression and interdisciplinary studies. 3. To develop authentic products that are primarily directed toward bringing about a desired impact upon a specified audience. 4. To develop self-directed learning skills in the areas of planning, organization, resource utilization, time management, decision making and self-evaluation. 5. To develop task commitment, self-confidence, feelings of creative accomplishment, and the ability to interact effectively with other students, teachers and persons with advanced levels of interest and expertise in a common area of involvement.
KEY CONCEPTS:	Personalized Learning by Doing. Real Purpose Applied to the Production of a Real Product for a Real Audience. Student's Role is Transformed From Lesson Learner to First Hand Inquirer. A Synthesis and Application of Content, Process and Personal Involvement.
ACTION FORMS:	Action Information Message Management Plan for Individual and Small Group Investigations Specification Form for Methodological Resource Books Type III Mentor Matrix

Figure 6. Type III Enrichment Summary Sheet

resource teacher. In cases where there are no special program personnel, the AIM should be directed to the chairperson of the Enrichment Team or persons who have been preselected to receive AIM's in particular categories (e.g., primary science, middle grade creative writing, etc.). In the discussion that follows, we will assume the presence of a resource teacher, but recognize that these duties will be shared by others if resource teachers are not a part of the program in a particular school.

When an Action Information Message is sent or delivered to the resource teacher, certain steps should be immediately followed if vacant slots or spaces exist in the resource room. First, the resource teacher either contacts or is contacted by the classroom teacher. The resource teacher should gather as much information as possible about the individual student or group of students. The student's interest in the topic, commitment to completing tasks and curricular strength areas should be analyzed by both teachers. If the individual student or group of students show particular strengths in

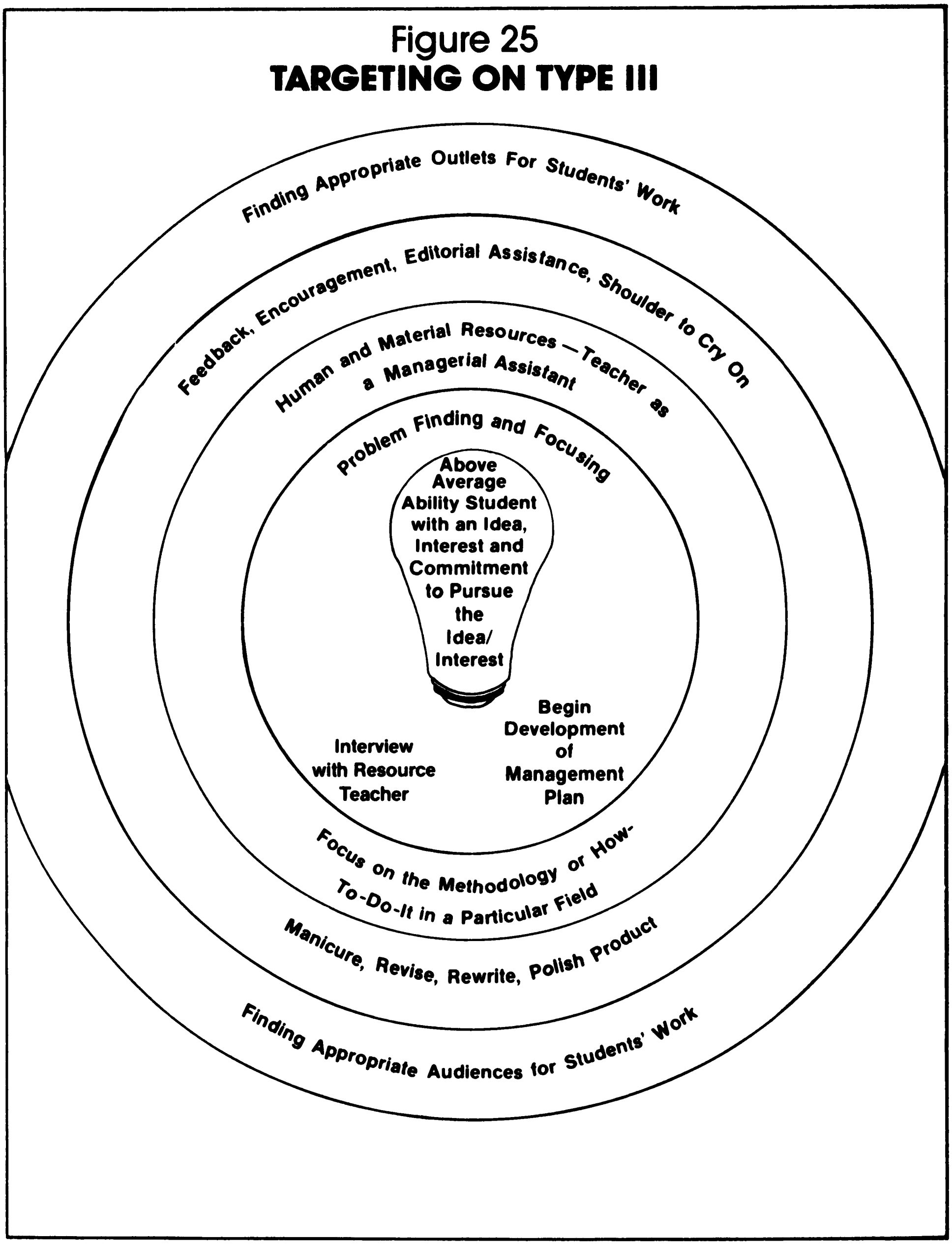


Figure 7. Targeting on Type III

certain subject areas, the resource teacher may also want to begin discussing possible strategies for curriculum compacting at this time.

The next step involves the actual interview with the student or group of students. The resource teacher may want to invite the classroom teacher to a very brief and informal pre-interview meeting in order to gain background information about the student(s). At this time, the two teachers can decide if the classroom teacher should be involved in the student interview. Whenever possible such involvement should be encouraged because this participation will result in a greater interest and understanding in both students' projects and the overall nature of what is actually happening in the resource room.

Several important topics should be dealt with at the time of the student interview. The resource teacher should try to assess how much interest is really present for further pursuit of the topics. Several questions may be asked that will lead the teacher to determine whether or not a true interest is being pursued. If the investigation or interest involved journalism, for example, and the student wanted to produce a monthly elementary school newspaper, the following questions might be asked at the initial student interview: (1) How long have you been interested in journalism? (2) What sources have you contacted to learn more about this subject? (3) Have you ever tried to publish a class or neighborhood newspaper? If not, why? (4) Have you ever tried to visit our local newspaper? (5) Do you know any other students or adults that are interested in this topic? (6) Have you looked at any books or talked with anyone who might help you get started on a monthly newspaper? If I can help you find a couple of books or someone to talk to about this project, do you think this might give you some ideas? and (7) How did you become interested in this topic?

Questions such as these will help to assess interest and commitment to the topic in mind. The last question is especially important because we want to be certain that the interest is in fact the student's. In one case at our field test sites, the resource teacher asked this question and listened in surprise as the student honestly responded that she really wasn't interested in the subject, but her mother was!

To further analyze the student's desire to complete the task, questions about procedures should also be asked at this time. If the idea for the monthly newspaper is being discussed, the resource teacher should, at this point, ask questions that will reveal whether or not the student has thought about the task commitment that will be required to complete the project or product. These questions might include: (1) How do you think you should get started? (2) How many hours do you think it will take you to organize completely a monthly school newspaper? (3) How many other students do you think you will need to involve? (4) How will you recruit reporters? (5) How can you reproduce your newspaper? and (6) Do you have any ideas that might help you to develop a newspaper that is somewhat different from others you have seen?

The point of this interview is not to *"frighten"* away individuals or small groups of students from beginning an investigation or product-oriented study in the resource room. It is, rather, to reserve the time and energies of resource teachers for students who have a genuine interest in their subject and a sincere desire to work.

If the resource teacher decides not to accept an Action Information Message and not to admit the student to the resource room for one of the reasons already listed, that decision must be diplomatically explained to the classroom teacher who has sent the Message. We found that in most cases in our field test sites, the classroom teachers reacted well to the decision, particularly when they had been involved in the interview. Some teachers indicated that they had been unsure about even sending the Message, but they had noticed an interest and thought that the resource room teacher should be notified. This is exactly how the procedure should work. The classroom teacher should feel a part of the decision and should not consider an Action Information Message which was not accepted as a failure.

If a successful interview results in the resource teacher and the classroom teacher agreeing that the student or group of students should begin working in the resource room, certain scheduling details must be followed. If a resource room does not exist in the school, the classroom teacher must make his or her own decision about the student's product or work and should try to revolve the student into a particular place in the room or school where the student can begin work. If a space exists in the resource room, schedules should be devised that will allow the student or group of students, whenever possible, to be out of the classroom during a time when the teacher is covering work that the student has already mastered. At this time, procedures should be implemented to streamline or compact the student's regular curriculum so that time may be made available to begin the investigation or Type III project. In addition, a contract or planning guide should be completed which documents the nature and scope of the student's proposed investigation. ***The Management Plan*** (Action Form 13, Renzulli & Smith, 1977), is one such device that has served to help students formulate their objectives, locate and organize appropriate resources and identify relevant outlets and audiences for their creative work.

Problem Finding and Focusing

Once a student has been revolved into a Type III experience, the first major responsibility of the teacher is to help the student identify the specific question(s) or idea(s) he or she is going to pursue. The process of problem finding and focusing should begin by first determining the students' general area(s) of interest. This determination can be made through the formal submission of an Action Information Message or it might result by simply observing the way in which a youngster responds to experiences in the regular curriculum, planned Type I and/or Type II Enrichment activities, or informal interests that may result from out-of-school experiences. If we are going to promote maximum amounts of Type III involvement on the parts of students, teachers must have a thorough understanding of the model in general and specific training and orientation about how to spot advanced level interests in particular topics or areas of study. It is also absolutely essential for students to view the special program as a place where they can bring their interests and ideas and gain some assistance in determining whether or not an idea might subsequently result in the development of a Type III project. We recommend providing students and teachers with numerous examples of Action Information Messages that have been received in previous years [or you may choose to use some of the examples included in ***The Schoolwide Enrichment Model*** (Renzulli, et al, 1985)] and to describe the types of follow-up that took place as a result of these forms being submitted. This dimension of training related to the Triad Model cannot be overemphasized; and it is suggested that during the early years of your program you consider doing somewhat of an "*overkill*" in this area of orientation and training.

Most teachers have little difficulty recognizing general families of interest—scientific, historical, literary, mathematical, musical, athletic. However, problems arise when they attempt to capitalize upon these general interests and use them as the starting point for (1) focusing in on a specific manifestation of general interests, and (2) structuring specific interests into researchable problems. How teachers deal with interests, both general and specific, is crucial and if handled improperly will undoubtedly get students off on the *wrong* track.

We know of one youngster, for example, who expressed an unusual interest in sharks. The teacher appreciated the child's enthusiasm and reacted in what he thought was an appropriate fashion: "*I'm glad that you have such a great interest in sharks—why don't you* do a report *about sharks?*" Those awful words, "do a report . . ." lead to an inevitable end result—yet another summary of facts and drawings based entirely on information copied from encyclopedias and "*all-about-books.*" While the student

Action Form 13

MANAGEMENT PLAN FOR INDIVIDUAL AND SMALL GROUP INVESTIGATIONS

(Actual Size: 11" x 17")

Prepared by Joseph S Renzulli, Linda H Smith

NAME ______ GRADE ______ Beginning Date ______ Estimated Ending Date ______

TEACHER ______ SCHOOL ______ Progress Reports Due On Following Dates ______

GENERAL AREA(S) OF STUDY (Check all that apply)

__ Language Arts/Humanities __ Science __ Personal and Social Development

__ Social Studies __ Music __ Other (Specify) ______

__ Mathematics __ Art __ Other (Specify) ______

SPECIFIC AREA OF STUDY Write a brief description of the problem that you plan to investigate. What are the objectives of your investigation? What do you hope to find out?

INTENDED AUDIENCES Which individuals or groups would be most interested in the findings? List the organized groups (clubs, societies, teams) at the local, regional, state, and national levels. What are the names and addresses of contact persons in these groups? When and where do they meet?

1. ______
2. ______
3. ______
4. ______
5. ______

INTENDED PRODUCT(S) AND OUTLETS What form(s) will the final product take? How, when, and where will you communicate the results of your investigation to an appropriate audience(s)? What outlet vehicles (journals, conferences, art shows, etc.) are typically used by professionals in this field?

METHODOLOGICAL RESOURCES AND ACTIVITIES List the names & addresses of persons who might provide assistance in attacking this problem. List the how-to-do-it books that are available in this area of study. List other resources (films, collections, exhibits, etc.) and special equipment (e.g., camera, transit, tape recorder, questionnaire, etc.) Keep a continuous record of all activities that are a part of this investigation.

GETTING STARTED What are the first steps you should take to begin this investigation? What types of information or data will be needed to solve the problem? If "raw data", how can it be gathered, classified, and presented? If you plan to use already categorized information or data, where is it located and how can you obtain what you need?

A complete description of the model utilizing this form can be found in: *The Enrichment Triad Model: A Guide For Developing Defensible Programs For The Gifted And Talented.* - Creative Learning Press, Inc. PO Box 320 Mansfield Center, Ct 06250

prepared a very neat, accurate report, her major investigative activity was looking up and summarizing already existing information.

Although previous (background) information is always an important starting point for any investigative endeavor, one of the goals in Type III Enrichment is to help youngsters extend their work beyond the usual kinds of *reporting* that often results when teachers and students view the Type III process as merely looking up information.

Some training in reporting is a necessary part of good education for all students. Indeed, the pursuit of new knowledge should always begin with a review of what is already known about a given topic. The end result of a Type III investigation, however, should be a creative contribution that goes beyond the already existing information that is typically found in encyclopedias and all-about-books.

How can teachers help students learn to focus problems and become involved in more advanced types of creative and productive involvement? The first step is to help students ask the right kinds of questions routinely raised by persons who do investigative research *within* particular fields of knowledge. At this point, however, we are faced with a practical problem. Because most teachers are not themselves well-versed in asking the right questions about specific fields of study, we must assist students in obtaining the methodological books (or resource persons, if available) that routinely list these important questions. In other words, if we want to ask the right questions about problem focusing in anthropology, then we must begin by looking at techniques used by anthropologists. Every field of organized knowledge can be defined, in part, by its methodology. In every case this methodology can be found in certain kinds of guidebooks or manuals. These *"How-To"* books are the key to escalating studies beyond the traditional report writing approach. Unfortunately, many of these books are not ordinarily included in elementary or high school libraries, but the fact that they are not easily available does not mean that able students cannot make appropriate use of at least selected parts of advanced materials.*

We can avoid the error of confusing traditional reporting with Type III investigations by keeping the concept of raw data in mind. Raw data can be thought of as relatively unorganized bits and pieces of information that can be gathered and analyzed in order to reach a conclusion, discover a principle, support an argument or create a unique product or presentation. (In a certain sense, even a poet uses new combinations of words, ideas, and feelings as "raw data" to create an original poem.) The ways in which researchers use data and the purposes toward which data are directed are important considerations in defining a Type III experience. In the following example we will try to highlight important steps and key concepts in problem focusing by noting these concerns in brackets.

Steps in Problem Focusing: An Example

Jason's teacher was aware of his special interest in anything and everything having to do with science. [Keep in mind that science is an area rather than a problem.] She provided him with several copies of Popular Science *and asked him to review and pick out the articles he liked best. [This is a good example of an exploratory activity (Type I) because these magazines include many topics that are not ordinarily covered in the regular science curriculum.]*

When the teacher asked Jason if there was any article he would like to follow-up by doing some research of his own, he selected the area of hydroponic gardening. [The general area of science has now been narrowed down somewhat but hydroponic gardening is a topic rather than a problem.] The teacher obtained Hydroponic Gardening *(Birdwell, 1974) from the county library and Jason practically* "devoured" *it in one night:*

*Through discussion with his teacher Jason arrived upon the idea of growing corn under varying conditions. [*Now *we have an "investigatable" problem.] He constructed several growing trays using paper milk cartons and obtained the necessary nutrients from his chemistry set, a high school chemistry teacher and a university extension agent with whom he made contact through assistance from his teacher. By varying the*

**Creative Learning Press now markets a wide range of how-to books in the following broad areas: social sciences, sciences, modes of communication and research methodology. You can write to their Mansfield Center office to obtain a listing of these books.*

amounts of certain macronutrients (nitrogen, phosphorus, potassium) and keeping other conditions constant [good research procedures] he was able to observe different rates of growth. Meticulous records were kept and weekly measurements [data] of growth rates and plant "health" [more data] were recorded. He also photographed plants grown under varying conditions by placing a standard growth-grid chart behind each plant [visual data]. Graphics and statistical summaries were prepared [data summary and analysis] and a written report was developed [communication of results]. Jason also organized an audio-visual presentation of his work [another mode of communication].

One of the most important points that we want to convey at this time is that it is not necessary for teachers to become experts in all of the methodological techniques of the many fields of study in which their students might develop an interest. This is indeed an impossible task, but it does not mean that we will be unable to provide very sophisticated levels of methodological technique to students who develop interests in specialized fields of knowledge. Our major responsibility in problem focusing and the other activities for facilitating Type III Enrichment described below is (1) to know about the existence of methodological resource books in the various fields of knowledge; (2) to know where such books are located and how we can obtain them for students; (3) to take the time and effort necessary to help them obtain these materials which will frequently be located in other places than our schools and (4) to provide or obtain the assistance that might be necessary for interpreting advanced-level material that might be difficult for younger students to understand.

Focusing On Methodology

The second major responsibility of teachers in facilitating Type III Enrichment is to give students methodological and managerial assistance. **Methodological assistance** means helping students to acquire and make appropriate use of the specific data-gathering tools and investigative techniques that are the standard and necessary methods for authentic research in particular fields of study. If a problem is well-defined and focused, the correct guidance by teachers during this phase of a study can almost guarantee that students will be first-hand investigators rather than reporters. This step of the process involves shifting our emphasis from learning *about* topics to learning *how* one gathers, categorizes, analyzes and evaluates information in particular fields.

Every field of knowledge is characterized, in part, by certain kinds of raw data. New contributions are made in a field when investigators apply well-defined methods to the process of "*making sense*" out of previously random bits and pieces of information. Although some investigations require levels of sophistication and equipment that are far beyond the reach of younger students, almost every field of knowledge has entry level and junior level data gathering opportunities.

At this stage of Type III activity the teacher's role is to help students identify, locate and obtain resource materials and/or persons that can provide assistance in the appropriate use of investigative techniques. In some cases, we may have to consult with librarians or professionals within fields for advice about where and how to find resource materials. We may also need professional assistance in translating complex concepts into levels students can understand. Although methodological assistance is a major part of the teacher's responsibility, it is not necessary nor realistic to expect teachers to have mastered a large number of investigative techniques. A good general background and orientation toward the overall nature of research is necessary, but the most important skill is the ability to know where and how to help a student obtain the right kind of material and the willingness to reach out beyond the usual school resources for specialized kinds of materials and resource persons.

Managerial assistance consists of helping students to make arrangements for obtaining the types of data and resources necessary for Type III investigations. Setting up an interview with a public official, arranging for the distribution of a questionnaire to students or parents, and providing transportation to a place where data will be gathered are all examples of managerial functions fulfilled by teachers in Type III situations. Additional activities might include gaining access to laboratories or computer centers, arranging for the use of a college library, helping students to gain access to a telephone or photocopying machine and driving downtown to pick up some photographic materials or electronic parts. The teacher's responsibilities in this regard are similar to the combined roles of research assistant, advocate, ombudsman, campaign strategist and enthusiastic friend. At this stage of product development the student should be the leader and emerging expert, while the teacher assumes a supportive rather than authoritative posture. The teacher's typical comments should be: "*What can I do to help you? Are you having any problems? Do you need to get a book from the university library? Would you like to bounce a few ideas off of me? Are there some ways that we might explore raising the money you need for solar cells?*"

The major purpose of the managerial role is to help the student stay on track and move toward each intermediate goal and accomplishment. A planned strategy for bringing the teacher up to date on progress between meetings will create a vehicle for fulfilling the managerial role. A log, notebook or annotated time line are good examples of such vehicles. And of course, this procedure should involve a review and analysis of The Management Plan and the notation of appropriate information on the respective sections of the Plan.

The Editorial and Feedback Process

Even the most experienced researchers, writers and creative producers need feedback from persons who can reflect objectively upon a given piece of work. For young scholars who are having initial experiences in the often frustrating task of first-hand inquiry, this feedback must be given in a firm but sensitive manner. The major theme or idea underlying the feedback process is that almost everything can be improved upon in varying degrees through revisions, rewriting, and attention to details, both large and small. This message must be conveyed to students without harsh criticism or discouraging comments. Each student must be made to feel that the teacher's most important concern is to help the aspiring artist or scholar reach the highest possible level of excellence. Just as a champion athlete or dancer knows that a rigorous coach has the performer's best interests at heart, so also must students learn that critical feedback is a major service that good teachers must offer.

There are several ways students can learn about the relationship between high quality and the feedback process. Authors such as Gottschalk (1969) describe the functions of succeeding drafts of historical manuscripts. The text provides examples of first-draft and edited copies of the same manuscript. A similar strategy is to locate well-written journal articles in the student's area of research and other products that profoundly illustrate how a particular method was described or results were reported. Outstanding examples of work completed by other students of the same age will also provide prototypes as well as motivation to pursue revisions that might be necessary.

Finding Outlets and Audiences for Student Products

If the Type III dimension of our model is to have maximum value in the overall development of young scholars and creative producers, major attention must be given to helping them find appropriate outlets and audiences for their most creative efforts. This concern is once again modeled after the *modus operandi* of creative and productive individuals. If we could sum up in as few words as possible the *raison d'etre* of highly creative artists and scholars it would certainly be *impact upon audience.* Creativity is a source of personal satisfaction and self-expression, but a good deal of the rewards come from bringing about desired changes in the human condition. The writer hopes to influence thoughts and emotions, the scientist carries out research to find better ways to contribute to the knowledge of his or her field, and artists create products to enrich the lives of those who view their works. Teachers can help young people to acquire this orientation by encouraging them to develop a sense of audience from the earliest stages of a Type III investigation.

The teacher's role regarding outlets and audiences requires helping students take one small but often neglected step in the overall process of product development. The first step is to consider how people typically communicate results or products within given fields of the arts and sciences. Once again, we can look to the activities of practicing professionals and the How-To books for guidance. In most cases, young artists and scholars will be restricted to local outlets and audiences, but there will be occasions when products of unusual excellence can be shared with larger audiences.

Although school and local audiences are an obvious starting point in the search for outlet vehicles, teachers should always help students gain a perspective for more comprehensive outlet vehicles and audiences beyond local opportunities. Many organizations, for example, prepare newsletters and journals at the state and national levels and they are usually receptive to high quality contributions by young people. Similarly, state and national magazines oftentimes carry outstanding work by young people. Whenever student products achieve unusually high levels of excellence, encourage them to contact one of the publishing companies and magazines that specialize in or are receptive to the contributions of young writers, artists and researchers. Just as gifted athletes extend their involvement into larger and larger fields of competition, so also should our most able young scholars and artists be encouraged to reach out beyond the local levels of success they have achieved. This process involves an element of risk-taking and the chances of not having one's work accepted in the wider arenas of publications and dissemination. But at the same time, we have built in an element of success by beginning the process at the local or school level. At the same time, we have also built in the opportunity for a *"real world"* experience by helping young people to learn about the rigors and challenges of the creative producer as he or she attempts to reach out to wider audiences.

Procedures for Evaluating Type III Enrichment

The Student Product Assessment Form

The Student Product Assessment Form (SPAF) was the result of a comprehensive instrument development research project (Reis, 1981) that was directed toward establishing the reliability and validity of this instrument and assessing the quality of products that were produced by various groups of students participating in programs for advanced ability students. The validity and reliability of SPAF were established through a year long series of studies, using a technique developed by Ebel (1951). Levels of agreement among raters on individual items of the scale ranged from 86.4 percent to 100 percent. By having a group of raters assess the same set of products on two occasions, with a period of time between ratings, we established a reliability coefficient of .96 for the instrument. Information about the reliability of this instrument should be brought to the attention of decision makers in order to establish the credibility of your approach to the evaluation of student products. In other words, when questions about *"hard data"* and objectivity are raised, the fact that you are using a research-based instrument of proven value will help to overcome many of the concerns that traditionally are raised about the merits of various approaches to evaluation.

The instrument is composed of fifteen items designed to assess both individual aspects as well as overall excellence of products. Each item reports a single characteristic on which raters should focus their attention. Items 1 through 8 are divided into three related parts:

1. *The Key Concept.* This concept is always presented first and is printed in large type. It should serve to focus the rater's attention on the main idea or characteristic being evaluated.
2. *The Item Description.* Following the Key Concept are one or more descriptive statements about how the characteristic might be reflected in the student's product.
3. *Examples.* In order to help clarify the meaning of the items, an actual example of students' work is provided. These examples are intended to elaborate upon the meaning of both the Key Concept and the Item Description. The examples are presented after each item description.

Item 9 contains seven different components which details an overall assessment of the product. When completing the ratings for this assessment of a student's product, raters attempt to evaluate the product in terms of their own values and certain characteristics that indicated the quality, esthetics, utility and function of the overall contribution. In other words, raters are encouraged to consider the product as a whole (globally) in Item 9; to use their own judgment and rely upon their own guided subjective opinions when completing this component.

The results of product assessment should be summarized in the main body of an evaluation report. When this approach is used it is important to make the readers aware that the individual Assessment Forms, Management Plans and actual products are available for their review. It is not necessary to submit every product for a formal evaluation. A stratified random sample (by grade level and various areas of student interest) can be used to provide a fair picture of the types of work that are being pursued in the special program. Whenever random samples are used it is important to secure agreement (from boards, or funding agencies) about sample sizes prior to deciding the actual number of products to be rated. It is also important to describe in detail exactly how a truly random and unbiased approach will be used to select products for rating.

"Data" From the Management Plan

There are several important types of evaluation information that can be derived directly from an analysis of several Management Plans. Each of these types of information is consistent with the objectives for Type III Enrichment set forth on the summary sheet of this chapter. For example, Objective No. 2 calls attention to student involvement in various interdisciplinary studies. By simply tallying the numbers of check marks in the General Areas of Study box from several Management Plans you can provide some factual (and even statistical) information about the variety of disciplines that can be found in Type III Enrichment projects. Similarly, the same objective refers to advanced levels of knowledge and methodology used within particular disciplines. Information relating to this objective may be obtained by analyzing several Management Plans for books and/or resource persons that students ordinarily would not come into contact with in regular curricular activities or through the use of ordinary school textbooks or library materials. Categorical tallies of intended audiences, products and outlets will help to highlight the ways in which students are achieving the objectives set forth for Type III

Enrichment. Even the objective related to task commitment can be documented by simply presenting data about the average length of time that students spend on their Type III projects. This information coupled with Management Plans, Student Product Assessment Forms, the products themselves, and perhaps examples of sophisticated resources such as college level books, esoteric scientific equipment, computer software, etc. will provide for both a comprehensive and highly impressive array of evaluation information.

Research on the Triad/Revolving Door Model

Although the Triad/Revolving Door Model is a relatively new system for identification and programming, its effectiveness has been documented by a series of research studies and field tests in schools with widely varying socioeconomic levels and program organizational patterns. Using a population of 1,162 students in grades one through six in eleven school districts, Reis and Renzulli (1982) examined several variables related to the effectiveness of Triad/Revolving Door. The Talent Pools in each district and at each grade level were divided into two groups. Group A consisted of students who scored in the top 5 percent on standardized tests of intelligence and achievement. Group B consisted of students who scored between 10 to 15 percentile points below the top 5 percent. Both groups participated equally in all program activities.

The Student Product Assessment Form (SPAF, Renzulli, Reis & Smith, 1981) was used to compare the quality of products from each group. A "*double blind*" method of product coding was used so that judges did not know group membership (i.e., A or B) when evaluating individual products. An analysis of variance indicated there were no significant differences between Group A and Group B with respect to the quality of students' products. These findings verify the three-ring conception of giftedness underlying the Triad/Revolving Door Model and clearly support the effectiveness of the model in serving a group that is somewhat larger than the traditional top 5 percent.

Questionnaires and interviews were used to examine several other factors related to overall program effectiveness. The data indicated that feelings about the Revolving Door program—gathered from classroom teachers, administrators, students in the Talent Pools, and their parents—were generally positive. Many classroom teachers reported that their high level of involvement in the program had favorably influenced their teaching practices. Parents whose children had been placed previously in traditional programs for the gifted did not differ in their opinions about the Revolving Door program from parents whose children had been identified as gifted under the expanded Revolving Door criteria. And resource teachers—many of whom had been involved previously in traditional programs for the gifted—overwhelmingly preferred the Revolving Door identification procedure to the traditional reliance on test scores alone.

Additional research (Delisle & Renzulli, 1982) examined academic self-concept and locus of control. This study established the importance of non-intellective factors in creative production and verified earlier research related to the three-ring conception of giftedness. Using a step-wise multiple regression technique to study the correlates of creative production, Gubbins (1982) found that above-average ability is a necessary but not sufficient condition for high level productivity. The roles of task and time commitment and the importance of student interests were verified. Several factors related to improved productivity were identified. A study of student, parent and classroom teachers' attitudes toward the Revolving Door Model (Delisle, Reis & Gubbins, 1981) revealed support for this approach and a high degree of cooperation among all persons involved in the implementation of a Revolving Door program. A comprehensive study of administrators' attitudes toward programs based on the Triad/Revolving Door Model was conducted by Cooper (1983). The findings indicated that although the programs had not been integrated into the school curriculum as thoroughly as had been anticipated, the model was effective in serving Talent Pool students, it helped to minimize attitudes of elitism, and it promoted a *"radiation of excellence"* (Ward, 1962) throughout the schools in which the model was implemented. A detailed technical report (Renzulli, 1984) describing studies dealing with all aspects of the Triad/Revolving Door system is available from the Bureau of Educational Research at the University of Connecticut.

The research summarized above and experiences growing out of widespread use of the Triad/Revolving Door model lead to a number of conclusions. First, although the model provides special services to larger numbers of students than do traditional programs for the gifted, the greater involvement of classroom teachers and the rotation of students in and out of Type III Enrichment activities actually increase, rather than decrease, services to gifted children. Second, special programs that have traditionally been restricted to students who score in the top 5 percent on standardized tests can effectively serve other high ability students, if we take such factors as action information into account when we identify participants and establish program activities. By doing so, we also minimize concerns about elitism and help to do away with the you-have-it or you-don't-have-it approach to giftedness.

Third, programs for the gifted that rely on traditional identification procedures may not be serving the wrong students, but they are certainly excluding large numbers of well above-average pupils who, given the opportunity, are capable of producing an equally high level of work. High levels of productivity can only occur when above-average ability interacts with such other factors as task commitment and creativity. It is these other factors that enable students to create products of exceptional quality.

Finally, the flexibility that characterizes the Revolving Door Model can help to insure more appropriate identification of high ability students and more appropriate programs to meet their individual needs. In a larger context, it also provides an alternative to the traditional approaches that have made programs for the gifted the veritable ping pong balls of educational priorities.

Four Key Questions About the Model

Before we conclude this chapter, we believe it is important to respond to four of the most frequently asked questions about the Triad/Revolving Door Model. These questions are frequently raised by coordinators, teachers of the gifted, administrators or state department consultants. We have noticed that many of the persons raising these questions have not familiarized themselves with any of our longer publications; instead, they generally raise these questions after reading the briefest descriptions of the model. Because this chapter is a condensed version of our model, we believe it is important to respond to these questions in order to avoid any confusion regarding the rationale or recommended programming practices that have been presented.

Does the Triad/Revolving Door Model "discriminate" against underachieving gifted students? Since the very beginning of the development of our model, we have consistently emphasized that task commitment and creativity are *objectives* that we would like to develop in high ability students. In a Triad program students gain entrance to the Talent Pool through any one or a combination of multiple criteria that are decided upon at the local level. Indeed, the first pathway of entrance into the Talent Pool is through high scores on traditional tests of intelligence, achievement or aptitude. Thus, underachievers who are identified through traditional measures, as well as those who enter the Talent Pool through alternate pathways, are served on a regularly scheduled basis each week. These students participate in Type I and Type II Enrichment in both resource room situations and regular classrooms. They also are involved in mini-courses, special counseling sessions and activities that are specifically designed to help them learn how to make better use of their potential. These carefully planned educational experiences are designed to generate task commitment and creativity, and to bring these clusters of potential together with one another in our above-average ability population.

We also believe that this model is especially advantageous for bright underachievers because of the individual guidance and counseling that are part and parcel of the facilitation of Type III Enrichment. The research on highly creative/productive individuals has very clearly indicated that a close personal relationship in a one-to-one situation around a common area of interest has been an extremely influential factor in their personal and professional development. The *common area of interest* between the student and the person filling a mentorship role is the secret of developing this relationship.

We do not believe that every bright underachiever can be "saved" through this or any other model. At the same time, however, the research clearly tells us that personal adjustment and happiness are a function of a positive self-concept and feelings of worth about oneself; and therefore, one very important avenue of pursuing overall personal and social adjustment is by creating an environment in which young people can develop feelings of accomplishment. In one of the few studies that has been conducted with high ability persons who eventually ended up in therapy (Keiser, 1969), a good deal of their inappropriate adjustment could be traced back to limited opportunities for the challenge and enhancement of superior abilities.

We are by no means claiming that this or any other educational approach can overcome severe problems that may give rise to underachievement. In such cases we recommend that the assistance of *qualified* counselors and therapists be sought. Teachers who work with bright underachievers can serve a very important function in helping to create the right linkages for appropriate service when they estimate that such service is beyond their own areas of expertise.

Are student products the major goal of Triad Programs? In the original book on the Triad Model (Renzulli, 1977c, p. 65) three major outcomes of this particular approach to programming were pointed out: (1) Attitude change and development of value systems (2) Improved cognitive structures and (3) Improved problem solving (inquiry) strategies

The product dimension of Triad is considered to be a vehicle through which both cognitive and affective dimensions of overall development can be pursued. Perhaps an analogy will help to illustrate the point. In dozens of manufacturing plants across the country and around the world, numerous components for the construction of automobiles are produced. Engines, wheels, fenders, speedometers, etc. are each produced separately. But at a certain point in time and location, all of the separate parts come together at a place called an assembly plant. In many ways, Type III products are viewed as *the assembly plant of mind.* All of the abilities that we attempt to develop in young people, both cognitive and affective, as well as self-directed learning skills in the areas of planning, organization, resource utilization, and time management need a place within a total educational program where they can come together and be applied in a more naturalistic manner than the separate ways in which they are ordinarily taught.

This synthesis of content, process and learning-how-to-learn skills is modeled after the *modus operandi* of first-hand inquirers, and is considered to be an important part of our model because it is the *application* of content and process that has caused certain persons to be recognized as gifted contributors to the knowledge and culture of mankind. In other words, history does not remember those persons who merely mastered the component parts of content or process. Rather, it has been the products of mind (concertos, essays, films, scientific discoveries, etc.) that allow us to see and to guide the mind at work. We believe that any program attempting to develop gifted behaviors in highly able young people must have a product-as-vehicle component just as the automobile industry must have assembly plants.

A related question in connection with the product dimension of our model is this: Is it realistic to expect totally original products from students, especially very young students? We have always answered this question with a favorite expression. We do not necessarily expect small children to do great things; but we do expect them to do small things in a great way!

We believe that student products are the vehicles through which well trained and sensitive teachers can use their skills to help bright youngsters escalate their thinking and feeling processes to higher and higher levels of understanding. Everything from the improved use of basic skills to the application of higher processes can be nurtured when young people willingly and zestfully pursue a self-selected problem or area of artistic expression. Although we may not expect a third grader conducting a controlled experiment on optimal conditions for sunflower growth to make the same kind of breakthroughs as a plant physiologist at Harvard, we nevertheless expect the young inquirer to use authentic methods and as sophisticated a research design as possible for his or her present level of understanding. These kinds of product development situations allow teachers the opportunity to bring advanced knowledge and methodology to the learning process; and they also allow us opportunities to pursue two very important goals of the Triad Model—the development of task commitment and creativity. It is these traits, not the product itself, that we want our most able learners to gain from special programs and to carry forward in higher educational and later life situations.

Is the Triad Model based on research? We and our colleagues have spent several years conducting a variety of research studies on various components of the Triad/Revolving Door Model. Five dissertation-length studies have been completed to date, and follow-up research currently underway is examining the longer term effects growing out of participation in Triad-based programs. These studies have been summarized in a two volume Technical Report (Renzulli, 1984) as well as numerous research articles that have appeared in a variety of professional journals.

Because the Triad Model focuses on the development of more complex kinds of creative productivity in young people, the effectiveness of our efforts must be examined through a combination of both quantitative and qualitative research designs. Since we are attempting to promote more complex and applied types of growth in young people, our research, by necessity, could not routinely employ the types of designs traditionally used to examine growth in basic skills. Similarly, since one of the major goals of a Triad-based program is to achieve various kinds of integration and an impact upon the total school program, we have sought to examine various research questions related to the attitudes of general faculty, parents and administrators. These avenues of research are considered to be important for both the purposes stated above and the need to help services for bright youngsters become accepted as an important component of a school's overall programming efforts.

If there is one thing about our model in which we take the most pride it is that we have taken the time to examine implementation in a variety of school settings and to introduce modifications growing out of the research data. We hope that in the years ahead additional research studies by both supporters and critics of the model will be conducted, and that additional refinements in the model will be introduced whenever there is solid evidence that such modifications may be warranted. Although services to bright youngsters are obviously the major goal of this or any other programming model, we also believe that the goals of good science must be a primary concern of persons offering suggested practices to the education public. All consumers of information on identification, programming and counseling practices should have the right and the obligation to make some rigorous requests from anyone who presumes to give advice on these topics:

- Show me your research findings;
- Provide me with articles, technical reports and evaluation data about what you are recommending;
- Give me a directory of places where I can see this program in action.

Does the Revolving Door concept result in a "watering down" of services to bright youngsters? An obvious conclusion that one might draw whenever efforts are made to extend services to a somewhat larger population is that the quantity and/or quality of services may become diluted. We have attempted to avoid this potential shortcoming by introducing various safeguards through a subsystem in the model called Curriculum Compacting. This subsystem is designed to bring direct services to highly able youngsters during that portion of time that is spent in regular classrooms.

This approach is especially important because in most programs, bright youngsters spend the vast proportion of their time in regular classrooms under the direction of classroom teachers. The advanced abilities that brought these students to our attention in the first place certainly justifies making some modifications in the *general* curriculum and in activities that take place in the regular classroom. This approach also helps to create a legitimate role for classroom teachers and, in many cases, it also serves as a point-of-entry for involving non-program teachers in mentorship roles and other types of involvement may represent advanced levels of expertise and interest on the parts of general faculty members. Indeed, curriculum compacting procedures can help to create a cadre of allies among the general faculty. Both better relations and an actual increase in the amount of direct services that are provided to bright youngsters often results.

In a similar fashion, the Triad Model has attempted to extend services by enlisting the aid of various community members with special areas of interest and expertise. This approach not only helps to avoid the *condition of separateness* that exists in many special programs, but it also helps to overcome a problem that is present in any program that attempts to provide services for a wide range and level of abilities. This problem is the plain fact that special program teachers cannot be all things to all students. A tremendous multiplier effect and therefore an increase in services is the result of our efforts to maximize the involvement of as many faculty members and community persons as possible.

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Discussion Questions

1 What are the advantages and disadvantages of viewing giftedness as temporal and situational rather than fixed?

2 Should the activities of gifted programs be based to a large degree on the interests, learning styles and curricular strengths of individual students? Why or why not?

3 What services are automatically guaranteed to Talent Pool members?

4 What type of inservice training is necessary for the successful implementation of a Triad/Revolving Door program?

5 In what ways should administrative support be sought and why is it important in this model?

6 What is the role of Action Information in the Triad/Revolving Door model?

7 What is the difference between a Type III investigation and a "report"?

8 What teacher strategies can be used to help a student in completing a Type III investigation?

9 Under what circumstances should a student be eliminated from or added to the Talent Pool?

10 What characteristics would you suggest teachers or parents look for in children who are not necessarily successful at school learning but might be successful at creative productivity?

11 What are the advantages and disadvantages of a model for gifted education that depends rather heavily on ownership by classroom teachers and other school personnel?

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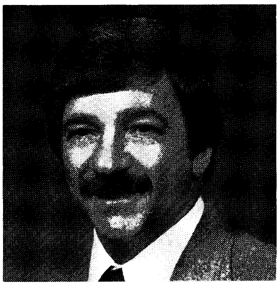

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Summary

The Secondary Triad Model

The Secondary Triad Model evolved after several years of experience with field test sites in which the Enrichment Triad Model had been implemented at the elementary level. In early attempts to provide similar services to high ability students at the junior and senior high school levels, several problems emerged that were not easily resolved through the use of the elementary administrative design. These problems included scheduling, finding time for creative/productive work in "content crowded" classes, and developing administrative and staff support. Blending the gifted program into already existing options such as advanced placement, honors classes and extra-curricular activities was an additional concern.

The Secondary Triad Model pursues the same goals as the elementary Triad Model while addressing some of the problems discussed above. It begins with the formation of an Interdisciplinary Planning Team (IPT) that includes faculty members who volunteer to participate from each of the major academic areas. This team plans and organizes program goals and activities, and meets on a regular basis to discuss curriculum compacting options for students and to plan schoolwide enrichment opportunities.

The Secondary Model also includes the formation of Talent Pool classes which are based on the Enrichment Triad Model. These classes actually become self-contained Triad programs within each discipline and allow regular curriculum to be compacted so that students may participate in Type I and Type II activities within the subject, and "revolve into" Type III experiences if interests develop. All Talent Pool students receive an orientation to the program and are interviewed about their interest in enrolling in one or more Talent Pool classes. Even if eligible students do not enroll in any Talent Pool classes, they can participate in various enrichment activities and meet on a regular basis with a resource teacher or an IPT member for discussion, counseling and any other appropriate intervention activity.

The Secondary Triad Model

During the last several years we have witnessed a resurgence of interest in programming for gifted and talented students at the secondary level. This interest has grown out of the sincere concerns of many secondary teachers and administrators who would like to find ways and means of providing a challenging learning environment for their more able students. Interest has also grown out of pressure from parent groups who have witnessed successful services for their children at the elementary level and therefore would like to see a continuation of these services in the junior and senior high schools. Administrators have also expressed concerns about the need for challenging programs that would help to stem the tide of high ability secondary students seeking alternatives in private schools. Perhaps the most prevalent reason for heightened interest in secondary programming, however, is the growing awareness on the part of educators that many of the current provisions such as honors and advanced placement classes and acceleration procedures are simply not meeting the needs of many of our most able students.

Concerns about Programming for Gifted and Talented Students at the Secondary Level

One only needs to examine current research to confirm the basis for these concerns. A recent study (Gold, 1980) showed that many of our most academically talented students are not even registering for more advanced-level courses and the Advanced Placement Program serves far fewer students than could benefit from these types of experiences (Marland, 1975).

In a study completed for the National Institute of Education, Cuban (1982) examined high schools at the turn of the century, in the two decades between the world wars, and from the mid 1960's to the present day. His conclusions confirm what many secondary teachers readily admit. "The overall picture of high school teaching since 1900 is striking in its uniformity: persistence of whole-group instruction, teacher talk out-distancing student talk, question/answer format drawn largely from textbooks. . . ." Cuban's research is consistent with other studies, most notably Goodlad's "A Study of Schooling" (1983) in which observers of high school classrooms noted that in the typical secondary classroom, the teacher lectured to the whole class most of the time. In a study conducted by the National Science Foundation (1978) which randomly sampled over 5,000 U.S. high school teachers on their methods of instruction, similar results were found. Roughly one-half to two-thirds of the responding teachers said that they taught their classes as an entire group. Since this preponderance of whole-group instruction in secondary schools seems to be a prevalent characteristic of many classrooms, the next logical question becomes: What is being done to meet the individual needs of students whose learning characteristics differ from those of the group at large? Or the question may indeed be: Are individual differences in superior students being recognized and provided for in most secondary classrooms in the United States today?

Recent research studies also raise questions about the appropriateness of the curriculum used in many schools. Indeed, the well-publicized National Commission on Excellence Report (1983) states: "Secondary school curricula have been homogenized,

This chapter is based on sections of the authors' book, **The Secondary Triad Model: A Practical Plan for Implementing Gifted Programs at the Junior and Senior High School Levels** *(Creative Learning Press, 1985).*

diluted, and defused to the point that they no longer have a central purpose." Many sensitive secondary teachers have described to us their guilt and frustration as they watch bright students complete assignment after assignment of previously mastered work—work that could easily be eliminated and replaced with more challenging experiences if a more flexible approach to secondary programming were available. At the same time, teachers relate their frustration about having five or six classes a day with 20 or 30 students per class and their inability to find the time to substitute appropriate and challenging work for students who already understand the material and therefore need no further drill or review. These questions are especially relevant to persons interested in the gifted and talented because "individualization" has become a major emphasis in special programs designed for our more able students. The research, however, tells us that such individualization is virtually non-existent at the secondary level.

The Educational Products Information Exchange (1980–81), a non-profit educational consumer agency, revealed that 60% of the fourth graders in some of the school districts studied were able to achieve a score of 80% or higher on a test of the content of their math text *before* they had opened their books in September! Similar findings were reported with tenth grade science and social studies texts. Even when efforts to locate more challenging texts are made by individual districts, difficulties arise. According to Kirst:

Meanwhile, with regard to content and materials, a sample of U.S. publishers agreed that their textbooks had dropped two grade levels in difficulty over the last ten to fifteen years. According to the Los Angeles Times, when Californians tried to reserve two slots on the statewide adoption list for textbooks that would challenge the top one-third of students, no publisher had a textbook to present. They could only suggest reissuing textbooks from the late sixties (now unacceptable because of their inaccurate portrayals of women and minorities) or writing new ones, a three to five-year project. (1982).

Varieties of Programming Alternatives

In a review of the literature on secondary alternatives, Silverman (1980) found over sixty provisions currently being used to provide services for gifted students at the elementary and secondary levels. Although each of these administrative patterns of organization has certain distinct features, for purposes of analysis we have grouped them into three broad categories. Before describing the categories, it is important to emphasize that any analysis of programs for the gifted must recognize the difference between administrative and theoretical models. Administrative models consist of patterns of organization and procedures for dealing with such issues as how we should group students, develop schedules for the time spent in special programs and arrange for the delivery of services. Theoretical models, on the other hand, consist of principles that guide the instructional process and give direction to the content, thinking processes, and outcomes of learning experiences that might take place within any given administrative pattern of organization. Theoretical models are mainly influential in determining the quality of special program experiences, whereas administrative models are more concerned with the efficiency and "smoothness" of special program operation and the way that programs "fit into" the total school program.

It should be pointed out that certain administrative models sometimes evolve into *defacto* theoretical models. Acceleration, for example, has traditionally been viewed as an administrative model; however, when it is used mainly to promote more rapid coverage of traditional subject matter, then it also assumes theoretical purposes. This analysis will use administrative models as an outline but a major concern will be the theoretical implications of each organizational pattern. It is important to keep in mind that we are not presenting these categories as a practical guide from which persons can select options, but rather as a method for analyzing the advantages and disadvantages of each broad category.

Category I: Special "Editions" of Regular Courses

This category describes any course that students take in place of a regular course. A distinguishing factor of Category I is that the course is awarded academic credit and is a part of the student's regular schedule. These courses may require special admission procedures and they are ordinarily selected by students on a voluntary basis. An eligible student might elect, for example, Honors English III in place of a regular junior year English course; but he or she would *not* have to take both courses. Similarly, college or university courses and any type of summer or evening course that substitutes for a high school requirement and is awarded replacement credit would fall into this category. Inclusive in this category would also be the Advanced Placement Program, courses offered within the school under the auspices of the International Baccalaureate Program, honors courses, or any other course that serves as a substitution for a regular graduation requirement. For purposes of convenience, we will also include in this category special schools for the gifted, the rationale being that in addition to the other advantages such schools might offer, they generally consist of "collections" of advanced level courses.

Category II: "Extra" Courses, Seminars, or Special Electives

This category consists of any and all school-based experiences that eligible students may elect to take *in addition* to those courses that constitute their regular school program. Included within this category are scheduled time blocks in which students participate in a resource room or enrichment centers or activities. Students generally give up study halls to participate in these classes. These extra courses or enrichment experiences may or may not be taken for credit; but a distingushing feature is that even when credit is awarded, the courses may not be substituted for a graduation requirement. These options are sometimes offered during an "extra period" attached to the school day. They can be scheduled within the day, on Saturdays, during evening hours and before the school day begins.

Category III: Off-Campus Experiences

This category includes school and out-of-school apprenticeships, internships, mentorships and work experience programs. Included within this category are organized programs such as the Executive High School Internship Program, Junior Achievement, and participation in special programs offered by science centers, centers for the arts or other places that offer special opportunities for students with advanced interests or abilities. As is the case of Category II, credit may or may not be awarded for these Off-Campus Experiences, and they are not ordinarily accepted in substitution for regular graduation requirements.

Problem Areas at the Secondary Level

Three major types of problems are encountered when attempting to develop programs to serve gifted and talented students at the secondary level. In some cases, the problems are practical and in other cases they relate to certain theoretical issues that form the underlying rationale for providing special educational services to gifted and talented students.

"Time" and Scheduling Problems

Most secondary teachers and administrators are adamantly opposed to any plan which would in any way change or interrupt the existing schedule. The schedule seems to dominate much of what is or can be successful in a secondary school setting and it became apparent in our review of secondary programs for the gifted that a plan for a successful program must be able to be implemented *within* the existing boundaries of the present school schedule. Many "pull-out" programs simply do not work well at the secondary school level and we have witnessed cases in which students were actually marked absent and penalized in the grading process because they participated in a special "pull-out" program experience that was scheduled during the time of a regular class meeting. Time and scheduling problems exert their greatest influence in Categories II and III. Highly exciting special program opportunities are often placed in competition with regular required classes and assignments. This arrangement forces students to make difficult choices between non-credit experiences that they might like to pursue and required courses that, after all is said and done, figure into a student's grade point average, attendance record and sometimes even personal relations with teachers. Offering non-credit experiences during study halls, before or after school, or during an extra period added to the school day avoids certain scheduling problems but, at the same time, requires students to make difficult choices about the allocation of their time. Competition with sports and other extra curricular activities, part-time jobs and social activities frequently results when programs fall into Categories II or III, and even such practical matters as school bus schedules enter into programs that are "add-ons" to the regular program.

One of the biggest problems associated with programs that fall into Categories II and III is competition for students' work and study time. A student may, for example, be engaged in a very exciting activity that is part of a special seminar or off-campus experience; however, the realities of a term paper, examination or heavy reading assignment for a regular class may cause the student to have to make some difficult choices. If the choice and time allotment favor the non-credit activity, the result may be lower grades and even antagonistic teachers who have said things to students such as, "And you are supposed to be gifted!" We have even witnessed teachers who have attempted to remove students from participation in special programs because regular class work was not considered to be up to par.

By way of summary, although extra courses and off-campus activities present opportunities for highly exciting enrichment experiences for gifted and talented students, they do not easily overcome the time and scheduling problems described above. These problems are "practical" in nature; however, they frequently prevent the amount of participation that students might like to devote to such experiences. They also have an effect on the amount of "quality time" that students are able to devote to either their regular courses and/or their supplementary enrichment opportunities.

The More-For-Less Problem

One of the biggest problems that secondary students face is making decisions about the level of courses in which they will enroll. The previously cited research by Gold (1980) showed a decline in the number of students enrolling in the more difficult advanced placement and honors courses. We found a similar pattern in the secondary schools in which we conducted our research. Through an extensive interview process, a general pattern of reasons for this decline became clear. Students explained quite frankly that they believed it was foolish for them to enroll in an honors or advanced placement class in which they would have to do two or three times the amount of work that would be required in a regular class and, at the same time, take the chance of earning a lower grade. In most cases, the work in honors and advanced courses did not seem to be very different from what was happening in regular level courses; however, the *quantity* of work was greater and students were almost always placed in competition with other bright students. This situation frequently results in a highly competitive "scramble" for the limited number of top grades and undue pressure being placed upon students in order to maintain a high grade point average.

Unfortunately, many of our brightest secondary students have learned to underachieve through their earlier experiences in school. If an able student is continuously given work that is extremely easy to master, the student may become bored, indifferent or lazy. Eventually, he or she may learn that the "way" to go to school is to exert minimum effort while simultaneously achieving top grades. While this system may work in the elementary grades, it often does not in secondary settings, especially if the bright underachiever is taking more challenging classes. We have interviewed many secondary students who attained top grades in elementary school without ever having to work! Some of those students went into a secondary setting without having learned to exert anything other than minimum effort. In the new setting, they often started out in more challenging classes and ended up in easier sections where they could continue to simply "get by." We must ask ourselves if we are doing our best for students who fit this description.

Problems Related to the Nature of the Learning Environment

Problems that might be considered more theoretical in nature relate to the ways in which many advanced placement and honors courses are conducted. Although detailed development of this argument is beyond the scope of the present chapter, a brief description will attempt to highlight the basic dimensions of the problem. In many cases, "advanced courses" end up being a more-of-the-same approach to serving gifted students, and the differences between these courses and a regular course are in terms of the quantity of material covered, the occasional selection of a different text and the *speed* at which the material is pursued. Quantity and speed are obviously appropriate procedures for providing a more challenging learning environment but, at the same time, the role of the student remains essentially that of a learner of lessons and a doer of exercises. The instructional model is highly didactic in nature and most of the material is dealt with in a prescribed and presented fashion. Predetermined assignments and methods for solving problems are frequently used in a manner that is identical to the regular curriculum and emphasis is placed upon the acquisition, storage and retrieval of information.

Although there are obvious advantages to this type of instructional model, it often does not provide the opportunities for individual selection of topics within disciplines or interdisciplinary topics. Most honors and advanced placement classes do not place major emphasis upon the development and application of investigative methodology, opportunities for creative productivity, development of independent and self-directed learning skills, time management or the use of advanced level and non-traditional reference and resource materials. In our research, we found that many students in advanced classes (and especially those who participated in elementary gifted programs) said that there was never time within their classes for independent or small group study or opportunities to pursue avenues of interest that were frequently sparked by reading assignments or teacher-led discussions. Inquiries about why students did not pursue areas of special fascination always resulted in the same response—there was never time for in-depth excursions into self-selected topics because there was always more content to cover. What happens in many secondary schools is that the processes of independent study and self-directed learning are caught in a tidal wave of content and eventually drowned. Instead, the student is cast as a perpetual "consumer of information" day-after-day and year-after-year.

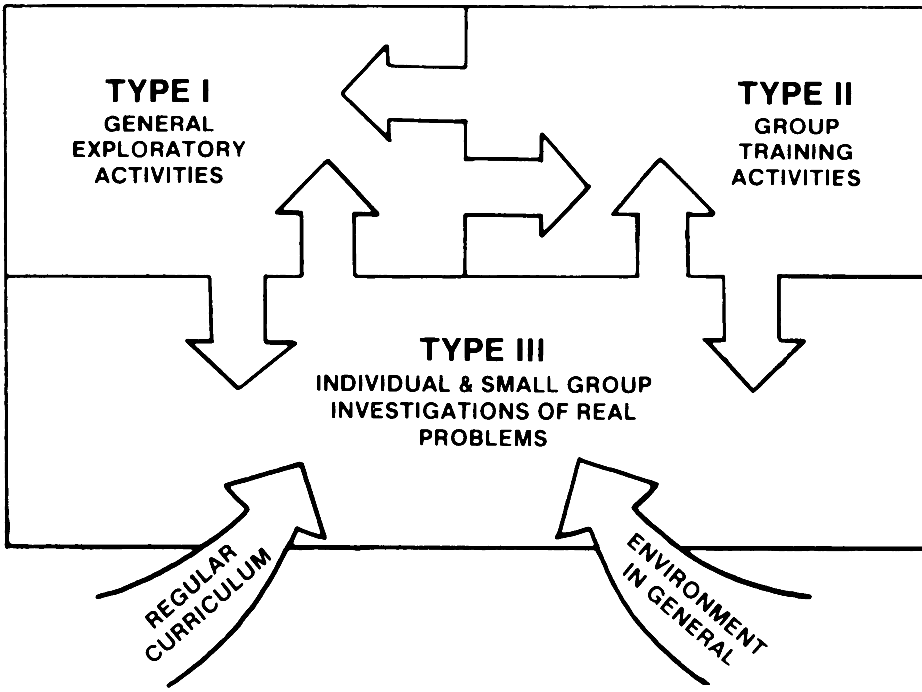
We believe that a major goal of a secondary gifted program is the encouragement of productivity in our students; yet before this can happen, students must learn the processes of creative productivity. This is rarely accomplished by a teacher-assigned term paper on a semester or yearly basis or in an accelerated class where the emphasis is placed upon covering more and more content. The development of persons who may become producers of and contributors to existing knowledge must begin with at least some experience in an instructional model that provides young people with an opportunity to experience the *modus operandi* of the first hand inquirer. A more detailed description of this model and the application of the model to instructional programs for gifted and talented students can be found in Renzulli (1982), Renzulli (1983), Reis and Cellerino (1983) and Reis and Hébert (1985).

By way of summary, this section has attempted to point out some of the major problems facing secondary program models for gifted and talented students and the ways in which these problems interact with the three major categories of secondary programs described in the previous section. It is important to emphasize that each administrative pattern of organization presents its own practical and theoretical advantages and disadvantages. But it is also important to point out that a careful analysis of the models and the positive and negative features of each can enable us to approach the overall task of secondary programming with an eye toward overcoming as many of the problems as possible.

Initial Steps for Implementing the Secondary Triad Model

In the Secondary Triad Model, we have attempted to develop a plan that overcomes both practical and theoretical difficulties in providing services to gifted and talented students at the secondary level. The model, which has been field tested in a variety of school districts for the past seven years, is an outgrowth of two earlier models that have been used to guide the development of programs for the gifted and talented at the elementary level. **The Enrichment Triad Model** (Renzulli, 1977) was originally developed to provide a defensible rationale for organizing qualitatively different learning experiences for gifted and talented students (see Figure 1). According to surveys by Mitchell (1982) and Speed (1984), it is the most widely used programming model for the education of gifted and talented students in the United States and Canada. **The Revolving Door Identification Model** (Renzulli, Reis & Smith, 1981) is a more recent plan that focuses on a flexible approach for identifying students who can benefit from several types of enrichment services commonly offered in special programs. Both of these models are based on a large body of accumulated research (Renzulli, 1986) which clearly indicates that persons who have been designated as "gifted" because of their unique accomplishments and creative contributions possess a relatively well defined set of three interlocking clusters of abilities. This research was referred to in the previous chapter and serves as the conceptual framework that underlies the Secondary Triad Model as well.

Based on our definition of giftedness, the first step in developing a Triad/Revolving Door program is to identify a group of students that is referred to as the Talent Pool. Although a wide variety of criteria are used to identify this group, for purposes of discussion, it is easiest to think of them as the top 15 to 20 percent of the general population in either general ability or in one or more specific areas of ability in the major categories of school achievement (i.e., mathematics, science, language arts, etc.).



OVERVIEW OF THE ENRICHMENT TRIAD MODEL

TYPE I ENRICHMENT

Type I Enrichment consists of experiences and activities that are designed to bring the learner in touch with the kinds of topics or areas of study in which he or she may develop a sincere interest. Through involvement in Type I experiences, students will be in a better position to decide if they would like to do further research on a particular problem or area of interest.

TYPE II ENRICHMENT

Type II Enrichment consists of materials, methods and instructional techniques that are concerned with the development of higher-level thinking and feeling processes. These processes include critical thinking, problem solving, inquiry training, divergent thinking, awareness development and creative or productive thinking. Type II activities are open-ended and allow students to escalate their thinking processes to the highest levels possible. Type II activities are also designed to introduce students to more advanced kinds of studies.

TYPE III ENRICHMENT

Type III Enrichment consists of activities in which the student becomes an actual investigator of a real problem or topic by using appropriate methods of inquiry. The success of a Type III activity depends on the interest and task commitment of the individual student. Examples of intensive, long-range Type III activities include: the creation of a walking robot; the production of a dramatic marionette show which outlines the development of clowns from the thirteenth century to the present; a continuation of Tolkien's *Lord of the Rings* in the form of a novel; the writing and illustration of a Children's Christmas Book; etc.

Figure 1. The Enrichment Triad Model

Procedures for forming the Talent Pool are not unlike traditional "screening" procedures used in more traditional identification systems; however, the major difference is that we do not "throw away" the majority of this group in favor of a finally selected two or three percent that is ultimately included in the gifted program.

There are three reasons why a Talent Pool of 15 to 20 percent is recommended. First and foremost, the research tells us that it is from this group that we can expect to identify those persons who will ultimately engage in high levels of creative productivity. Research on the "threshold effect" (MacKinnon, 1962; Barron, 1963; McNemar, 1964; Torrance, 1969; Wallach, 1976) has consistently shown that students who possess well above average (but not necessarily superior) ability and who also have the potential for developing task commitment and creativity are the persons who have the highest probability of displaying gifted behaviors. This group unquestionably includes those persons with the highest IQ's, but it is also open to others who show equal potential for creative performance. A second reason for the recommended size of the Talent Pool is that most of the activities typically used in gifted programs that serve the top two or three percent have generally been found to be effective with this larger group of youngsters. Most of the students in the nation's major universities or four-year colleges come from the top 15 to 20% of the general population. A third rationale for Talent Pool size is that, by definition, students working at the 85th and above percentile are clearly capable of showing high degrees of mastery of the regular curriculum and therefore both regular curricular modification and enrichment experiences are clearly warranted.

Four families of information are used to identify Talent Pool students. This procedure has been explained in detail elsewhere (Renzulli, Reis & Smith, 1981) and consists of deriving *psychometric information* from traditional tests of intelligence, aptitude, achievement and creativity. *Developmental information* is obtained through the use of teacher, parent, and self-nomination and rating scales (see Program Document A). *Sociometric information* is derived from peer nominations and ratings. And finally, *performance information* is based on actual examples of previous accomplishments in school and non-school settings. The model allows a great deal of flexibility with regard to the number of criteria used and the exact instruments that might be selected by a given school or program. A step-by-step decision-making format is used to process all information and make final Talent Pool selections. A "safety valve" entitled Special Nominations is also used as a final check to help minimize the chances of excluding potential Talent Pool members who might have been overlooked in the earlier stages of the identification process. A procedure for resolving discrepancies between and among the four families of information is recommended, as are follow-up reviews and opportunities for youngsters to enter the Talent Pool after the initial selection process has taken place.

Experiences with districts using this model have shown that Talent Pools can be formed quickly and easily without the "agonizing" decisions that are frequently associated with identification procedures that are trying to weed out all but the top three to five percent. Individual testing is only used in places where discrepancy information is present, and complicated formulas and additional testing are avoided. All Talent Pool students are considered to be members of the program and they receive certain services (described below) on a regular basis. Students do not revolve in and out of the program, but rather revolve into and out of different types and levels of enrichment based on ways in which they respond to regular curricular experiences and specifically planned enrichment activities.

Entrance into the most advanced level of enrichment (Type III) is based almost

NOMINATION FORM FOR A SECONDARY GIFTED AND TALENTED PROGRAM

Student ____

Grade ____________________ Homeroom ____________________

Teacher Making Referral ____________________ Date of Referral ____________

Why do you think this student should be included in the secondary gifted and talented program? (You may wish to list examples of ideas, projects, creative endeavors, etc.)

INTERESTS

Please indicate the areas of interest that the student has displayed in your class this year or in the past. If you've noticed other specific topics (interest in computers, e.g.), please note this in the column entitled "Other."

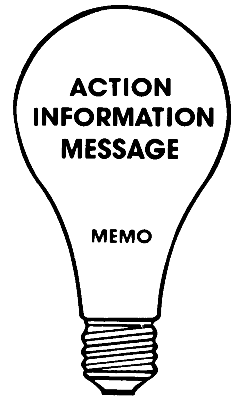
	EXAMPLES
Fine Arts	
Science	
Creative Writing	
Social Studies	
Literature	
Music	
Drama	
Mathematics	
Other	
Other	

Program Document A

entirely on the concept of **action information.** Action information can best be defined as the type of dynamic interactions that take place when a student becomes extremely interested in or excited about a particular topic, area of study, issue, idea or event that takes place in his school or non-school environment. The best way to understand this concept is to begin with the second term, *interaction*. An interaction (in learning) takes place when a student comes into contact with and is influenced by a particular person, concept or piece of knowledge.

In the Secondary Triad Model, students may complete an Action Information Message if they become interested in pursuing a topic, or finding out more about an idea or even following up on a class lecture that has excited them. Action Information Messages (Figure 2) may be completed by the student, any of the student's subject area teachers, an administrator, a parent or a community resource person. Action Information Messages do not always result in a student completing a Type III investigation.

Rather, they should be regarded as the *starting point* for developing the interest and a potential indication that the student may decide to pursue the interest. Students may be interviewed upon the receipt of an Action Information Message and appropriate teacher actions (described in the previous chapter) taken to facilitate the Type III investigation.



TO: ________ Talent Pool Class Teacher

________ Program Coordinator

________ Other

FROM: ________________________ Student (print name)

________________________ Teacher (print name)

________________________ Other

General Curriculum Area: ____

Idea for Investigation or Study: ____

____

____

In the space below, provide a brief description of evidence of high levels of task commitment or creativity on the part of a student or small group of students. Indicate any ideas you may have for advanced level follow-up activities, suggested resources or ways to focus the interest into a first-hand investigative experience.

Date Received ________________________

Date of Interview ________________________

Mentor Located ________ Yes ________ No

Name of person who will be responsible for facilitating this Type III

Figure 2. Action Information Message

In the sections that follow, we will present an overview of the services provided to Talent Pool students. These services are listed in Figure 3. It should be noted that we are not necessarily limiting services to those which are mentioned in this figure; nor are we advocating that every service should be implemented at once. We believe that this model allows individual differences to emerge in schools and has the flexibility to be able to be modified as necessary.

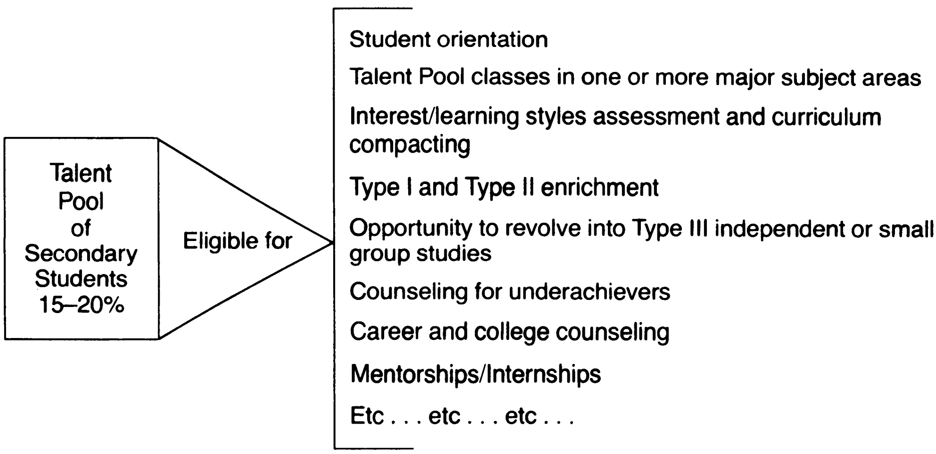


Figure 3. Services Available to Talent Pool Students

Student Orientation to Services

A key ingredient in getting the Secondary Triad Program started is to provide all eligible Talent Pool members with a thorough orientation to the Triad Model. This orientation can be arranged as a one-on-one interview (see Program Document B) or as an invitational assembly program for identified Talent Pool members. Keep in mind that orientation sessions should be widely "advertised" so that students who might subsequently nominate themselves will feel free to attend. This activity is especially important for students who have not participated in a Triad-based program at the elementary level. The orientation session should be conducted in the spring of each school year and should present all of the various services and opportunities available to Talent Pool students. Lists of available options (including interest assessment, curriculum compacting, Types I and II Enrichment, opportunity to complete Type III studies, counseling, mentorships and internships) should be distributed, and the services should be explained. A description of Talent Pool classes in each subject area should be provided. Brief presentations by Talent Pool teachers and descriptions of completed Type III projects by students who have already participated in the classes will help to make students aware of what a Talent Pool is all about. Emphasis should be given to each major aspect of the Triad Model (i.e., compacting and the three types of enrichment) and special emphasis should be placed on how a Talent Pool class differs from courses that simply cover increased amounts of subject matter.

Interest, Learning Styles Assessment and Curriculum Compacting

Since each of these services was explained in the previous chapter, a brief summary of these opportunities for Talent Pool students will be included here.

The first of these services to Talent Pool students consists of a careful assessment of student interests, learning styles and strengths in specific subject matter areas or thinking processes. This assessment attempts to provide one additional layer of information that may not have been revealed if general assessment instruments were used for Talent Pool

INITIAL INTERVIEW NOTICE

Name ______________________________ Homeroom ____________

You have been chosen to be interviewed as a *potential* candidate for a new program that is being developed at our high school.

How have you been chosen? You are in a group of students who fall into one or more of the following categories:

A. Students with above-average test scores.
B. Students who are recommended to this program by teachers.

What will this program involve?

Based on students' interests and needs, individual or group programs will be developed. These programs will be conducted during the homeroom and study periods.

Some possibilities are:

A. Opportunities to develop special talents.
B. Career information.
C. Scholarship and college information.
D. Speakers on various topics.
E. Discussions.
F. Problem solving.
G. Opportunities for individual research.
H. Contests.

In some cases, enrichment or acceleration in particular areas may be encouraged.

Please plan to attend a meeting with me in ______________________________

on ______________________ at ______________________ .

This notice should be used to obtain a permit from your homeroom teacher for this meeting.

Attendance at this initial meeting will not obligate you in any way to continue in the program. But if you cannot attend, please see your program advisor before the day you are scheduled.

Freshman Program Advisor ______________________________

Sophomore Program Advisor ______________________________

Junior Program Advisor ______________________________

Senior Program Advisor ______________________________

Program Document B

identification. Although we believe that the identification of interests and learning styles is an appropriate procedure for all students, it is especially important in programs using this model because many decisions about group and individualized programming will emanate from having a maximum knowledge about these characteristics of Talent Pool members. It should be emphasized that information about students' interests and learning styles is used for programming rather than admission purposes. It also should be pointed out that some of the students entering the Talent Pool might have limited interests and learning style ranges. One of the goals of Triad/Revolving Door is to expand both interests and learning styles and therefore we should not be overly concerned if youngsters have limited ranges of interest at the time of entrance into the Talent Pool.

Another area of service to Talent Pool students consists of making appropriate modifications of the regular curriculum. It is safe to assume that many of these pupils, by virtue of their designation as Talent Pool members, are capable of covering one or more subjects in the regular curriculum at a faster pace than students of average or below average ability. A procedure called "Curriculum Compacting" (Renzulli, Smith & Reis, 1982) is used to help these students progress through standard curricular material in a more efficient manner. This procedure makes use of formal and informal diagnostic/ assessment techniques and the careful documentation of already mastered areas of proficiency in the basic skill subjects. At the secondary level, one of the advantages of grouping Talent Pool students together in specially designated classes is that they can ordinarily cover the regular curriculum at a more rapid pace than students who are not in such classes. Faster and more efficient coverage of the regular curriculum means that Talent Pool students will spend less time on basic material than other students and thereby make available various amounts of time that can be used more appropriately for a wide variety of enrichment or acceleration options.

Curriculum compacting at the secondary level is often a challenging task for many subject area teachers because of the number of students they see each week as well as the short time span allotted to each class. Before compacting is accepted by the general faculty, we have found it most helpful to generate the support of the school administration and, whenever possible, the districtwide administration as well as the Board of Education. If the Board of Education adopts the procedure of curriculum compacting, it will make the enforcement of this necessary strategy for bright students much easier. The other necessary step to plan in order to make compacting occur in the schools is the provision of teacher training in how to compact curriculum in various subject areas (Starko, 1986). This training may be completed by the Interdisciplinary Planning Team (IPT)* or by the newly hired resource teacher or by someone from another district, but it must occur if this service is to be guaranteed to bright students.

Curriculum compacting is easier to achieve in homogeneously grouped classes for bright students, but it can occur in any kind of class. It is important to have a coordinator, teacher or IPT member explain the process to students who may then initiate the procedure themselves by making an appointment with the appropriate subject area teacher. In some schools using the Secondary Triad Model, a memo is sent by the TAG (Talented and Gifted) resource teacher or a member of the IPT to each subject-area teacher asking them to consider curriculum compacting either after a Type III investigation has begun or after a student has indicated a need for this service (see Program Document C).

General (Type I and Type II) Enrichment

Two types of general enrichment are provided for Talent Pool students and, at the secondary level, these types of enrichment are almost always directly related to the subject matter covered in the Talent Pool class. Type I Enrichment (general exploratory experiences) consists of experiences and activities that are purposefully designed to bring the learner into touch with the types of topics or areas of study that are not ordinarily covered in the regular curriculum. Since the regular curricular content of any given subject matter area deals with a relatively limited range of the full scope of knowledge within that area, one of the first purposes of an enrichment model should be to expand the range of exposure to the numerous topics, concepts, issues and other areas in the overall scope of knowledge that are by necessity eliminated from regular curricular coverage.

**For a comprehensive description of the IPT and its functions, see pages 297 through 303.*

REQUEST FOR CURRICULUM COMPACTING

FROM:

RE:

TO:

Please comment on the possibility of compacting occurring in your class so that the above named student may work on the following Type III project:

General Curriculum Area:

Brief Description of Investigation of Study:

Name: Date:

Name: Date:

Name: Date:

Name: Date:

Name: Date:

Program Document C

Prepared by Margaret Bialoglowy, Torrington Schools

There are two major objectives to the Type I Enrichment segment of this model. First, introduction and exposure to a broadened range of knowledge within any given field is considered to be worthwhile in and of itself. Second, and more important so far as the targeted nature of this population is concerned, is the opportunity that such exposure presents for those youngsters who might like to go further and pursue more intensive and individualized studies of any of the material that was originally presented in an exploratory experience. In the diagram of the Triad Model presented in Figure 1, this activity can be noted in the arrow connecting Type I with Type III Enrichment.

Type II Enrichment consists of process-oriented teaching activities that are designed to develop specific skills in areas such as creative thinking, problem solving, self-directed and independent study skills, research and reference skills, and other thinking and affective skills that generally fall into the process rather than content family of educational objectives. In the Secondary Triad Model, an effort is made to identify those kinds of skills that are most intimately related to the subject matter area. For example, a research skill emphasizing oral history techniques might be used in a Talent Pool history class as an example of Type II training. Once again, a related objective is to provide opportunities for follow-up that might result from any of the specialized process training provided within the Talent Pool class. Thus, for example, the mere exposure of youngsters to oral history techniques might result in one or more youngsters engaging in a study using this methodological procedure. In the diagram of the Triad Model, this example is represented by the arrow going down from Type II to Type III Enrichment.

Advanced Level (Type III) Enrichment

Another area of service for students in Talent Pool classes consists of enrichment experiences in which the student becomes an actual investigator of a real problem or topic by using appropriate methods of inquiry within a given field. An example of such a study in the area of history is described in Figure 7.

In general, Type III topics are self-selected by individuals or small groups of students and are based on interest, task commitment and a willingness to pursue an area of study in a highly professional fashion. In Type III Enrichment, the role of the student is changed from that of learner-of-lessons and doer-of-exercises to that of being a first-hand investigator using advanced level knowledge and methodology in the pursuit of original research questions or creative endeavors. Type III Enrichment ordinarily is carried out over relatively long periods of time. The role of the teacher is transformed from that of an administrator of lessons and a disseminator of information to one of being a managerial and methodological assistant to the student. At the secondary level, this often involves the recruitment of other resource persons from within the faculty or outside the school who have specialized knowledge in a particular area of student interest.

Type III Enrichment also places a great deal of emphasis on the utility of student products and creations. Submission to professional journals, presentations at historical societies, artistic productions and a wide variety of other outlets are often built into Type III endeavors in order to help create higher levels of task commitment and to provide youngsters with opportunities for pursuing ever-increasing levels of excellence in their final products. This approach also helps to develop a refined sense of audience and the importance of effective communication that will lead to having a desired impact upon such audiences. In our society it is important to remember that we "know" most gifted individuals for one reason. This reason is that through their own medium of presentation, whether it be in the arts or sciences or in leadership areas, they have had some kind of an impact upon a particular audience. We have found that this audience dimension of type III helps to provide an internal source of motivation and adds an element of reality and relevance to the self-selected student endeavors.

Talent Pool Classes

The Secondary Triad Model involves the formation of Talent Pool classes which differ greatly from the traditional honors or accelerated classes and can therefore be offered in addition to honors or accelerated classes in large secondary schools. These classes are actually established as individual Triad programs within any given discipline or subject matter area. Because Talent Pool students elect to take these classes, they generally possess both well-above average ability *as well as* an intense interest in the area. Talent Pool classes are established as a separate section or class within each department (see Figure 4). These classes enable students to complete the regular curriculum in a compacted fashion as well as to have enrichment opportunities *within* their class. These opportunities may involve Type I and Type II experiences as well as the time to revolve into a more advanced level Type III investigation (see Figures 5, 6, 7). If students do become involved in an advanced level study, they also have the benefit of having a Talent Pool class teacher who is a subject area specialist and is committed to helping students pursue their interests and develop investigative methodology opportunities for creative productivity, independent and self-directed learning skills, time management, and the use of advanced level and nontraditional reference and resource materials. This can be accomplished because of the regularity of the schedule; Talent Pool classes meet every day and students take these classes instead of a regular class. Time is built into the schedule for these other types of experiences.

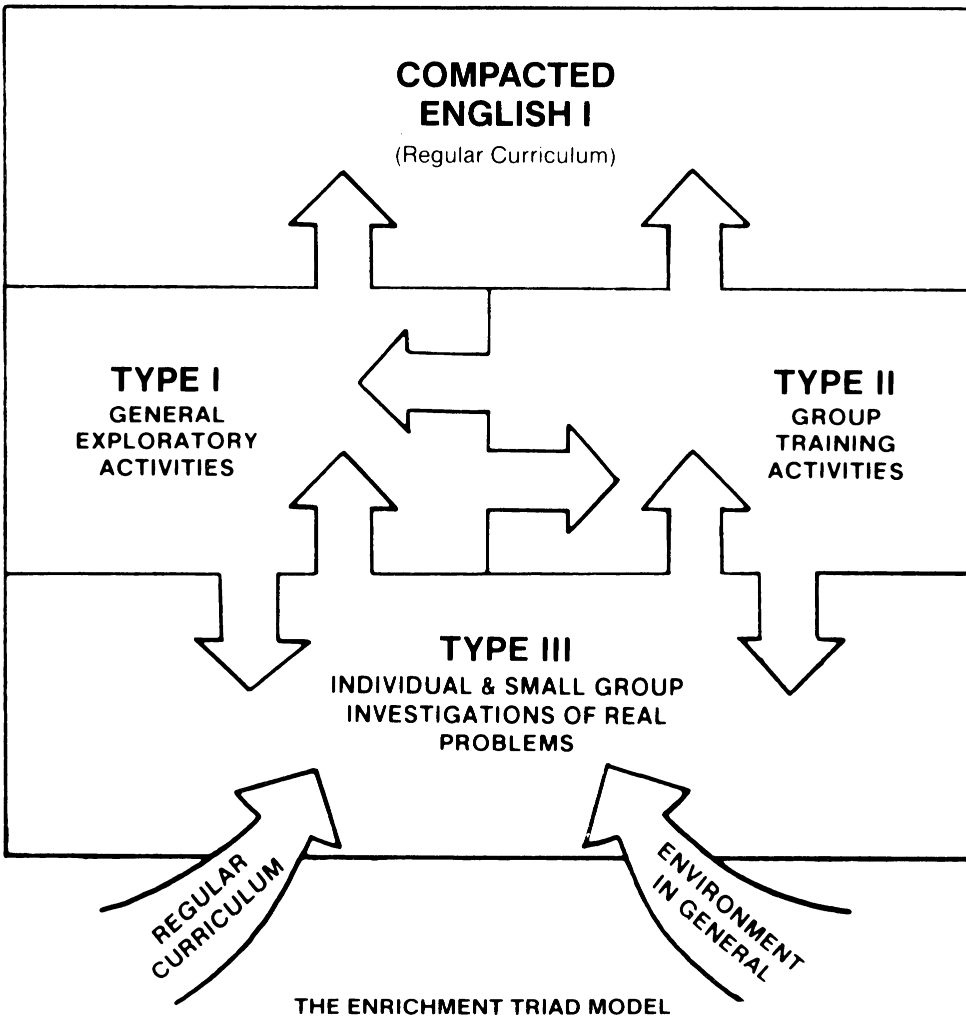


Figure 4. Talent Pool Classes

Students who are involved in these subject area Talent Pool classes are actually involved in Triad-based gifted programs within a subject area. As has been described earlier, Talent Pool students are eligible for certain services within their Talent Pool classes. These services include: an analysis of interests, academic strengths and learning styles; a modification of the regular curriculum to determine how much of it has been previously mastered and how much can be compacted; an exposure to Type I and Type II Enrichment experiences within the subject area, as well as an opportunity to "revolve into" Type III investigations of real problems should the interest and desire to do so emerge. It is essential for students to understand beforehand exactly what will be done within these Talent Pool classes and equally important to understand that a Talent Pool class does not simply mean more rapid coverage nor a "more of the same" approach. Students who have participated in elementary Triad programs will have little difficulty understanding the nature and expectations of Talent Pool classes. In those cases where there has been no previous experience with the Triad Model, students might be given a description of what will be involved in the Talent Pool class as well as the orientation

TYPE I	TYPE II
Teacher-led discussions	Locating information sources
Exciting speakers	Interviewing skills
Simulation	Affective training in dealing with controversial historical issues
Field trips	Advanced research and reference skills
Presentation of old pictures and historical memorabilla	Photography and media skills
Presentation of old newspapers	Organization, cataloguing and preparation of materials
Panel discussions	Advanced writing and editing
Films	Evaluation of primary vs. secondary sources
	Textbook stereotyping and bias in portraying history

TYPE III
Chronicle of an historical walking tour of a city
Oral history interviews with past city mayors
Development of a simulation war game
A media presentation of the music of the 1940s
Oral history interviews recording a factory's influence on a community
A book summarizing local folklore
A family tree: A study of genealogy

Figure 5. Possible Ideas for Activities in a Talent Pool History Class
Prepared by Sally M. Reis, Thomas Hébert

described earlier. This description of the class may be accomplished by the distribution of departmental memos describing the content of the Talent Pool class or through a description provided at the orientation meeting.

These Talent Pool classes provide a unique opportunity for programming for well-above-average students within the regular school setting without disrupting the schedule. The benefits of grouping Talent Pool students into special subject area "Triad programs" are many and varied. First, we are no longer requiring students involved in a gifted program to display gifted behavior (Renzulli, Reis & Smith, 1981) in every subject area all of the time, as is the case in some tracking systems. Students who excel in one or two areas can participate in a program in their particular strength area. By scheduling students into Talent Pool classes in which they show a strength and interest, we are providing an atmosphere in which they can excel and produce and not one where they may become frustrated, bored or disinterested. Because of the organizational system, Talent Pool class teachers who are familiar with the Triad Model can provide Type I General Exploratory Experiences within their own subject areas based on their expertise

1. What was here before the city?
2. Who was the first settler of our town? Is there a written biography of him/her?
3. Were there any natural disasters that changed our town? In what way?
4. Which was the first church in our city? Who built it and when?
5. Is there any folklore associated with our city, our region or our county?
6. How did certain historical events affect the people of our area? (for example, the Civil War, World Wars I and II).
7. Did anyone famous come from our area? Is there a written biography of that person? Has that person's contributions had an impact on our city?
8. Who was the town's first elected official?
9. What was life like for employees of our town's early factories?
10. How did the clothing styles change over the years?
11. What is the oldest building in this area?
12. What is the history of that building?
13. Are there any historically significant sites in this city?
14. What would it have been like to be (investigating student's age) in our town in the sixteenth, seventeenth, eighteenth or nineteenth century?
15. When were written documents or records of our town first kept?
16. Is there a written history of our city, region, county or state?

Figure 6. Questions for a Talent Pool History Class
Prepared by Sally M. Reis, Thomas Hébert

and student interests. They can also provide Type II process training activities within their respective subject areas. This can be accomplished within the time allotted to the subject matter class because the high ability and interests of the Talent Pool students allows for the faster coverage of curriculum. It is important to note that these students volunteered to take Talent Pool classes and participated in an orientation meeting in which the goals and objectives of these classes were explained either verbally or in writing (see, for example, Program Document D).

Scheduling Talent Pool Classes

One reason it is so important to seek the support and understanding of administrators in implementing the Secondary Triad Model is to secure their help in the scheduling of Talent Pool classes. The adaptation of the Secondary Triad Model that we are recommending works best in large secondary schools, although Talent Pool classes can be created even if only two or three sections exist for each class in a grade level. Scheduling Talent Pool classes should be completed in the spring of the year before implementation. We strongly recommend that Talent Pool classes be scheduled at times when other classes in which Talent Pool students traditionally enroll are not offered (i.e., band, orchestra, student council). Some high schools using this model use a scheduling plan that allows one large block to be made available for seminars, Type III work, Lisa, Mark, Beth and David, four high school freshmen whose interest in history was very strong, decided to investigate the Collins Company of Collinsville, Connecticut, a manufacturer of tools and machetes that had played an influential role in the development of their town. The decision to study the history of the company led to a discussion on the significance of primary sources in historical research. The oral history approach and how interviews could serve as a primary source was discussed. The four teenagers agreed that first-hand interviews would provide a better understanding of their topic. They were excited about learning more about the company by talking to the people associated with its operation over the years.

The four students were familiar with a ninety-six year old gentleman who had been employed as an executive by the Collins Company during its heyday. They agreed he would be a fascinating person to interview. To prepare for the interview, the students were trained in interviewing skills such as how to make the respondent feel at ease, establishing rapport, dealing with an elderly person and concluding an interview. They felt they needed "hands-on" training with the process. To provide this, their teacher arranged for them to simulate an interview with the history department chairman, a teacher well-informed on the history of the company.

With their initial research completed and background information provided by the history department chairman, the four students had a foundation of knowledge upon which they could develop their questions for the interview. Several sessions of brainstorming questions enabled the youngsters to produce an extensive list of questions centered on the theme of their investigation of the factory's history.

On the day of the scheduled interview, the elderly gentleman arrived to find four young people very well prepared and eager to talk with him. An hour passed and he continued to enrapture the four youngsters with his stories about his work with the company. The interview was a great success and the students used excerpts to narrate a slide presentation of the company's history.

A copy of the slide presentation was donated to the Collins Company so that the historical role of the company as related by the elderly executive could be preserved. The presentation was also entered in *History Day*. The students placed in the state level and went on to national competition.

Figure 7. An Example of an Historical Type III at the Secondary Level

Prepared by Sally M. Reis, Thomas Hébert

interdisciplinary studies, etc. This is accomplished by scheduling the Talent Pool English class, a Talent Pool Study Hall and the Talent Pool History class in three consecutive periods.

Period 1	Talent Pool English	8:00–8:50 A.M.
Period 2	Talent Pool Study Hall	8:55–9:45 A.M.
Period 3	Talent Pool History	9:50–10:40 A.M.

TALENT POOL CLASS IN ENGLISH

In order to decide whether you could benefit from a Talent Pool class in English, you should carefully consider the following:

1. Are there sometimes areas of the English course, for example, mythology or the language of advertising, that you would enjoy pursuing in greater depth than the regular class permits?
2. Do you do any reading other than required reading? (This might be the newspaper, magazines, history or biography—not necessarily fiction.)
3. Do you enjoy the challenge of expressing yourself effectively with words, in speech and in writing?
4. Do you have interests and/or talents related to English studies that are not recognized to any great extent in the regular school curriculum—for example, journalism, creative writing, drama, science fiction, film?
5. Do you have a keen interest and/or talent in a subject other than English—such as music, art or history—which you would like to have a chance to connect with your studies in English?
6. Do you frequently feel that more time than you need is spent on drill and review?
7. Do you frequently find that classroom discussion lags?
7. Do you have a fairly high degree of self-discipline?
9. Do you have a minimum mark of B in your present English course?

If you have answered yes to most of the above questions, you would probably find the Talent Pool class in English suited to your needs and interests. This course of study will be compacted to provide time for you to develop specific interests: individually, in small groups and as a class. Such a class is usually characterized by lively discussion and debate. In the Talent Pool setting, you will play a greater role in determining the course of study.

Should you have any questions about the Grade 10 Talent Pool class, speak to your English teacher, to the Department Head or to your guidance counselor. In order for you to be considered for the class, your name should be submitted to your English teacher no later than Tuesday, April 10. Interviews will be held during the week of April 16.

Program Document D

Jane Enticknap, English Department Head, Brantford Collegiate Institute

This schedule enables some Talent Pool students to have a block of almost three hours for the types of activities that are mentioned in this book. Not all Talent Pool students will take both English and History class, but we have found that a high percentage of students taking the English Talent Pool class *also* sign up for the History class. Those that do not, still have the opportunity of having a Talent Pool Study Hall that is right before or after their Talent Pool class. This allows the luxury of time for extended discussions, independent study, guest lecturers and even some counseling. The persons in charge of the Talent Pool Study Hall are, of course, the Talent Pool History and English teacher. If both can be assigned to the study halls, all types of enrichment opportunities, mentorship and independent study help can be facilitated.

The same plan can be put into place for the Talent Pool Math and Science classes. The Talent Pool Study Hall in between those classes can allow lab time in science, computer time in math and a wide range of other possibilities. It is, of course, important to note that all Talent Pool classes per grade level should be scheduled during different periods, allowing the Talent Pool sutdent who qualifies for more than one class to enroll in any or all of them.

Management Within a Talent Pool Class

Talent Pool classes can be organized in one of several ways. Our experience has demonstrated that individual teachers' styles and management systems influence the manner in which the class is conducted. In some classes, for example, the teacher may decide to complete a unit in six weeks instead of nine and work on the particular topic or unit five days a week for that six week period. This is possible because of the advanced ability level of the students in this Talent Pool class. If a teacher decides to complete a topic or unit in six weeks instead of nine, he or she can then use the remaining three weeks for Types I, II and III Enrichment. This is one organizational pattern that has been used successfully by Talent Pool teachers. Others choose to complete the regular curriculum work in three days of the week, and use the remaining two days for either advanced curriculum work which allows the teacher to expand the regular curriculum or provide students with the time to pursue independent or small group investigations (Type III) of a self-selected topic. They may also be used by teachers for Type I Enrichment experiences such as guest speakers, films or panel discussions. Type II process training (which may include oral history techniques in a social studies class or bibliotherapy in an English class) may also take place within this time period.

Students who understand curriculum compacting should also be given the opportunity to initiate a more intensive compacting process within a given class. For example, if students are told that the talent Pool English class will be spending a six week time period reading and analyzing a play or novel, a student should have the option of approaching his or her Talent Pool teacher and negotiating an arrangement in which he or she can complete the book or play in two or three weeks, attend class periodically for discussions, take the same exam or complete the same assignments as the other Talent Pool students but *earn* this time to pursue independent study or read another book or play. Too often in this country, bright students must sit and wait for the rest of the class to catch up on a reading assignment for Chapter 2 or 3 when they have already completed the entire book! Self-selected compacting options can overcome this problem in a Talent Pool class.

When individual students are ready to pursue Type III projects, a form such as the one presented in Program Document C may be circulated. This form was designed to identify subject area *or* Talent Pool classes where additional time for projects can be found through curriculum compacting procedures. This form is particularly useful when the time set aside for Type III work within Talent Pool classes is not sufficient for individual student's needs.

In some of our field sites, Talent Pool teachers expressed an interest in completing the regular curriculum in the first six months of the year and leaving the remaining three months for independent study or other enrichment experiences. We believe that this arrangement completely negates the concept of Action Information, the interactions that take place between a student and a particular learning situation. What would happen if in September a student gets tremendously excited about a lecture on the Nixon/Kennedy debates of 1960 and has to wait until April to have the time in school to research the topic with the help of a mentor who also has an interest in this area? By the time students are able to begin their study six months later, the excitement of the idea has diminished or, in many cases, been completely forgotten. Too often, students do get excited or involved in a topic, lecture or particular problem and have neither the time, the necessary resources nor the knowledge of the appropriate research methodology to carry out an independent or small group study. The organization of a good gifted program should provide a systematic way for this time to be provided, for mentors to be located and for students to learn the methodology that will allow them to research their idea. Talent Pool classes provide the mechanism for students to become involved in an advanced level study when the idea occurs.

Teachers of Talent Pool classes often send parents brief summaries of what has occurred in their classes during a given year. This communication enables parents to see the types of enrichment that can be provided when students are eligible for curriculum compacting. They can also see that the regular curriculum has been covered and their child not "shortchanged" on the basics.

Our experience has demonstrated that it is highly effective for Talent Pool teachers to have the opportunity to teach the same group of students for a two year period. For example, in one of our junior high field sites, Talent Pool students remain with the same language arts and social studies teacher for seventh and eighth grade. This enables the teacher to provide curriculum compacting opportunities over a two year period and to oversee research projects that may extend for more than a one year period. The relationships that develop between these Talent Pool teachers and their students are closer than is possible in a single year time block. This two year block also makes it possible for very small schools to provide Talent Pool classes to their students. The class can serve both seventh and eighth grade students, covering the basics of both grades' curriculum in alternate years.

We have found that almost all Talent Pool students take at least one Talent Pool class. Many students take two of these classes and some take three. In those cases where bright students are displaying signs of underachievement and are apt *not* to register for *any* Talent Pool classes, regular sessions are arranged by the Program Coordinator. These regular sessions are held in the resource room and students are scheduled in either during a study hall or when they can be "freed" by a classroom teacher. They may be involved in a mini-course, in some type of appropriate Type II training (like Future Problem Solving) or they may become involved in an independent or small group (Type III) study. This regularly scheduled time spent with the Program Coordinator and the time spent with an Interdisciplinary Planning Team member to whom they have been assigned can achieve several goals. By providing encouragement and developing a warm and trusting relationship between student and teacher, the IPT member can work with bright underachieving students and often encourage them to enroll in a Talent Pool class in the future or to become involved in enrichment seminars or independent or small group studies. Because of the identification system used, all high ability and high IQ students are automatically included in the Talent Pool in a Triad/Revolving Door Program and therefore receive regular services of the type described in this book. We have found that many potential underachieving students can be effectively "turned around" by the services provided to them as Talent Pool members.

Selecting Students for Talent Pool Classes

Following the general orientation session, students who are still uncertain about enrollment in particular Talent Pool classes should have an opportunity to arrange for individual interviews with appropriate teachers. For example, a student who displays a demonstrated or potential high ability in English may decide to register for the Talent

Pool freshman English class (see Figure 4) after an interview with the teacher, counselor or IPT member. During the interview, which ideally is completed the spring before students enter the secondary school, students should be asked about their interest in participating in one or more Talent Pool classes. Questions about their past productivity (if they have participated in an elementary gifted program) and future plans should be discussed during the interview. Input should also be sought from previous classroom teachers and elementary TAG resource teachers. At the conclusion of the interviews and after carefully assessing any recorded information compiled in the student's file (scores, grades, anecdotal records, etc.), a decision should be made about which Talent Pool classes a student will take. These decisions should be made by the student after advisement from the elementary resource teacher (when available) and those persons with whom the student has interviewed. Students are then scheduled into classes composed of other Talent Pool students who share the same strengths and interests in the subject. Our experience has indicated that most students should register for one or two but no more than three Talent Pool classes.

At this point, information about the selection of Talent Pool classes should be shared with parents. We recommend that the criteria for placement in Talent Pool classes be reviewed and a listing of each student's specific subject area selection be included.

Integrating Talent Pool Classes With Existing Options for Above-Average Students

One benefit in implementing the Secondary Triad Model is the way it may be adapted to the existing school schedule which already includes both honors and/or Advanced Placement Classes. If these classes are already scheduled, the implementation of this model will not cause scheduling problems nor will it involve major staff changes.

The major differences in a Talent Pool class and an Honors or Advanced Placement Class may even result in *both* options being kept available to students. If that is the case, students will have a choice of selecting a class that involves more or different content or opting to take a Talent Pool class which will provide them the opportunity for enrichment and self-selected independent or small group study. If a decision is made to eliminate Honors classes and adopt this model, one thing that must be avoided is simply calling a pre-existing Honors class a Talent Pool class *without* implementing all of the services and options to students that have been described.

The success of the Secondary Triad Model requires that faculty members have direct input into a decision to adopt this model. Since these advanced classes are usually taught by subject area specialists who feel a great deal of ownership about their special class, they must be involved in the decision to make any modifications in these classes. We have found that a need for a gifted program is often not realized by secondary teachers. In fact, many excellent teachers with whom we have interacted in the last several years believe that Honors and Advanced Placement Classes and/or extracurricular activities fulfill the needs of bright students and that a "gifted program" is simply unnecessary in junior high or high school. This is not what is indicated from our research. As we stated earlier, in addition to recent statistics showing a decline in these classes, our interviews indicate considerable frustration on the parts of bright students who never have a chance to pursue their own research within the current structure of many high schools.

If many faculty members do not see the need for a gifted program, inservice training about the needs, characteristics and possible program options for high ability students should be provided. If faculty support can be gained, even if it is only in one department, a Talent Pool class may be organized. Quite often, faculty members who have taught Honors classes for several years firmly believe that their method of teaching is an excellent one and that the introduction of more (and in some cases, advanced) content is the way in which the class should be taught. If this is the case, those teachers should not be encouraged to *volunteer or be recruited to teach a Talent Pool class.* Unless the teacher understands and clearly sees the need for opportunities for the types of enrichment and services we describe in this chapter, he or she will not be effective in teaching a Talent Pool class.

It is wise to create Talent Pool classes where departmental support has been gained and where sufficient enrollment has resulted in a class being able to be formed. Based on the population of the school, the willingness of a teacher and a department to conduct a class, and the number of students interested in being in the class, a decision can be made about how many regular (or Honors if it is being *replaced* by Talent Pool) classes will become Talent Pool classes. We have found that in small to middle sized secondary schools, one Talent Pool class per subject area is usually created for each grade level. In some situations, it may not be possible or plausible to institute a Talent Pool class. For example, the mathematics department representative on the IPT who is a physics teacher, does not think a Talent Pool class can be organized in physics because it usually takes all of the allotted time to cover the physics curriculum with the generally above-average students who elect to take the course. Therefore, a Talent Pool physics class should not be organized. We firmly believe that it is better to *start* with Talent Pool classes only in departments where faculty support has been gained and a willing teacher is ready to undertake some training and make some changes in the existing Honors and/or Advanced Placement Class. Unless the faculty member involved in teaching these classes is willing to make these changes, what may happen is that the title of the class may be the only change that occurs within the class.

A major focus in the organization of a Talent Pool class is the planning of what types of enrichment and/or acceleration techniques will be used in the Talent Pool class that are *different* than what is normally used in other classes. To be able to assure that the new Talent Pool class is different than the existing honors or even heterogeneous class, several options may be explored:

1 All teachers interested in becoming Talent Pool teachers can be asked to submit a very brief outline with the goals of the class as well as the possible Type I and Type II activities that will be introduced within the class. Additionally, teachers may be asked to detail how they would differentiate the instruction and content within the class (besides the introduction of Type I and Type II activities) so that students will be able to work at a pace that is commensurate with their abilities *and* pursue their own interests within the subject area.

2 Talent Pool teachers can be asked to submit a brief monthly report form (see Program Document E) that would detail the types of enrichment being offered within the class and whether or not curriculum compacting was successfully accomplished for all (or some) Talent Pool students. This report would be sent to the Program Coordinator and the school principal.

3 A monthly meeting may be organized for members of the IPT (which includes Talent Pool class teachers), the Program Coordinator and the principal. During this meeting, compacting procedures, monthly goals, enrichment experiences and the kinds of Type III investigations students are pursuing should be discussed.

4 Talent Pool teachers can be asked to work during the summer (if funds can be allocated) to determine the ways in which differentiation and specific enrichment activities (Types I, II and III) could be developed. Type II mini-courses can be arranged during this time period. Mentors and community resources can be contacted and Type I experiences can also be organized. By having some time to work together, interdisciplinary topics and a blend of Type II activities between departments can be facilitated.

5 Talent Pool teachers can be given examples of Types I, II and III activities and suggestions that will serve as "jumping off points" for the development of individual enrichment activities by Talent Pool class teachers.

TALENT POOL TEACHERS

Monthly Talent Pool Class Report

Teacher's Name: ______________________

Month of Report: ______________________

Date Submitted: ______________________

Please list the Type I Experiences provided in your talent pool class this month, or mention any Type I's that you would like the Resource Teacher to schedule in your classroom for the coming month.

What experiences have you provided for the talent pool students in your class that were different than what is normally provided in a regular class in your subject area? (example: acceleration, differentiated thinking skills, opportunity for independent or small group study, etc.) Please be specific.

Have any of your talent pool students expressed an interest in or started a Type II investigation?

If so, have you provided time for these Type III investigations in your classroom or the Resource Room?

Do you have any comments or concerns you'd like to make about our TAG Program?

Selecting Talent Pool Class Teachers

We strongly recommend that each teacher in the school receive a brief memo with a description of the gifted program or a copy of the district proposal for the Secondary Triad Model. The memo should ask teachers to review the description or proposal. If they become interested in teaching a Talent Pool class, they should be asked to contact the principal in writing to let him or her know that an interest exists in teaching a Talent Pool class.

We further believe that once a teacher has expressed an interest in teaching this type of class, the expected responsibilities of the position should be explained. These responsibilities begin with the necessary background reading and perhaps even course-work (where available) that a teacher should begin before attempting to teach a Talent Pool class. For example, teachers need to have some familiarity with the characteristics and needs of gifted students and an understanding of the Three-Ring Conception of Giftedness and *The Enrichment Triad Model.* After receiving inservice training in these areas, potential Talent Pool class teachers may be asked to submit an outline of what might be covered in their class (as explained earlier) or work during the summer to establish options for the class.

Once teachers have contacted the principal about becoming a Talent Pool class teacher, a committee should be formed consisting of the Program Coordinator (if one has been appointed) and any IPT members who are not applying to become Talent Pool class teachers. Decisions about how to select the teacher and criteria for selection can then be left up to this committee but one important consideration should always be kept in mind. It is important to select Talent Pool class teachers who can get along well with each other and the Coordinator *and* show flexibility and resourcefulness.

Grading Policy in Talent Pool Classes

Many questions have been raised about how students are graded in a Talent Pool class. These questions usually focus on whether or not students are graded on regular curricular work or whether students are graded on the basis of their own performance or compared to other students in their class. Also, we are constantly asked about the way a Type III is evaluated and whether or not students should receive high grades in a Talent Pool class if they spend only a day a week completing their regular curriculum work and the rest of the time engaging in a self-selected independent study.

What are the purposes of a grade? Does a grade represent varying degrees of mastery of basic skill material? Or does it constitute "time spent" in a given class and a number of attendant factors such as neatness, interest and effort, punctuality, personal agreeableness and "getting along" with the instructor? If we answer yes to both questions, we are immediately faced with somewhat of a dilemma.

Suppose that a very able student can demonstrate high degrees of mastery or competence on all of the material in a given course on the first day of school! Does this student deserve an "A" or "A+" and should the student be required to sit throughout the semester or year even though the material has been mastered? This philosophy can be applied to students who have mastered regular curriculum work in a Talent Pool class. If mastery can be demonstrated, we believe students should receive an "A" for that segment of the Talent Pool class. In fact, one of the reasons for the establishment of Talent Pool classes is to avoid the problem of bright students becoming bored in regular classes and therefore, psychologically "dropping out" or becoming a behavior problem in class. In regular classes, students like this are often "graded down" even though mastery has been clearly verified and documented.

We believe that formal grades should be awarded for mastery of *the regular or required curriculum.* If highly able students can demonstrate mastery through acceleration or curriculum "compacting," then grades should be given on the basis of mastery rather than the amount of time spent in a given course or the number of assignments completed. When it comes to assessing work that clearly represents departures above and beyond the required curriculum, we believe that the use of formal grades should be abandoned and replaced with procedures that guarantee students comprehensive evaluative feedback.

The evaluation of products should be achieved by the use of an instrument called the *Student Product Assessment Form* (SPAF, in Renzulli, Reis & Smith, 1981). This form consists of eight specific indicators of product quality and seven overall estimates of the general characteristics of a given student product. The items in SPAF are: (1) Early Statement of Purpose, (2) Problem Focusing, (3) Level of Resources, (4) Diversity of Resources, (5) Appropriateness of Resources, (6) Logic, Sequence and Transition, (7) Action Orientation, (8) Audience and (9) Overall Assessment (Originality of the Idea, Achieved Objectives Stated in Plan, Advanced Familiarity with Subject, Quality Beyond Age/Grade Level, Care, Attention to Detail, etc., Time, Effort, Energy and Original Contribution).

Each item consists of a key concept, descriptive statements about how the concept might be reflected in a student's product, and an actual example of a product that is illustrative of the key concept. When we are evaluating the unique products of students, we do not have a set of norms or standard scores by which to judge if a product is truly creative, or by which to assign a formal grade.

Responsibilities of the Program Coordinator and the Talent Pool Class Teacher

The coordinator provides certain types of services to both Talent Pool class teachers and Talent Pool students (see Figure 8). The coordinator provides on-site training to Talent Pool class teachers and assists them with curriculum compacting and differentiation of curriculum and instruction. Additionally, the coordinator co-teaches process skills, helps to manage Type III investigations, plans for process skill courses taught either by him- or herself, the Talent Pool class teacher or an expert in the field, locates mentors, and organizes Type I activities as they relate to content areas.

The coordinator also provides direct service to Talent Pool students in a wide variety of ways. If the Talent Pool class teachers elects to have the coordinator teach Type II process training in their classes on a regular basis or for a certain time period, that is provided as a direct service. Additionally, the coordinator should be seeing (on a regular basis) Talent Pool students who have *not* enrolled in Talent Pool classes for the types of services described earlier: Type I and Type II Enrichment, interest assessment and perhaps even informal discussions on underachievement (if that applies). The coordinator also provides services to students involved in Type III advanced level studies by arranging for Talent Pool students not in Talent Pool classes to work in a resource room (or other designated area) on the Type III idea. Students in the Talent Pool classes have the option of working on Type III investigations within their Talent Pool classes, in the resource room or in both places. In either case, the coordinator is available to provide needed instruction, resources or other assistance. Schoolwide and resource

I. Talent Pool Class Teacher

   A. Volunteer to teach Talent Pool class.
   B. Compact regular curriculum.
   C. Plan differentiated curriculum.
   D. Join and plan with IPT.
   E. Plan Type I activities.
   F. Teach Type II activities (when appropriate).
   G. Relate content materials to Type I, Type II Enrichment.
   H. Create opportunity for greater flexibility in interdisciplinary teaching.
   I. Evaluate (grade) Talent Pool students' performances.
   J. Facilitate Type III investigations.

II. Program Coordinator (may also be called resource teacher)

   A. Facilitation (Coordinator) Component
      1. Assist teachers in compacting curriculum.
      2. Provide on-site inservice in differentiating curriculum.
      3. Plan mini-courses with teacher.
      4. Teach Type II activities in Talent Pool classes, if requested.
      5. Schedule Type I's in classroom, if requested.
      6. Serve as resource for people and materials for classroom activities.
      7. Provide Type III assistance in classroom.
      8. Complete Compactors.
      9. Evaluate program objectives.
      10. Coordinate the IPT.
      11. Provide for integration of the coordinator's expertise in Type II instruction with the Talent Pool class teacher's expertise in content.
   B. Resource Room Component
      1. Provide Type II instruction.
         a. occasionally to non-Talent Pool class students at the invitation of teachers.
         b. to Talent Pool students (1 period per week either within the Talent Pool class or the Resource Room).
         c. to students engaged in Type III investigations (as need arises).
      2. Provide Type III assistance.
      3. Plan schoolwide and resource room Type I with IPT.

Figure 8. Staff Responsibilities

room Type I's, as well as content area Type I's and Type II's are also planned by the program coordinator. He or she serves as a resource, especially to Talent Pool class teachers, but additionally to any teachers wanting assistance. The coordinator also serves as a member and/or coordinator of the IPT comprised of Talent Pool class teachers and a guidance counselor. The team meets on a regular basis to plan for the integration of content, to provide for flexibility in scheduling, and to act as resources to each other especially in the areas of Type II and Type III activities.

The coordinator can also be involved in organizing and scheduling sessions for Talent Pool students (and other interested students) on college scholarships, the application process, financial aid and other areas of concern that high school students generally face about their future. One high school that has adopted the Secondary Triad Model has a series of weekly seminars during a preselected study hall (a Talent Pool study hall is ideal for this purpose) in the junior and senior year. Both college and career counseling is made available to interested students during this time period.

The Interdisciplinary Planning Team

One reality about an attempt to develop a comprehensive secondary program is the necessity of inviting faculty participation in the decision making process. A major goal of this model is the creation of faculty "ownership" (Reis, 1983) and involvement in the program. Our experience has clearly demonstrated that negative, outspoken faculty members can virtually destroy the chances for program success in a wide variety of ways. It is therefore essential, for the survival of any educational innovation, for faculty members to be informed about plans for new programs, invited to participate on a committee to determine directions and future policy and involved in any major decisions about changes in the existing school program.

In order for a comprehensive gifted program to be established in any school, the faculty must have an opportunity to become involved in the selection of a definition, identification system and programming model. Therefore, we recommend the formation of an Interdisciplinary TAG Planning Team which would serve as the core group for planning and implementation. This IPT (Interdisciplinary Planning Team) should meet regularly to plan the development of the secondary program and report back to their own departments. Whenever possible, a coordinator or team leader should be selected to serve a major organizing function. The members of the IPT should come from the four major academic areas: Mathematics, Language Arts (including foreign languages), Social Studies and Science; and a representative may be named from the Fine Arts and/or Industrial Arts areas. In our research each IPT member volunteered to represent his or her department and usually was given a block of time for program planning and implementation purposes. We strongly recommend that each member of the IPT be selected the spring before the planning effort begins so that scheduling can be arranged for them to have a common planning time in order to work together during the school day. In one field test district, four IPT members were released from a 30 minute home room period *every* day to allow them the time together to plan the implementation of their program. In other districts, the IPT members were released from certain duties (home room, study hall) for a school year so that regular planning meetings could be held. During these meetings, program teachers could discuss enrichment opportunities, curriculum modification and individual student research topics. This time could also be used for individual appointments with students and counseling sessions for individuals and small groups.

IPT members should be recruited by an invitational memo which is sent to the entire faculty. This memo can describe the general goals of implementing a secondary gifted program and might state that volunteers will receive a future change in teaching assignments (in some cases) as well as planning time for programming purposes.

Coordination and Leadership of the IPT

The IPT should be formed by screening those who have volunteered and selecting persons who tend to be positive about the possibilities for beginning a secondary program. An attempt should also be made to identify faculty members who could get along well with each other. We have found that it is sometimes an excellent idea to include a faculty member who tends to be a negative and outspoken critic of change, for if this faculty member can be convinced to work positively for the implementation of the program, he or she may then be able to win over other faculty members who have similar feelings. However, if two or three negative faculty members are appointed to the team, it may be extremely difficult to accomplish anything.

It must be stated at this time that, in our opinion, it is impossible to implement a viable comprehensive secondary program without having someone to organize and coordinate the effort. In other words, it is absolutely necessary to have someone appointed whose primary responsibility is coordination of all secondary services to gifted students. Quite often the superintendent of schools or the secondary school principal selects someone to head the IPT Committee who may then eventually apply to become the secondary program coordinator. In smaller school districts or communities with a single and relatively small high school, a coordinator's position might be shared between the elementary and secondary programs. In smaller schools the coordinator might have a part-time teaching assignment or be responsible for operating a resource room that serves both students and other faculty members in a wide variety of ways. But once school size (junior and senior high schools combined) approaches or exceeds 1,000 students, one of the major contributors to program success will be the presence of a full time secondary coordinator.

A word of caution is also in order at this point. Administrators (principals, guidance directors, central office personnel) who already have major responsibilities in other areas have generally been unsuccessful in developing and maintaining highly successful programs for the gifted. The "press" of other responsibilities frequently results in a lower priority for gifted program activities; and this low priority has an inevitable "ripple effect" throughout all members of the faculty.

We have also too often seen a disastrous situation arise because of the appointment of someone totally ill-suited to serve as a program coordinator. In one case a high school subject area teacher, whose negative personality was known schoolwide, was relieved from his teaching situation and put in a coordinating role in the gifted program because it was felt "he could do less damage there." A person placed in the "start-up" role of implementing a gifted program needs to have a background and knowledge of the field which includes definitions, identification systems and programming options. It is also important that the coordinator possess some personality factors that will allow him/her to work with and be accepted by other faculty members. We are not saying that this person has to possess a unique wit or a magnetic charm; but we have found that people who are able to relate to others and get along with different personality types are able to make change happen more easily than those who cannot. The structure of secondary schools and the necessary changes that are part and parcel of gifted programs require a leader with unusual energy, patience, and the ability to work with individuals with varying styles, personalities and teaching competencies.

Responsibilities of the IPT

One of the first responsibilities of the Interdisciplinary Planning Team (IPT) is to examine the alternatives and options that already exist for bright students in the school. The members of the IPT should list everything that is already planned for and available to bright students. They should also be encouraged to examine the areas in which they believe services are not currently available for gifted and talented students but should be. For example, if honors and advanced placement classes are already in place, that should be noted. If the IPT members believe that very little is happening for bright and/or talented students within their respective departments, that should also be indicated. Dialogue should be encouraged between and among IPT members about their individual beliefs related to providing services to bright youngsters. The chairperson of the IPT may need to assume the responsibility of providing members with reading material related to education of bright students. Numerous articles related to the Secondary Triad Model, internships, mentorships, counseling or other options should be distributed to the members of the IPT.* These articles may be discussed and used to "zero" in on the particular problems and/or individual differences that exist in any school. If the members of the IPT are not familiar with any options related to services for bright students, the chairperson may decide to organize one or more inservice training sessions to provide an orientation to those options. It is also highly advisable to have the IPT members visit other gifted programs in the area and have them speak to students, program teachers, subject area teachers and administrators about the program.

Once an understanding of the needs of bright students has been gained and a discussion of what is already happening with both the school and the departments has been conducted, IPT members can begin to draft a preliminary plan for the services that will be offered to students. (The services generally recommended in the Secondary Triad Model are those listed in Figure 3.) It should be noted that any proposed plans must be shared with the general faculty for their input. This has been accomplished in various ways in the secondary schools that have adopted the Secondary Triad Model. In some schools, a two to three page memo explaining the major components of the proposed program was distributed to the staff two weeks before an optional after-school question and answer meeting was held. In other schools, members of the IPT have verbally presented the proposed program to their individual departments, answered any questions and brought the concerns of the department back to their meeting. At this point, departmental input can be discussed and modifications may be made in the proposed plan. In smaller secondary schools, a brief written explanation of the proposed services may be distributed at a general faculty meeting in addition to an oral explanation, after which questions may be raised. It should also be noted that it remains the responsibility of the IPT to be the "agent in charge" of the implementation of any of these services. In other words, it has been our experience that the IPT should not merely plan the proposed program; they should also remain a team which meets regularly throughout the implementation of the new program.

Organizing a Mentor System

Another responsibility of the IPT is to help recruit persons who will serve as mentors for individual students (or small groups) who decide to pursue Type III projects. The Type III Mentor Matrix (Figure 9) is used to categorize persons into one of the areas indicated on the horizontal axis of the matrix. Although areas of science have been indicated on the enclosed sample of this Action Form, IPT members should enter whatever topics they believe are appropriate in each column. We believe that an individual matrix should be prepared for each major subject matter area and subtopics entered in the various columns of the matrix.

Two main sources of input exist for recruiting teachers whose names will eventually be entered in the cells of the matrix. The first is responses to some type of Faculty Talent Survey that should be completed by all faculty members early in the school year. This instrument should be designed to determine specific topics within subject matter areas in which persons might like to serve as mentors. This instrument will also help determine the extent of each teacher's commitment for working with individuals or small groups in a mentorship situation. The second source of input is the coordinator's or building principal's individual knowledge about the special interests of faculty members and the

See, for example,* **The Triad Reader, *which includes 42 articles related to designing and implementing gifted programs based on the Triad/Revolving Door Model. Available from Creative Learning Press, Mansfield Center, Connecticut.*

Department ______________

Grades	Biology	Physics	Chemistry	Astronomy	Ecology	Geology
5–6						
7–8						
9–10						
11–12						

Figure 9. Type III Mentor Matrix

kind of information that we can obtain from fellow staff members through personal contact. We have found that individual discussions with faculty members are an excellent way both to determine their areas of specialized knowledge and to help them gain an appreciation for the kinds of excitement that can result from this type of one-to-one interaction with individuals and small groups.

There are three major considerations that should be taken into account as you begin to complete the Mentor Matrix for any given school, grade level or department. These considerations are discussed below.

Finding Time

A decision must be made regarding whether or not a given teacher will serve as a mentor to students within his or her classes only, or if mentorship services will be extended to other students. The interests and expertise of any given teacher will obviously be extended to a larger target population if that teacher is willing to meet students from other classrooms. Therefore this second approach is preferred.

Certain organizational problems must be overcome, and these problems relate mainly to identifying specified periods of time when students can meet with their mentors. If the school schedule has a built-in activity period and/or "club" period, certain portions of these or any other time blocks that are not devoted to regular instruction are most convenient for mentorship activities. Many teachers who have been enthusiastic about this activity have voluntarily scheduled short time blocks before and after school and during lunch hours or scheduled study hall supervision. In some secondary schools, teachers' schedules include a certain number of "office hours" each week that traditionally have been used for remedial assistance but that also can be devoted to mentorship activities with students who are working on a Type III project.

Administrative support and cooperation are essential in helping to arrange schedules and identifying given time periods during which mentorship activities can take place. It is recommended that each teacher who agrees to serve as a mentor prepare a schedule indicating those times that he or she has set aside for individual meetings with students and that these charts collectively be summarized on a master schedule that can be distributed to other teachers and to Talent Pool students. "Time" is an essential ingredient in the effective implementation of this approach; therefore it is highly recommended that teachers and administrators work cooperatively to develop a schedule that will be convenient for participating teachers and that will allow easy access for students who are seeking mentorship assistance.

Specificity of Topics

A major purpose of the Mentor Matrix is to identify at least one person in each area who will assume mentorship responsibilities. An additional refinement can also be incorporated into this approach by asking teachers to indicate special topics within subject areas where they would prefer to give individual or small group assistance to students. These specialties can be indicated on both the general matrix and the matrix that focuses on a specific subject matter area at the junior/senior high school level. Although general assignments to categories are necessary to make this procedure effective, any specialized topics or interests within general subject areas will help to promote a more effective and "elegant" system.

Expanding the Mentor Matrix Through Community Involvement

The Mentor Matrix concept is based on the involvement of teacher volunteers. A similar approach, however, can be used to identify, classify and record the names of any and all community members who might express an interest in working with individuals or small groups of students on a mentorship basis. By extending this approach to the community at large, we can greatly expand both the number of persons who are available to serve as mentors and the diversity of topics in which services might be provided. Community members can also be used as the basis for an internship program. In this program, Talent Pool members who are in their junior or senior year of high school can become involved in a work experience outside of school. This experience would provide a first-hand opportunity for students to "get a taste" of what particular careers actually involve.

The IPT: After the Planning Stage

It is conceivable that several of the IPT members may become deeply interested in the gifted program and subsequently volunteer to teach a Talent Pool class in their respective subject areas. Once the program planning is completed and the program is accepted by the faculty, we strongly recommend that the IPT remain in place as an Advisory Board or an Enrichment Committee, charged with planning Type I and Type II experiences for the general school population. Teachers who have been members of the IPT in the early planning stages should be encouraged to *remain* on the IPT and teachers who are teaching Talent Pool classes should automatically become members of the IPT. If the members are given a brief amount of time to meet together for planning purposes, a wide range of services can be provided. The IPT can organize a variety of enrichment opportunities with the help of the full or part time coordinator by finding a convenient time for these talks. Memos like the example shown in Program Document F should be sent to students announcing these enrichment seminars.

MEMO

TO: Interested Juniors and Seniors

FROM: IPT Members

DATE: April 9

We would like to invite you to the enrichment seminars listed below. These talks will begin at 11:50 A.M. and end at 12:30 P.M. By scheduling these talks at this time, we know you will be able to have a shortened lunch shift and we are confident that you will benefit from these seminars.

Seminar 1 — Tuesday, April 24

Mr. Baldev Sachdeva will be in Room A112 to speak on "Matrices in Action." This talk will describe some of the uses of matrices in such areas as coding and probability. It will begin with 2×2 matrices and basic operations on them. Prerequisite for attending: Two years of high school algebra.

Seminar 2 — Wednesday, April 25

Ms. Joan Fitzgerald will be in Room A112 to speak on "Radiation and You." There will be a slide presentation and speaker. The information provided will enable you to make valid, reasonable judgments about radiation as it affects your life. No prerequisite for attending.

Program Document F

The IPT can also schedule these Type I sessions within Talent Pool classes or within other classes. Memos can be sent to faculty members asking if they are interested in having speakers conduct seminars or teach advanced process skills in their classes. IPT members can also aid the Program Coordinator by assisting both Talent Pool and non-Talent Pool teachers in compacting curriculum and in differentiating curriculum. They can help to organize a mentor program both with faculty members and with community volunteers by using the Type III Mentor Matrix. They can also help to organize when certain Type II skills will be introduced and taught by both the Program Coordinator and the Talent Pool teachers. This organization of a secondary Type II Scope and Sequence will help to eliminate the repetition of process skills at the secondary level.

An additional responsibility of the IPT during their regular meeting times is interdepartmental communication on the work load of Talent Pool students. For example, Talent Pool students should not be encouraged to work on more than one Type III study at any given time. IPT members ought to know when a student has begun a Type III study in science so that modifications may be made in other Talent Pool classes to allow this study to be completed. In some cases, time may be found during another Talent Pool class for that student to spend in his or her independent or small group study.

A student may be given the option of not attending a Type I Enrichment presentation and instead, use the time to work on his or her Type III study.

The Interdisciplinary Planning Team (IPT) has also been used in some districts as a counseling group for Talent Pool students. By working cooperatively with school guidance counselors, the IPT members who have received inservice training in education of the gifted can serve as advocates to Talent Pool students over a four year period. For example, in one district the IPT members were given one free period a day for this function and worked with the same Talent Pool students from their freshman to their senior year. This long term relationship allowed the opportunity for the IPT member to meet informally with individuals or small groups of Talent Pool students several times each year and to keep a constant check on how students were doing in their classes. The IPT monitored underachievement in some students and advised students on the amount of work they were undertaking and their future plans (courses for next year, college ideas, financial aid). If any type of serious problem was encountered in these sessions, the IPT member automatically referred the student to a specially trained guidance counselor but continued to stay involved with the student as an advisor, mentor and in some cases, a friendly shoulder to cry on. This option encouraged the development of a strong support system between teacher and student as well as a *proactive* rather than *reactive* system for dealing with potential concerns before they emerged as problems.

Conclusion

The features that make the Secondary Triad Model an attractive and organized practice for providing for the needs of bright students are many and varied. Our research has demonstrated that the model has an infinite amount of flexibility and can be adjusted to fit the various needs of individual teachers and schools. If our research has demonstrated anything, it has clearly shown that a great deal of patience, flexibility, dedication and humor is needed by anyone who attempts to implement a secondary gifted program. We are hopeful that our model will provide some guidance on how a comprehensive model can be organized in a wide variety of secondary schools.

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Discussion Questions

1. What are some of the most common problems that occur when attempts are made to institute a secondary gifted program?

2. What are some of the most common administrative designs for secondary gifted programs?

3. Discuss the role and responsibilities of an Interdisciplinary Planning Team.

4. Why is the role of a program coordinator (full or part time) important in the development of the Secondary Triad Model?

5. Why is an orientation session so important for students who may be eligible for a Talent Pool Class?

6. Explain the statement from the chapter: Students who are involved in a Talent Pool class are actually involved in a Triad-based program within a subject area. How is a Talent Pool class like a gifted program?

7. What might some of the differences be between a Talent Pool class and a traditional Honors class? Between a Talent Pool class and an Advanced Placement Class?

8. How might the Secondary Triad Model be integrated into existing Honors or Advanced Placement classes?

9. How can the differentiated curriculum or activities within a Talent Pool class be documented or evaluated?

10. What are the various options that might be used for time management within a Talent Pool class?

11. In what ways might the enrichment opportunities offered within a Talent Pool class be extended to other non-Talent Pool students?

12. A major objective of this model is the encouragement in students of creative productivity. How is this facilitated by the Secondary Triad Model?

Calvin W. Taylor

XI

Dr. Calvin W. Taylor is Professor of Psychology at the University of Utah. He is a native of Utah and completed two of his degrees in that state. His doctoral degree was completed under L.L. Thurstone at the University of Chicago. Through his own basic research and educational theory, he extended and implemented Thurstone's factor analysis studies on ***The Vectors of Mind*** into application by developing and implementing his Multiple Creative Talent Teaching Approach. At the National Academy of Sciences he built the selection system for the NSF Graduate Fellowship Program. He is founder of the Institute for Behavioral Research in Creativity (IBRIC), organizer of nine International Creativity Research Conferences and director of 19 summer creativity workshops for teachers. Dr. Taylor has received the APA Richardson Creativity Award, was elected to the Education Hall of Fame and is chairman of the forthcoming 7th World Conference on gifted, talented and creative children.

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Summary

Cultivating Simultaneous Student Growth In Both Multiple Creative Talents and Knowledge

Developing multiple talents in students is good training and preparation for them to move into other gifted classes in school and to prepare them for eventual success in their careers. There are indications that curiosity and questioning (inquiring) abilities tend to become decreasing characteristics of students as they advance through school and college. Students are not being trained to become creative people who open new fields and create new opportunities.

We have produced an educational approach which will improve the nature of education by developing more of the potential inborn human resources. This can be described as a simultaneous double curriculum which involves developing both innate talent processes and adding knowledge to one's own existing knowledge storehouse.

Initially, the multiple talent concept involved six talents: *academic, productive thinking, planning, communicating, forecasting* and *decision-making*. It was recently expanded to include *implementing, human relations* and *discerning opportunities*. The greater the number of different brainpower talents that students learn to use, the more nearly equal the students will become, talent-wise, on the average. The greater the number of talents, the more this method moves toward being an equal opportunity classroom approach. Since all students are potentially highly talented in at least one of the abundant variety of human resources, awareness of this outcome leads to increased self-esteem and enhanced wellness.

Very often our schools only push for academic talents, leaving other potential talents in dormancy. Our approach is to provide students with opportunities to develop and increase their creativity, innovation and risk-taking attributes. Broadening this band of talents functioning in schools develops more of the whole person, thereby increasing human capabilities and strengthening the total health of students of all ages.

Chapter XI

Cultivating Simultaneous Student Growth in Both Multiple Creative Talents and Knowledge

This chapter describes the vigorous, deep roots of the approach of Teaching for Multiple Creative Talents. It emerged from my doctoral studies with Thurstone, from my two year effort as director of research of the Office of Scientific Personnel at the National Academy of Sciences in developing the total selection procedures for identifying the best future scientists in the National Science Foundation Fellowship Programs, and from our nine Utah-sponsored International Creativity Research Conferences (which Maslow called the "blue ribbon series in Creativity").

This student-focused approach is founded on massive basic *Research* (R) and sound underlying *Theory* (T). It has undergone numerous thorough *Development* (D) processes and has been successfully *Implemented* (I) and *Evaluated* (E) in several dissertations and projects in Utah and around the nation. With a solid *Theory* (T) basis, we have expanded the usual R & D scientific steps into the more complete R & D & I & E procedures, where implementation means to finish the work.

These funded projects include Project Implode and Project Seagull in Utah, Project Impact and Project Advance in Iowa, the nation-wide Talents Unlimited Project in Mobile, Alabama which is the Exemplary G/T Project on the USDE's National Diffusion Network, and Project Reach in Minnesota.[1] A 1978 conference on the status of talent-focused teaching, i.e., on "Developing and Implementing Multiple Talent Teaching" (Taylor, 1978b), led to a request from Utah's Superintendent Walter Talbot for a national summary report on multiple talent teaching results, almost all of which were an unbroken string of positive findings against comparison classrooms. These results were published in full later by Senator Hatch in the *Congressional Record* (Taylor, 1980). It is also evident that students can learn and experience how to use all these new talents creatively. Therefore, collectively they could be called multiple creative talents.

Any G/T program which has students deliberately use their minds in ways beyond typical academic talents could be factor analyzed and then described as a multiple talent type of teaching approach. Such programs may be using a set of newly-named talents that are not necessarily synonymous with the customary set of talents in our Multiple Talent Totem Poles. However, such G/T programs do call for students to use more of their total mindpower (total brainpower).

It is suspected that practically all special Gifted and Talented Programs feature stretching the mind knowledge-wise or brainpower-talent-wise, or stretching the mind both ways, either simultaneously or in succession. Our point of view is that having students develop their multiple creative talents would be good training and preparation for them to move into any other types of G/T programs described in other chapters of this book. We also believe that if students have been trained in using their multiple creative talents, they will be better prepared to function in other kinds of G/T programs and thereby help those other programs yield better results in their measured effects on students.

Cultivating multiple creative talents is a systematic scientifically-based approach for developing some of the highest level brainpower talents that are relevant to having students function effectively in their careers and lives as well as in their schooling years.[2] Furthermore, it overcomes some of the unfortunate negative phenomena concerning creativity that have been reported in some of our nine conferences among leading researchers on creativity and in our own studies on National Science Foundation summer science programs.

There are indications that curiosity and questioning (inquiring) abilities tend to become decreasing characteristics of students as they stay longer in school, including through college years. By the time that students are in the higher levels of education, they have become programmed in both their brain and personal attributes to be less ready to deal with the unknowns and to tackle high-potential, high-risk opportunities than are younger students. A couple of years ago shortly after our new Utah Superintendent, Lee Burningham, took office, he immediately said to me, *"Isn't it too bad that creativity decreases in students the further they go through school?"*

Elementary school students are more ready in many psychological ways to do frontiering research than are high school students, who in turn are more ready than college students to venture and engage in risk taking types of frontiering research into the unknowns (Jablonski, 1964). Instead, students are being more programmed toward becoming verification scientists and technician types than to be creative scientists who open new fields and create new opportunities and continue to move frontiers ahead and be at the cutting edge in their field of science (Taylor, 1983).

Basic Research Background On Talents of the Mind

Probably all chapter authors came into the gifted field in different ways. Since my route may have been quite unique, it is described here in some detail. With a strong basic-research background in measurement, mathematics, physiology and neurology, I completed my doctorate in Psychology in the Biological Sciences Division of the University of Chicago. Dr. Louis Leon (L.L.) Thurstone was my supervisor (mentor).[3] Dr. Thurstone (1964) was always interested in creativity and eventually for A.C. Spark Plug did a factor analysis study of creativity which was essentially finished just before his death but was never widely published.

Thurstone's "The Vectors of Mind—Multiple Factor Analysis for the Isolation of Primary Mental Abilities," a highly mathematical treatment, opened the way for further development of his methodology, as published later in his book ***Multiple-Factor Analysis: A Development and Expansion of the Vectors of Mind*** (Thurstone, 1947). This complex approach (now extremely feasible through computer computations) is well designed to analyze and discover the multiple separate dimensions (variables, factors, abilities, vectors or talents) of the mind. He first utilized his own methodology to analyze the group type of intelligence (IQ) tests into seven factors (talents) of the mind which he and his wife, Dr. Thelma Gwinn (T.G.) Thurstone, published as "Seven Primary Mental Abilities." Along with his graduate students, he produced further studies on reasoning, perception, scientific, mechanical and verbal abilities (talents) to yield well over 20 talents—more than twice as many different talent dimensions *beyond the IQ* than there were within the IQ group tests.[4] My study was the first in his lab which did *not* use separate answer sheets. It was focused upon verbal fluency factors and found two new high-level talents described as ideational fluency and expressional fluency (also named verbal versatility).[5]

Many other researchers soon joined in those factor analysis studies. Later, for example, two E.T.S. research conferences a few years apart were organized by John

French in Princeton, New Jersey, to determine the number of dimensions (factors) of the mind which had been well established in multiple studies. (There I first met Guilford and was alphabetically assigned by the Inn to share a room with Thurstone.) The number of factors at the end of the second conference which had been identified and verified had been around 45 in number (not counting physical factors and personality factors). My area was communications and creativity.

Further work by Guilford and others has increased this number to at least 100 different high-level intellectual talents (Guilford, 1977). For example, in our continuing studies of communication and creative talents (extending beyond my dissertation) we found over 40 dimensions by emphasizing writing and talking talents, but *not* including any non-verbal talents in communicating or creating. These 40 talents are definitely important in functioning effectively as human beings in the world of work and in lifelong communicative and creative activities (Taylor, 1973; Taylor, Ghiselin & Yagi, 1967). Less than a third of them however, were ever developed in English, speech, language, arts and communication courses in 13 school years.

In completing my work in Washington, D.C. on NSF Fellowship Programs, the groundwork was prepared for long-range follow-up studies of the awardees and non-awardee applicants. The need to identify creatively talented persons through basic research on creativity was recognized, since a few highly creative scientists can produce great strides of progress in their field of science. This led later to my Utah proposal for National Science Foundation support to organize a first National Research Conference on the Identification of Creative Scientific Talent among the leading researchers on that topic. Step-by-step this ultimately led to our research conference series on different aspects of creativity, each conference being among the new set of leading researchers on creativity since the previous conference.

In every conference, our Utah team had one of the major and most complex chapters and contributions, which repeatedly showed the multiplicity of intellectual and non-intellectual resources in highly creative persons. The first three paperback reports on the "Identification of Creative Scientific Talent" sold out quickly. Then selected papers from those three reports were published in hardback and paperback by Wiley & Sons titled ***Scientific Creativity: Its Recognition and Development*** (Taylor & Barron, 1963), which was also translated into Japanese. Other volumes in the series are:[6] ***Creativity: Progress and Potential*** (also a Portuguese version); ***Widening Horizons in Creativity*** (also a Japanese version); ***Instructional Media and Creativity; Climate for Creativity; Educational Challenges of Creativity;*** and ***Creative Talents are the History-Making Talents.***

One of the numerous articles requested and published by professional journals was cleverly titled "The Creative Individual: A New Portrait in Giftedness." Two others were "Finding the Creative" and "Information and Scientific Creativity." Still another was "Many-sided Intelligence" (Taylor, 1963). Upon invitation, the featured article was written for each issue of *The Instructor* for a full school year under the series heading "Clues to Creative Teaching" (Taylor, 1962-3) with the following titles of the ten articles: "Bridges from Creativity Research to Teaching"; "Different Approaches to Creativity"; "The Creative Process and Education"; "Knowledge and Creativity"; "Learning and Reading Creatively"; "Listening Creatively"; "Creativity and Expression"; "Developing Creative Thinking"; "Developing Creative Characteristics"; and "Evoking Creativity." Another invited article was "Be Talent Developers—As Well As Knowledge Dispensers" (Taylor, 1968b).

Two other early articles of current interest are "Questioning and Creating: A Model for Curriculum Reform," and "Cultivating New Talents: A Way to Reach the Educationally Deprived." A research conference report on criterion of performance in management, leadership, and creativity included our chapter "On the Complexity of the Criterion (Measurement) Problem."

Our Peace Corps Project illustrates one way in which we learned how to improve training and education programs by constructing new measuring devices. In discussions with the Peace Corps Research Director, two ideas came together to form a Creativity Situational Testing Project. We build a set of multiple-scored situational tests of performances called for in Peace Corps Volunteers in overseas situations. The subtle challenge was to have the volunteers stimulate or catalyze both the sensing of local problems and coming up with creative solutions to these problems by the host country people themselves. Instead of having a Peace Corps volunteer be the star performer, the volunteer's task was to spark the host people into high participation in sensing and solving their own problems.

Our situational tests were built to be "ultimate criterion measures of successful performers." We learned to score the tests so that the volunteers got high scores when the host people became the most active participants and performed very well, while the volunteers appeared almost to be only a full time observer. These situational tests caught the attention of the Training Director of the Peace Corps, the first research project ever to do so. Consequently, he called the Training Directors from university campus training centers around our nation to a training demonstration meeting in Chicago conducted by our Situational Testing Research Team. We had to transform our tests to situational training activities plus convert our test scores to training scores. The program demonstrations went so well that the staff of one training center stayed up all night to replace their traditional highly lecturing, school-like training program curriculum to situational training activities that were job-like, not school-like. We received high commendations on the spot by the Peace Corps Training and Research Leaders.

From measurement theory and our measurement research experiences, we have come up with this rule: we are more interested in crude measures on the ultimate criterion target than with precise, reliable measures that are off-target. In other words, it is better to be on-target crudely than off-target with precision and rigor, i.e., "precisely off-target." Being validly on-target is better than being reliably off-target. We apply this rule whenever we construct criterion measures, whenever we select and build batteries of predictor scores, and whenever we develop educational programs to become more valid for the purpose at hand. For example, in our medical selection and education studies, we evaluate the performances of residents in training against the *Target of Excellent Physicians in Practice* (Albo, Taylor & Page, 1982). We also recommend that medical students be trained and evaluated in a broad band of physician-like performance and attributes.

In our numerous criterion and predictor research studies, we always build the best new criterion and predictor devices possible for the purpose of the targets at hand. We also add any available data which the organization has been using officially or on a trial basis. Besides our tailor-made new measuring devices, our unique trademark is that we invariably use a multiple variable approach in everything. We create and/or observe multiple types of activities, performances and accomplishments; we also use multiple sources from which we collect our data; and we often derive multiple scores from each set of data. We use a variety of different measuring techniques in both our battery of criterion measures and our battery of experimental predictor tests. After we have obtained all our multiple criterion scores and multiple predictor scores, we both factor analyze the total combined battery of scores and apply multiple regression methods for each of our criterion scores, in turn, as separate targets (Richards & Gottfredson, 1984). (This recent December article is based largely upon the work of our students, Richards and James; of our colleague Holland and his co-workers; and of our Utah work.)

An Invitation to Propose and Develop a Utah Theory of Education

After basic research efforts on creativity had caught the attention of many professional and educational organizations, we received an unexpected invitation from Dr. Roy Hall, Director of Research of the U.S. Office of Education. He had sent 17 USOE-supported G/T research projects to Jerome Bruner at Harvard to review. Bruner promptly let him know it was not his area and that he should send them to us to do the reviewing.

Using graduate student helpers, we promptly reviewed and wrote a report back, indicating that only three of the projects provided any excitement and the rest were hum-drum—merely minor variations of the traditional scheme of things. Then we added the type of studies which our approaches would suggest should be done. He quickly used our ideas in a west coast speech which went so well that he stopped over in Utah on his flight eastward. He invited us to write a proposal to take a look at education from the basic human sciences which could underlie educational practices and thereby improve the nature of education.

When the project was funded, we recruited a team of 10 persons and also used consultants from relevant fields here and across the nation (including Bruner, Lowenfeld, etc.). Our graduate students were deeply interested and involved in helping to develop the project, even though they openly stated that they had no interest whatsoever in going into education to help run and perpetuate the present system. About half of our team were directly within education. They joined in making new contributions during the meetings, but were often absent when they were too busy running the existing educational system in their various roles in the university, in the state office or in school districts.

We soon found ourselves focusing on the potential importance of human resources and the challenge of developing these potential resources in schools. Whenever our nation or any other nations (most recently the Venezuelan and Saudi Arabian nations) make statements about the human resources being the greatest resources of all, they generally are talking more about *innate, inborn, inherited* potential human resources than about acquired knowledge resources. With proper insights and techniques, the processes of unearthing and actualizing these inner resources can start to happen. In this way, these potential resources can become effectively functioning assets for both the person and the society. We looked at these challenges in several different ways and finally focused on both the inborn potential resources in the total person as well as the acquired knowledge resources in our theory. Our final theory report deliberately dealt with a broad coverage of human potentials (Taylor et al, 1964).[7]

In considering the implementation in our theory and the state of scientific knowledge about the whole person's natural resources, we felt that initial implementation should be on the potential brainpower talents. We knew that the tests developed in many factor analysis studies to discover the multiple potential brainpower talents could be transformed into classroom activities to activate and develop such talents. Such tests could also be indicators used to predict who has the greatest talent potentials and could also be models of the types of measures needed to produce multiple talent report cards.

Educators who say they are meeting the needs of students can no longer say that with confidence. Out of the above basic research has come the notion that one of the biggest needs of students is to be treated as having a full brain together with the marvelous brainpower that goes with that full brain. Students can learn to use their full set of brain powers throughout their schooling as one of their most vital, high-level human resources to be activated both for their benefit and for the benefit of society. The positive impacts and the spread effects from learning to use their full brain powers productively can be truly remarkable, as seen by the outcome data captured to date.

The Simultaneous Double-Curriculum Theory for Developing Human Resources

In this Utah Educational Theory, the first goal is the identification and cultivation of all the nation's known human resources. A main question is to what degree our educational programs are developing all of the country's important human resources. Our nation is certainly concerned with all its natural resources, especially as new types of physical and biological resources are uncovered. Likewise, educators could be extremely involved in the development of all the important inborn, potential human resources, as science discovers how to identify and cultivate each of them in human beings.

In general, knowledge is much more of an acquired human resource. During schooling, knowledge comes from outside the person. Even when a person has learned from experience, his inner experiences are often activated from outside, from instructions in school, from books, from activities in responding to environmental situations, from all types of variables surrounding a person, etc. Therefore, knowledge is essentially acquired after birth from the person's external world. (This reasoning largely excludes instinctual behavior which emerges from within a person at various periods in life.)

Summarizing this first goal, more of the typically neglected but vital high-level brainpower talents and their other supportive attributes need to be activated and developed so that students, through their schooling, will move toward becoming more effectively functioning, multi-talented, knowledgeable adults (Taylor, 1973; McKinnon, 1978). Two short slogans illustrate this point: "*When multiple talents function more creatively, people function more effectively*" and "*When multiple talents function more effectively, people function more creatively.*"

The second goal is to keep up-to-date, continually, in utilizing scientific research on human resources fully, and with minimal time lag in this important age of rapid scientific progress. The motto could be "*Let's go scientific!*" The emphasis here is more directly on inborn human resources than on knowledge. No other type of resources are as complex and as full of potentialities as these human resources, and no other resource fields can eventually become as technical (*"high tech"*) nor as important in the crucial companion-concept of "*high touch*" as can the potential brainpower type of human resources. (See "Bridging the Gap Between Basic Research and Education Practice," by Taylor, Ghiselin & Wolfer, 1962).

In this theory, two other goals less relevant to the present purpose were expressed as follows: the third goal is that education should be viewed in relation to careers and their actual world-of-work requirements. The fourth goal is that educational programs need to be designed better to give persons greater self-understanding, self-esteem and self-confidence. The final overall crucial goal involves a two dimensional model for developing educational programs. As in prediction validation studies, the focus should be on the ultimate target, not on the intermediate means to that end. Consequently, the focus is on the students and what is happening—especially inside the students—in classrooms.[8]

Two different aspects of what is happening inside the student are all-important. What inner talent processes (inner nervous system processes) are actively functioning in processing knowledge inputs? How and in what manner are the knowledge inputs being acquired and linked into the already existing body of knowledge inside the student; and how are these inputs stored in ways that they will become available, as needed later, on school tests or retrieved for other uses throughout one's lifetime? In essence, this is a simultaneous double curriculum, involving both talent processes and knowledge—i.e., developing innate talent resources and acquiring knowledge resources. It becomes possible to develop systematically a double-curriculum to obtain simultaneous growth in both talent processes and new knowledge acquired (and perhaps integrated with the already existing knowledge). Once this double curriculum is developed and teachers are properly selected and trained to operate this double curriculum in students, the cost of the educational system is no greater. At the same time, the deliberate systematic yield can essentially be doubled—at no extra cost—with double gain in new knowledge and in high-valued talents.

When a speaker said, "*We cannot survive ignorance,*" he sparked the thought that there are at least two kinds of ignorance in persons. These two kinds are: (1) ignorance of knowledge and (2) ignorance of functioning effectively as individuals. Which is the more important type of ignorance to try to overcome? Which type of ignorance will produce a larger automatic spread effect of overcoming the other type of ignorance? From all evidence experienced on transfer of training, a much larger spread effect will occur from focusing upon functioning effectively than from focusing upon overcoming ignorance of knowledge.

The other aspect of this goal includes all the means-to-the-end which enables the double curriculum to be functioning effectively inside the students. This collective means-to-the-end includes the teacher and the total classroom environmental system of media, double-curriculum materials, etc. It should be noted that this "*means dimension*" could initially have the parents in the teacher's role and friends and peers can later function in teaching roles as lifetime progresses and even later, supervisors in the organizations can also assume that role.

Ultimately it is healthful for the person, as an adult (and as much earlier as possible) to become self-taught, self-educating and self-activating. In that way, the inner double curriculum will be functioning continuously in response to external environmental challenges and opportunities and other forms of potential stimulation. This final overall goal, when being attained in effective ways, will also be accomplishing all the other four goals listed in this theory.

It appears that this theory of a simultaneous double-curriculum, involving both knowledge and brainpower talents, was years ahead of its time. Its desired outcome is to produce student growth simultaneously in both talents and knowledge. By now a number of demonstrations have shown that this double outcome has successfully occurred in many, many classrooms. Therefore, as a producer of high-level talent functioning, it closely resembles and fits into a new movement, now emerging among educators, called Outcome Based Education (OBE).

Selection and Naming of the First Six Talents in the Multiple Talent Totem Poles

In developing the initial multiple talents concept, creativity played the appropriate role by being a breakaway talent which also broke open the way for other talents to follow. Initially, in theory, there were two complex talent areas, *Academic Talent* and *Creative Talents.* (Since IQ tests items were largely selected and retained, historically, as relevant to the nature of schools, these two talents could alternately be considered as IQ Talents and Creative Talents.)

These two were soon expanded into six talents, the academic talent and five thinking talents (which could also be called creative thinking talents). Much of our factor analysis studies, following after my dissertation, were on creative talents and communication talents. A large factor analysis project on planning talents was finished and reported at about the time of John French's two Factor Analysis Conferences in Princeton. I also served as a consulting staff member to the Stanford Research Institute in training Planning Directors and Planning Vice-Presidents in a workshop held at Lake Geneva, Wisconsin. My strong observation was that these Vice-Presidents of Planning were extremely hungry to learn anything and everything about planning, because they had arrived at their high organizational level, largely by doing practically no planning whatsoever. Instead they had followed plans produced by others above them that were then imposed upon them to carry out (to implement). Then I was invited to an Air Force-sponsored, nationwide conference series on Long-Range Forecasting and Planning. I was the only psychologist to make a presentation and write a chapter in their reports (Taylor, 1968a).

Some of the national experts whose full time work was in forecasting told me that the name of their game, first, was to make the best forecast possible (often after using a variety of forecasting techniques to get different forecasts from the same data base and selecting the best one of all the forecasts). Then the second challenge was to unleash the most powerful forces possible in the future that were not functioning in past trends and bases from which the forecasts were made. Stated simply, this second challenge was to unleash as much creativity as possible which would upset the forecast by hastening the day when the forecast would materialize. In playing their game this way, any persons or organizations increase there chance of getting their "*firstest with the mostest*" and thus "*winning the future*" in that realm of human endeavor. (A General also said that a forecast within an organization could be turned into a plan if he were given the power to control all the relevant variables; and conversely, a plan would turn into a forecast if the power to have control over managing all the relevant variables were taken away.) From these experiences, I chose to add planning and forecasting as separate talents in our original set of six. Then with all these thinking and producing talents in the set, new ideas and plans and forecasts and messages could be produced overabundantly.

Finally, it seemed necessary and even wise to add decision making talents for evaluating which of the many options should be selected. Then by following the lead of the Talents Unlimited Project, my next totem pole decision, for implementation's sake, was to replace creative talents with productive thinking talents, since it would be more reasonable and feasible to have all students be thought of, initially, as thinkers and producers rather than the higher requirement that they must almost immediately be the highest-level creative type of thinkers and producers.

Therefore, our standard set of six talents included one imitating, non-thinking, reproducing type of talent together with five thinking talents involving ideas and things and futuristic predictions typically not produced before by students in their schooling. In other words, the set of talents included one non-thinking way of reproducing and thereby acquiring knowledge, plus five thinking ways of actively processing and working with knowledge in order to acquire it.

The well-known sequence of the talents on the totem poles were academic, productive thinking, planning, communicating, forecasting and decision making. Customarily each teacher-trainer had a first best talent to start with, which was often either productive thinking, communicating or planning. However, there need not be any fixed or sacred sequence of introducing these talents to teachers or to others. The greatest single gain for the development of a classroom of students is when a teacher adds a second talent, which ever one it may be. Consequently, if a group of students had five different teachers, either daily or even across five years, they could potentially have five two-talent teachers, each one of which specialized in a different one of the five thinking talents, along with and beyond the academic talents. The students would have the experience of each of the five thinking talents in activating and using the total set of totem poles.

In the 1984 summer, we retained the *Academic* and *Productive Thinking* talents as the first two in the sequence and rearranged the other four totem poles in the new sequence of *Communicating, Forecasting, Decision Making* and *Planning,* as shown in Figure 1. The main logic for this new arrangement is to have students learn to think in several ways and then end up with the planning talent which yields a product in the form of a plan, a design, a theory or a proposal.

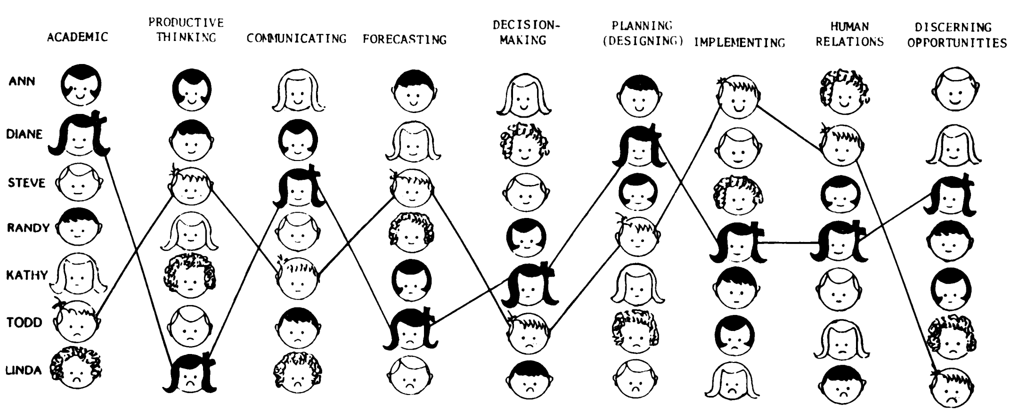

Figure 1. Taylor's Talent Totem Poles—Extended Version
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A 1984 Wall Street Journal article by Ann Crittendon described a Perry Pre-School Project in Ypsilanti, Michigan on black poverty students who were followed-up into their late teens. The program was very successful in reducing the societal costs tremendously for these students through that follow-up period. The program estimated that through their teens, the value of the benefits has amounted to seven times the initial investment costs. In other words, the students became more effectively functioning persons, less costly to society than comparison students who did not have this 12½ hours a week of pre-school training, costing about $4,000 per student. The estimated reduction in crime alone will save society about $3,100 for each person in the pre-school group. The main feature of this training was that students were asked daily to make their own plans as to what they would do each day for $2^1/_2$ hours and to carry out (implement) those plans. The summary was that these students learned to take the responsibility themselves for planning for and carrying out what they did in their own lives. This training experience led them to produce more effective lives and better futures for themselves that were less costly, in a negative sense, and more fruitful and productive in a positive sense, than their counterparts who had no such training.

The vital features of this teaching approach can be pointed out in the illustration in Figure 1 called the "Multiple Talent Totem Poles." Probably the greatest single gain will be to unearth these talents and get them actively functioning at some initial level on each totem pole. The first six talents (arranged in a somewhat different sequence) were the exact set used in all of the funded projects listed at the beginning of this chapter.

The Talents Unlimited (TU) Project, immediately after their three developmental years at their home base in Mobile, Alabama, took the opportunity and promptly passed the tough evaluation process to get on the USDE National Diffusion Network. This led to their getting funded to spread their TU Project across the nation. They have obtained multiple adopters in practically every state in the nation. The Talents Unlimited Project has invariably obtained a top ranking and often has been cited favorably and has been mentioned most frequently at the national meetings of the Diffusion Network Projects (Bobowski, 1978; Schlichter, 1985). On the Network, it probably has the most adoptions.

Note in Figure 1 that each student has his/her unique pattern of strengths and weaknesses across the talents. Ann definitely does not stay at the top, but Randy and Kathy each rise to the top as the most talented on two of the first six talents. Diane and Steve drop sharply downward on creativity. Also note that the bottom three on the first talent (Kathy, Todd and Linda) tend to rise as a sub-group and are never again so low, most often being around the average or slightly below, as a sub-group, on the other talents. The two lines tracing the faces of Diane and Todd show that they exchange places with each other six out of the possible eight times as to which one is higher across the set of nine totem poles—Diane is the higher five times and Todd four times.

On Figure 1, a person can draw a horizontal line across each of the talents to separate the top three, who are above average academically, from the bottom four, who are *not above average*. By looking at the other eight talents beyond the academic talent, one can see that the three top academically talented students, Ann, Diane and Steve, collectively, are above average, roughly, about 3/7ths of the time, and the bottom four academic students are above average roughly about 4/7ths of the time. This shows that the total set of totem poles approaches being an uncorrelated set. In other words, the positions of the seven students of the academic totem pole approach being randomly related, collectively, to their positions across all of the other totem poles. Practically no student ever stays at the top across a long set of different talent totem poles; no student stays in the middle; and no student stays at the bottom. Instead, everyone has both strengths and weaknesses all the way across the totem poles.

The greater the number of different brainpower talents that students learn to use, the more *equal* the students will become, talent-wise, on the average. The greater the number of talents, the more this method moves toward being an equal opportunity classroom approach. Finally, all students are potentially highly talented in at least one of the abundant variety of important human resources (Lessinger, 1970).

The authors (Davis & Rimm, 1985) of the book ***Education of the Gifted and Talented,*** present three "definitions of giftedness" in their first chapter. One is the USOE's definition of six types of giftedness, the second is Renzulli's model and the third is our Multiple Talent Model. It is noteworthy that during a recent sabbatical period, Carol Schlichter spent time with Renzulli in Connecticut. One outcome is that some of the multiple talents can be incorporated into the functioning of one main portion of Renzulli's model by any teachers so interested. G/T programs can thereby strengthen their approaches by using a combination of two of the above three models (definitions) of G/T programs.

Recent Expansion to Nine Talents in the Totem Poles

We have recently added three new talents to the initial standard set of six talents. The next talent in the sequence shown in Figure 1 is the new *Implementing Talent,* which so many of us know is crucial because we are deeply involved in implementing the multiple talent model. A new manual for the Implementing Talent may not be so sorely needed since the students could produce a plan and then the teacher could ask them to implement the plan or at least tell how they would implement the plan. However, if the plan seemed to be non-implementable, the teacher could challenge students to rework their plan until it could be implemented or to produce a new plan that would be implementable.

A couple of years ago, Beverly Lloyd (who first put students on the totem poles) and I decided to add another important totem pole of *Human Relations*. She was able to arrange her seven students on that totem pole from her knowing them in the classroom and in following them up, personally and otherwise, through high school for her dissertation. Project Impact in Iowa had already produced a teachers manual on Human Relations which is available for use with students.

Lastly, we have added the talent of *Discerning Opportunities* (or troubles, problems or challenges). This talent can identify and develop creative frontiering types of persons who could open small or large new fields full of opportunities where they and others could follow them and help make progress and improvements in the world. These Discerners will do the initial crude mapping of the new fields they open into which others can flow to help cultivate the new opportunities.

In the history of the world, people have migrated to what they hope are lands full of opportunities. Even now our nation is calling itself an *"Opportunities Society"* which again could be interpreted by many people to mean that they should try to move to this land. One of the features, however, of this Discerning Opportunities Talent is that the knowledge about it and how to search for and develop it could be exportable to other lands. Then if it is activated and functioning effectively, the people in many of those other lands could move toward making their situations into lands of opportunities. Then their people would not have to migrate to other places to be in a land of opportunities if the human talents of Discerning Opportunities are functioning effectively in their own lands.

All of these nine talents could be called *"high tech"* talents. However, the human relations talent could alternately and more appropriately be described as a crucial *"high touch"* talent to go with the "high tech" talent. Since years have been spent in developing the first six of these talents, they will be focused upon as a set (i.e., the initial subset) of six talents through most of the sections ahead in this report. The Human Relations talent was added about three years ago in 1982, so it will occasionally be mentioned more often than the other two, namely the Implementing Talent and the Discerning Opportunities Talent, both added in 1984 just before the writing of this chapter began.

A note of caution is needed concerning G/T programs featuring only the academically gifted. The problem is that nouns can be used as having one single, specific meaning, or as being collective nouns for a family of things. The trouble arises when students are labeled with a title such as *"The Gifted,"* whether this means only one specific kind or practically all kinds of giftedness. Students need to be taught or counseled, soundly, as to the narrowness or breadth of that label assigned to them.

The point here is how to avoid, in the long run, doing more harm than good to students selected by schools as *"The Gifted."* If excellent students interpret that they have been labeled as highly gifted in a wide range of activities, they could be set up for failure in the majority of career and lifetime activities. This is clearly seen in the academically gifted (talented) versus the other talent totem poles in Figure 1. Though such "gifted" students may later perform quite well in many of the other eight talents, they could still feel as having failed, in most cases, by not reaching way up to the top to "their expected high level" in these other important brainpower activities. Consequently, a total erroneous set of over-predications and over-expectations had unfortunately been put on them as potential lifelong burdens.

The second through sixth totem poles have been rearranged in a new sequence shown in Figure 1 so that this group of five thinking talents ends up with the planning talent and its product of a plan (or a design or a policy or a theory, etc.). This planning product then sets the stage for the last three newly-added talents to function. To demonstrate this purpose, Figure 2 has been prepared to show a subset of two of our first six talents plus our three new talents.

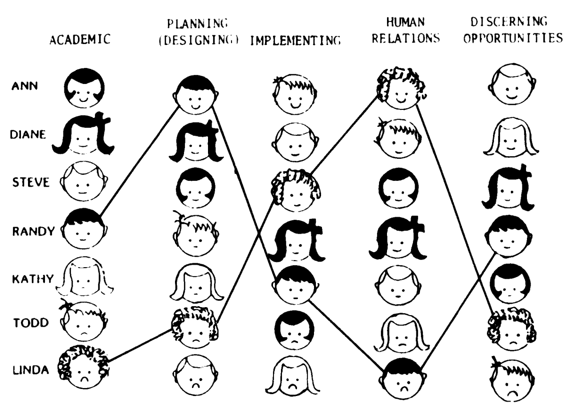


Figure 2. A Subset of Talents Which Emphasize the Different Nature of Each Talent in the World-of-Work.

In considering the first two talents in Figure 2, it would be quite an exception to the rule if a high grade-getter who excelled in imitating and reproducing and focusing upon the library of the past would be the best thinker and producer and creator of new plans for the future. Likewise, the best planner or policy maker would not necessarily be the best implementer of plans and policies. For example, in the design and construction industry, the designer—the architect—would not necessarily be the best contractor—and vice versa.

Nor in Figure 2 would any of those who are the best on the first three totem poles necessarily be the best in the highly important Human Relations talent nor the best in Discerning (or Creating) Opportunities for the future. The latter would be one who could open the way for others who are not so talented in his discerning type of talent, to fulfill the American Dream that this is a land of hope and opportunities for everyone. This talented discerner could help to export this dream and this hope for opportunities to all lands around the globe, where many other talented discerners could be more systematically discovered and activated to emerge with new opportunities to use their multiple talents for their own people.

Implementing and Evaluating the Multiple Talent Theory of Education

The Multiple Talent Development Approach was first presented as a set of upward parallel vectors on which a profile of scores can be drawn for each person. Dr. Darrel Allington is rightfully credited for transforming the chalkboard vector sketch into the form of multiple talent totem poles. Dr. Beverly Lloyd was the first to put all of her 28 students on six totem poles after getting each talent to function in every student in her classroom.

The comparative talents of the first seven students of Dr. Lloyd in her second grade class are shown in the totem poles in Figure 1. All of the first six talents in Figure 1 were functioning at one time or another in each of her students, with none of these talents remaining dormant, "six feet underground." Beverly Lloyd's dissertation (1984) was a follow-up through high school of her totem pole kids, all 28 of them taken 7 at a time, on four different sets of totem poles. She saw them daily as six-talented persons when she taught them in the second grade. She was also deliberately assigned to be their fifth grade teacher when they reached that level.

The evidence she obtained from factor analyzing their official high school records along with their earlier totem pole scores is that they generally had only one or two talents functioning in their official school work in high school. However, when their high school extra-curricular activities were factor-analyzed against their six talents in elementary school, it was found that they had functioned as "*more whole persons*" again, expanding into using six talents in the extra-curricular activities they chose. This could be described as *counter-curricular experience* or *counter-balancing experience* in selecting and being active in extra-curricular programs. This finding suggests that extra-curricular activities often involve a wider range of human development activities than do classroom activities. Also developing multiple talents is a way of inserting some of the validly predictive extra-curricular features into regular classroom activities.

The more talents that students have activated in schooling, the more chance that the students will find one or more talents in which they are above average or even highly talented. In Table 1 there is a gain as each new talent is added, but each gain decreases with the addition of another talent. Since some of the talents are slightly or lowly related instead of being completely unrelated (as is assumed in Table 1), there is some slippage without quite the rapid rate of climb shown in the table. For example, for two talents the percentage may be in the high 60s, below the 75% in Table 1. However, for half a dozen talents, the actual percentage is about 90%, as found in studies of the Talents Unlimited Project,[9] and continues to increase as additional talents are added.

Table 1
When more talents are taught, more students are found to be above average in at least one talent

Number of Unrelated Talents	Percent Above Average in at Least One Talent
9	99.8%
8	99.6%
7	99.2%
6	98.4%
5	96.9%
4	93.8%
3	87.5%
2	75.0%
1	50.0%

The greatest single gain is to have students change from being one-talent to two-talent students. Therefore, this occurs in students whenever a teacher who teaches for only one talent changes to teaching for two talents. For the sake of their students, teachers are therefore strongly urged to *become talent developers as well as knowledge dispensers*. Anyway, nowadays, computers and various audiovisual techniques and "instantaneous" photo-copying machines can help to do some or even a lot of the knowledge dispensing in school. Parents, supervisors and friends can also become talent developers.

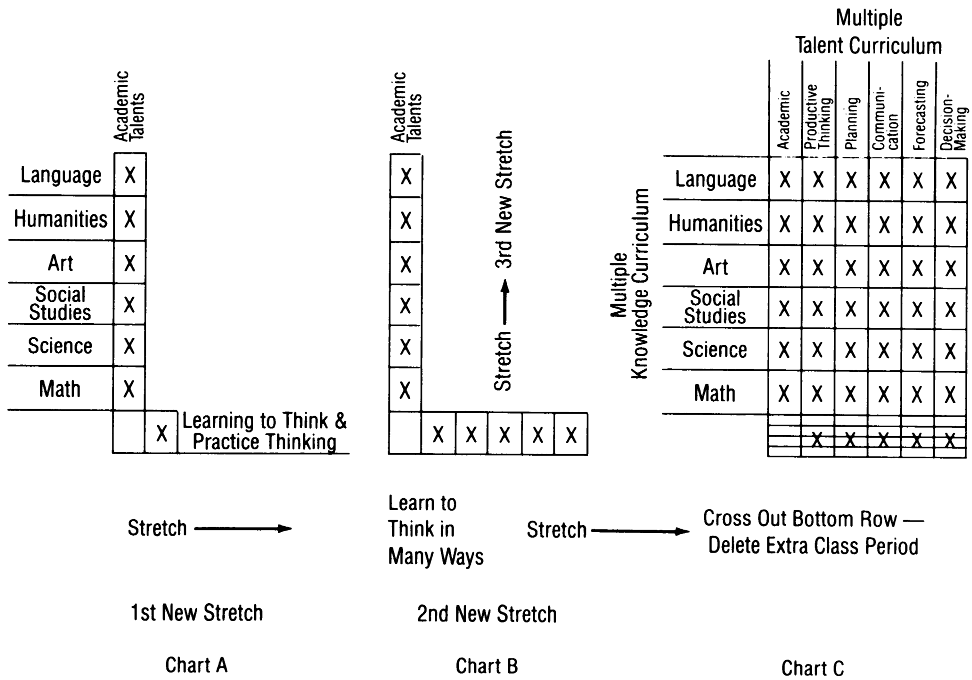
Training Teachers to Implement the Multiple Talent Teaching Approach

Initially each teacher trainer has started with a preferred first new talent. Mostly they have chosen Productive Thinking but a few have preferred starting with the Communicating or the Planning Talent. Generally, the Talents Unlimited Trainers have followed a standard sequence of Productive Thinking, Planning, Communicating, Forecasting and Decision Making. In orienting new teachers to our new talent type of curriculum, it has been repeatedly demonstrated that, on the average, teachers will rate each one of these five new thinking talents as being at least equally important to the academic talent. Consequently, this justifies the square shape and equal width of all the rows and all the columns as one reasonable way of presenting the final shape of Chart C in Table 2. For this chapter, a new presentation is made in terms of a series of expanding charts shown in Table 2.

The boxes, X's and arrows in Table 2 present a broad, total method for school programs to move from a six Knowledge-one Talent Curriculum (as seen in Chart A which is almost entirely focused on Knowledge) to a Simultaneous six-Knowledge-six Talent Double Curriculum, focused equally on both Knowledge and Talents (as seen in Chart C). The change process can be initiated by using a simple first step. Assume that the classroom program consisted initially of six classroom periods covering different subject matter. The challenge is to insert some additional training for students in what could broadly be called *"Thinking and Producing Talents."*

The first expansion in these charts illustrates a brilliantly-simple method used by Dr. Luis Alberto Machado (1981) for the five years when he was in the President's Cabinet

Table 2
Simultaneous Double-Curriculum: Students Develop Talents while Acquiring Knowledge—Use Talents to Acquire Knowledge or Use Knowledge to Ignite Talents



in Venezuela. He was the first in world history to have the title and challenge to develop the Total Intelligence (Total Brainpower) of students and other people in his country. In schools he added an extra period (which is illustrated here as being at the end of the school day) by shrinking the other six classes back time-wise to allow time to add the last new period. He could have had the topic be "Learn about Thinking" by having students continue to be Learners by using their Academic Talent to "Read about Thinking" and take notes on "Lectures about Thinking." Instead, he had teachers treat students as "Thinkers," not merely Learners, and had them "Learn to Think and Practice Thinking" the last period of the day.

Students are then being taught in the classroom to *Learn to Think*. They are learning to use their "Thinking and Producing Mind," the real powers of their mind. Daily thereafter, they will continue to *Learn to Think* and *Practice Thinking* in the last school period. (For this purpose, manuals aplenty are available from our sources and from other sources for teachers to use.)

The approach breaks away and creates a second column in Chart A in Table 2. To start this breakaway step, the first new *Stretch* occurs. When this classroom period of *Learning to Think* and *Practice Thinking* is added, as seen in Chart A, a new heading, labeled *Thinking Talents,* could have been added as a second column of talents to illustrate what happens in the seventh period. A teacher could be encouraged to use this Thinking Talents approach for only 5 or 10 minutes at the end of each day until they gain enough confidence to lengthen that last class period. A next step to be taken when teachers and students are ready is to introduce the concept of different kinds of thinking. The Thinking Talents could be analyzed and subdivided into five different kinds of thinking talents. The teacher could next have students use a different thinking talent each day of the week to bring about the second new *Stretch* to the right. Then a different thinking talent could be practiced each day of every school week in the last class period of the day, as shown in the horizontal stretching in the large "L" shaped form shown in Chart B.

Then when a teacher is ready, the third new *Stretch* would be upwards to use these different thinking talents in teaching each of the knowledge areas in the first six periods. This last big step upwards would result in Chart C. Then the extra last class period can be cancelled, as seen in Chart C, and the chart becomes a 6 × 6 equal-emphasis double curriculum.

Before the seventh "thinking" period was introduced, nearly all the classroom time would have been given to academic talents. Even in Chart A, about 1/7th of the time would be given to thinking talents and 6/7ths still given to the academic talent. That would still be true in the beginning stage of Chart B. However, after the third new stretch occurred upwards, more nearly equal time would be given to each of the six multiple talents, ultimately perhaps approaching 1/6th time, on the average, for each of these six talents.

The essential point about Chart C is that it focuses upon and shows what is happening to students at some time or another during their total schooling experiences in using multiple talent ways of acquiring multiple types of knowledge. Theoretically, it would be best for students (the clients) to have all the boxes in Chart C systematically filled in with X's throughout their schooling.

An Alternate Possibility: Going from Modified Chart A Directly to Chart C

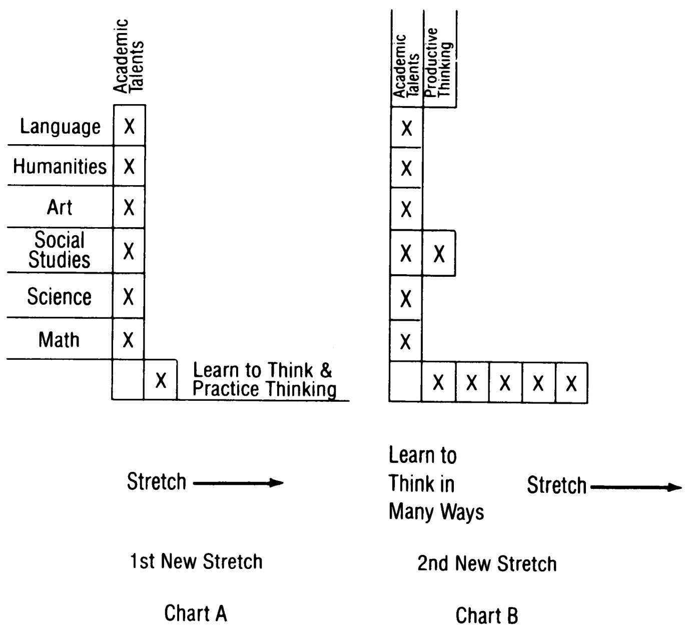
Some teachers and students, after working with Chart A for a while, may conceive of an alternate second type or route to follow without going into the Chart B way of having five different ways of thinking, a different one for each day of the week. Instead, they may be still holding the concept of thinking talents as a complex single type of talent and may realize that the broad thinking talents could stretch upwards as a full new column of thinking talents incorporated into each of the six types of knowledge curricula. Then the modified Chart A could consist of two columns both filled with X's for the broad academic (learning) talents and broad thinking talents. Also the extra class period for practicing thinking would be deleted by having the bottom row crossed out. Eventually some of these teachers could stretch directly to the right horizontally from the modified Chart A to produce the same ultimate Chart C completely filled with X's, with six knowledge rows and six talent columns. This final step, if taken, could occur very gradually and at the teacher's own rate.

How a Teacher Can Become a Two-Talent Teacher for One Knowledge Area

Since some teachers may initially hesitate about committing themselves to go the full route, it would be better to have them take a partial step to produce two-talent schooling for their students than to remain almost solely a one-talent-only schooling. Also, a partial three-talent would be better than a partial two-talent, and so on. The ideal is to have a systematic multiple-talent development across all the talents for all the students; but in the beginning some teachers will usually be reluctant. It is better for them to see that they could try a small new step rather than no steps at all.

In reality, a much simplified method of implementing these changes is to make the transitions easier and to put only partial and not full requirements hoped for in any teacher. As seen in Table 3, before moving away from the academic talent column, a teacher could be given a special first new manual to have students *learn about thinking*. This could be a short extra period still in the academic talent column as a smallest new beginning. Teachers would be teaching this *knowledge about thinking* in their usual way and would have students learn this knowledge by using their typical academic talents to do so. This class period would only advisedly be two minutes or perhaps five minutes long at the end of the day, each day of the week. (Plato said that the first new step is the most crucial step in the beginning of a new venture.)

Table 3
A Teacher's Minimum Adoption of the Simultaneous Double-Curriculum



Then when the teacher is ready, the first new talent-breakaway step is to change from *learning about thinking* to *learning to think*. A special second manual for the teacher would have a large number of short thinking activities for students to do for the last two to five minutes of the day (Chart A). This could continue until the teacher was ready for a special third new manual to help the teacher have the students learn five different ways to think—a different way each day for the still short last period of the day (Chart B). Then both the teacher and the students could be oriented and experienced, at least briefly, in learning how to think in these five new different ways. If the teacher desired, the time for the last class period could be lengthened to increase the amount of time for students to practice thinking.

The challenge then would be to simplify to a minimum the upward stretch in Chart B. The task, when the teacher is ready, is to select one subject matter area where one thinking talent, also of the teachers choice, is added. Then only that subject matter will be acquired in a two-talent way. When that has materialized, the teacher will have become a two-talent teacher for that one knowledge class. Chart B has been modified for the case where productive thinking was chosen for students to use as the second talent in the Social Studies. That teacher's students would then experience a simultaneous double-curriculum approach in Social Studies.

Talents Can Be Used Conventionally and/or Creatively

Recently I have described all of these new totem pole talents (including Implementing, Human Relations and Discerning) as a potential set of talents, each of which can function either conventionally or creatively. Furthermore, through divergent production of both non-creative and creative options, students can be trained to have their talents function in both ways, i.e., toward *conventional excellence* and toward *creative excellence*. For example, students can learn from their training and experiences what a conventional decision is—such as bankers usually make—and what a creative decision is—such as Mobile made in organizing and creating the Talents Unlimited Project and in selecting top-notch people to develop and implement it. Students can also practice how to produce both types of decisions. This would be true, too, for producing conventional plans and also creative plans and in sensing the differences between the two planning processes and between the two types of plans produced. Therefore, students can learn to use these talents, but they can learn to use them not only conventionally but also creatively.

In summary, all of the eight new talents can be used creatively and can therefore be described as creative talents. The more that each and every one of these new talents is functioning creatively in combination, the more the total process will become a higher creative process (Taylor, 1962).

Nationwide Views and Evaluations of Multiple Talent Teaching

President Lyndon B. Johnson created a White House Talent Task Force with the intention of moving toward the goal of "Talent Development: An Investment in the Nation's Future" (Ward, 1968). Multiple talents were thereby seen as great inborn human resources to be sought out and developed. William Vassar and I were main consultants to that project, so we organized a panel on that topic held at the 1984 annual convention of the National Association for Gifted Children. James Gallagher joined as a panelist. The three of us plan to present our experiences and reactions in a forthcoming article. Unfortunately, due to Johnson's illness in the last part of his presidency and thereafter, the final report of the finding and recommendations of the task force were classified "Presidential Confidential" and never became available for national distribution and implementation.

In practically all schools that I contacted on that project, the classwork was focused almost entirely on knowledge. The School for the Arts in Interlochen, Michigan did, however, advertise themselves as the best school for developing talents in the world.

My most memorable experience with the White House Talent Task Force was my visit to the Air Force Academy. Their three broad and separate areas of curriculum were academic, leadership and physical education. The academic curriculum was probably, by far, the narrowest of the three broad areas in the span of talents functioning in their "academic" classrooms. Leadership, including military leadership, was much wider, talent-wise, and physical education was divided into very active sports for a person's earlier years as well as lifelong sports. They were able to suit up everyone and had the equipment and facilities to do so in about 30 sports. The span of physical and thinking talents would be very wide in functioning effectively in such a large number and variety of sports.

At the annual American Legion convention held in Salt Lake City in 1984, Ensign Holderied received an award for being the first woman in the history of the Naval Academy to graduate at the top of the class. She said that there were just too many complex things being considered for the midshipmen to know exactly where they stood in their class until the final overall ratings were published. Multiple variables were used in determining their overall criterion measures of success. These included military performance variables, physical fitness and physical activities, professional, leadership and attribute performances as well as the academic grade point averages. Because she became the second in command of the 4,300 midshipmen during her last semester, her school grades went down; but she still, overall, ended up #1 in her graduating class of 1,400.

These multiple talent military programs occurred primarily outside of their academic classrooms; but the total multiple talent performances of students in these military academies were definitely included in their overall ratings. These multi-talent activities were not merely being recorded as extra-curricula participation, but as the functioning of great human resources that were being developed. It is often said that human resources are the greatest potential resource of any society. These high-level talents are certainly among the most important human resources.

Searching For and Developing Multiple Creative Talents: A Best Investment in our Nation's Future.

The findings reported below were preceded by and founded upon (1) considerable basic research on creativity and multiple high-level brainpower talents and (2) the Utah-developed Theory of Education, described above, which was supported financially by the U.S. Office of Education. One spinoff during that project was the front-running 1962 *NEA Journal* article titled "Bridging the Gap between Basic Research and Educational Practice" (Taylor et al., 1962).

These remarkably positive results—summarized below across several hundred comparisons—suggest that the above title of this section be seriously considered as a slogan for action. It would produce a widespread improvement in education and ultimately in the identification, development and utilization of the nation's vital human resources.

The following extracts are from *The Congressional Record* (Taylor, 1980, pp. S12407-11) on the topic of "Multiple Talent Teaching Results":

All the results on ten projects plus several replications scattered across the nation have almost uniformly been in favor of Multiple Talent Teaching over traditional academic-only-type of teaching. Practically all results were leaning positively with the large majority of these results being statistically significant differences.

The probability would be essentially infinitesimal (about .000 . . .) that these strings of differences, practically all in one direction and across ten or more projects, could ever occur by chance. It is suspected that no new educational approach has ever attained such powerfully significant results on measured student performance across such a wide range of relevant classroom activities.

In correspondence, Dr. Carol Schlichter (University of Alabama) commented that *"the fit of Multiple Talents in almost any area of educational programming is phenomenal."* Rachel Morton (of North Carolina) has similarly written us that *"the deeper I get into the multiple talent approach, the more it seems that it fits just about anywhere when people are looking for meaningful innovation in education."*

In all the results in the full report in the Congressional Record, the less effective educational experiments or programs were the existing traditional programs, i.e., the comparison classrooms in all the multiple talent studies described above. Consequently, when the slogan of *Excellence in Education* came out and started to be widely quoted and adopted, it was comparatively easy for us to discern that there could be many kinds and concepts of excellence in education. Some of these are not really as excellent as others, as shown in the findings cited above. In summary, the established systems proved to be the worst experiments and experiences for students in each and every comparison study in the *Congressional Record* report on Multiple Talent Teaching results.

The multiple talent approach was used and studied in an undergraduate class of mine for 12 successive quarters, averaging 25 students per class. It was remarkable that this teaching approach produced a great amount of active participation from college students. One striking finding was that students participated openly so much in the total group and in different subgroupings that peer nominations could be used. Each student was asked to nominate among the other students, the two who were best in the Academic Talent, the two best in Productive Thinking, and so on through the initial six talents. They were also asked to name the two whom they would choose as their teammates if they were to initiate a new business venture downtown which they would want to be successful. In other words, they nominated the two best out of 25 (the top 8% as they knew the students) in each of six talents and as a seventh set of two teammates. For the 300 students in those 12 classes, guess how many (what percent) were nominated by one or more fellow students in at least one of these seven functioning categories? The answer was 99% since only three students out of the 300 received no nominations whatsoever. It is highly doubtful that anyone else has ever collected data, especially in higher education, showing such positive results for practically all students.

Sam Proctor (1978) has said that a mind is a terrible thing to waste. Since a high percentage of students' minds are not being developed and utilized in typical school work, it is also true that a large part of anyone's mind is a terrible thing to waste. Individuals can also waste their own talents by not trying to activate them or by wasting them after they have had them functioning at a high level of excellence. An eminent performer in one of the arts became involved in drugs for a short period of time. Afterwards she said she had finally realized clearly that it was possible for her to destroy herself. Then she added that talents are terrible things to waste and that a person can get to the point of choosing whether or not to destroy one's own talents by throwing away one's life.

"Our search for talents should have higher priority than our search for natural resources, because the discovery and development of the latter are fully dependent upon the former." This is a statement by Dr. Walter Talbot, longtime State Superintendent of Utah. Likewise, our search for talents should have higher priority than our search for knowledge because the acquisition of existing knowledge and the production of new knowledge are fully dependent upon the former. It can be said, however, that knowledge accumulated by humankind is a potentially highly valuable tool for humans to use. Though knowledge is not initially or directly an inborn human resource, it can definitely become an important *acquired* human resource.

New Concepts for Identifying and Developing G/T Students

The IQ is No Longer Central to Total Brainpower and to the Best Education Possible.

The "group-tested IQ" type of intelligence is not central to the total power of the brain of a person, according to accumulated research findings in new educational practices. The same is true for the Academic Talent in our Totem Poles. In fact, the Academic Talent is probably less than 1/10th of the total brainpower talents. In our latest set of nine totem poles, it is only one of nine approximately equally important talents in the talent-focused classroom studies to date. Furthermore, it is not central to who will acquire school knowledge the best when students are treated as thinkers, not merely learners: that is, when students acquire knowledge by thinking ways of processing the knowledge (Goleman, 1984).

However, the narrow group-IQ measure is a bit more central if students are *treated as learners,* not thinkers, and thereby largely use non-thinking ways of processing and learning the school knowledge. In our now extended nine talent totem poles, the Academic Talent essentially covers non-thinking styles of learning, while all of the other eight talents are primarily thinking and producing and even creating types of talents. Academic talent is primarily receiving, reproducing, imitating or regurgitating the knowledge. Such knowledge is minimally processed—largely received, stored and later retrieved and returned. The knowledge is *not* modified or contaminated by more active brain processing *nor* by mixing and associating it with any of the acquired and readily available knowledge already within a student's storehouse.

From our point of view, there is no longer any major issue or debate about IQ intelligence tests (especially in the group testing of the separate answer sheet type). We are strongly interested in research on total brainpower and its rapid implementation and in being up-to-date in both such research and its implementation. The IQ scores retain only their comparatively equal importance against the many other high level talents. These other talents, collectively, are way beyond the comparatively small portion in the total brainpower which IQ scores measure. Teachers, on the average, give Academic Talent scores approximately only equal weight to each of the other five talents on our initial set of six Totem Pole Talents. Therefore, Academic Talents are seen as deserving only 1/6th of the total importance assigned to all those six talents on the initial set of totem poles. To us, it is clear that the important research focus, interest and any debate should now largely move beyond the IQ, not about the IQ. In general, knowledge can be acquired by non-IQ ways as well as by IQ ways—and, most often, better by non-IQ ways.

Our sustained research indicates that creativity includes a vast portion of the total power of the brain. The IQ is definitely not a substitute for creativity nor does it overlap creativity enough to be of very great concern in the creativity research movement. Consequently, creativity is largely way beyond the IQ. From Toynbee's lifetime perspectives as an eminent historian, he defines creative talents as the history-making talents in any field of human endeavor. A main issue concerning the value of creativity is that those nations who do the best in identifying and cultivating creative talents will become more effective and potent in the years ahead and will emerge as the leaders in the future. Those nations who hold onto and are highly steeped in traditional intelligence testing and believe that it is almost all-important are the ones which will be failing in comparative effectiveness and importance as the world moves ahead in the future.

In the letter to the editor of the *Manchester Guardian* in March 1983, Cliff Bore, the head of research at one of the British Aerospace design sites, wrote that the academic controversies about the inheritance of "intelligence" serve to hide important myths.

One is the notion that intelligence is the same as academic talent—the ability to manipulate abstract concepts—and that this talent may be measured (at least roughly) by some form of IQ tests. Another myth is the notion that this particular form of talent is either all-important, or it embraces all the other forms of talent necessary for guiding the affairs of man.

The extraordinary thorough and detailed work of the Department of Psychology at Utah University, under Professor Calvin W. Taylor cast a lot of light on such questions. He showed—and this is crucial—that such innate talents as creativity, leadership, communication talent and academic talent are very largely distinct from each other and very poorly correlated. That is, individuals may have one talent in high degree (say leadership) and others in low degree (say creativity). Indeed, once that has been stated, everyone can see all around many examples of people with very mixed degrees of talent. In particular, possession of academic talent in high degree is no sign that any other talent will be possessed in high degree.

Another of his conclusions concerned the aim of education: to discover which talents each person has innately, and to develop them by appropriate training. This, in my view, says it all.—Yours, Cliff Bore, Cobham, Surrey, England.

The Concept of Only One Learning Rate Per Student is Obsolete

In education, one of the most widely held notions is that every student has one and only one rate of learning knowledge, one "learning curve;" and at a given time is at one and only one level of that knowledge since he only has one knowledge learning curve. As long as the complexity of talents is not recognized, students will often be seen through the now grossly oversimplified picture of only one talent, as displayed in the first Academic Totem Pole in Figure 1. They will then be lined up from highest to lowest on only one totem pole and solely on the basis of that one talent. In this way they may almost be pegged by teachers and others as being at the *"one-and-only rate"* where they belong (and individualized instruction will be designed especially for them to function at their one-and-only rate).

In sharp contrast, we contend that as students switch talents by using a different talent way of processing knowledge, each one starts at his same level, but with a new rate in the knowledge learning curve for that talent. The concept of multiple talents implies that each student has as many different learning curves as the number of talents functioning. When a set of students switch from one talent to another, there is a randomly different sequence of their learning curves from highest to lowest compared to the sequence of their curves found if only one talent, the Academic Talent, is considered. Every student would therefore have nine different learning curves, one for each of the nine different talent ways of learning knowledge. Consequently, if students are lined up from highest to lowest on the Academic Talent, when they switch to a productive thinking talent, they will be arranged in a different sequence. Their set of learning curves for all students included would be a radically different set of curves and in a different sequence than they were when they were using their academic talent to acquire knowledge.

Does Each Person Have a Unique Developmental Curve for Each Talent?

There is a very important question that remains to be determined experimentally. It is expected that each person would have a somewhat unique developmental growth curve for each different talent, partly because of the different potential in each talent. For example, a person who has the fastest and highest growth rate curve in the productive thinking talent may have the lowest and slowest growth rate curve in the decision making talent. It is therefore expected that for the nine talents there would be nine different *talent growth rate curves* for each person.

During the developmental years of Project Reach, Juntune (1978) followed up students for three years of multiple talent training. She reported that *"across the three year period, 48 of the 53 performances by the talent-trained students showed significant improvement. In these students, a combination of growth both from the project's effects and from maturation effects occurred in 12 of the 15 comparisons and positive cumulative project efforts occurred in all 15 comparisons."*

If it is still possible, it would be interesting to process the data collected on Project Reach to yield *"growth-and-maturation"* curves. These curves could be individual ones for each student on each different talent that was measured as well as average curves for the entire sample on each student across the three year period.

Lloyd's dissertation (1984) followed up a full class of multiple talent trained-and-measured students from the second grade through high school. Unfortunately, it was not possible to remeasure them in high school through the same classroom activity scores. If that had been possible, growth-and-motivation between the two *"points"* of second grade and high school could have been plotted. However, she only obtained the regularly reported and recorded data in their high school files after they had graduated. Nonetheless, by factor analysis and other data processing methods, the results clearly showed that they had been formally treated in their official high school schooling only as one-talented students (or maybe students with only one-and-a-half types of talents functioning) who no longer were students with six talents functioning in schools. So their other talents in her seven talent set had been dormant ("put on hold") during their official schooling in high school. Questions about whether maturation would show changes during dormancy and whether losses rather than gains in growth would be found during dormancy remain unanswered. What little evidence emerged is that any chances for the other multiple talents to function and be practiced occurred only outside of the official academic schooling, as did occur in extra-curricular activities or as might have also occurred in non-school activities such as outside work, summer activities, etc.

Furthermore, there is the challenging question whether there is *no relationship* for an individual between the growth rate curve for a given talent and the curve for the rate of learning knowledge by use of that same talent. If so, for every student there would then be two sets of 9 curves each, one set for the growth curve for each talent and a second set for the knowledge learning curves when using different talents to acquire the knowledge.

In summary, the widely accepted notion no longer holds that there is only one talent for learning and only one learning curve for each person. Already we are way beyond that in theory and also in practice. However, we have not yet fully caught up in determining if the knowledge learning-and-retention curves and the talent growth curves are related or quite unrelated and whether there are common features within and between the shapes of these two different types of curves, especially on the talent growth curve. About the only precedents to the latter are the group-average studies of the IQ growth-and-level-and-decline curves and some initial sketches of separate growth curves by the Thurstones on certain of their initial Primary Mental Abilities (talents).

Spin-off Needed All the Way Upwards as Well as at the Same School Level

Most G/T programs have been started and exist at the elementary school levels. Explanations can be readily produced why elementary schools are the first to sense problems and the first to need to cope somehow with these problems. In recent years, across our nation the greatest number and variety of new attempts to improve education have been occurring in G/T programs. Therefore, some or even many of these programs have learned new ways to give their students a better education that could spin-off to benefit other students in classrooms at their same level. Ultimately, upward spin-offs should occur to all higher levels in education for the greatest benefits to all students and to their nation.

This spin-off concept is continually being used by our Space Agency to maintain and increase its national support, financially and otherwise. The remarkable positive spin-offs back to Earth of the communication satellites is an undeniably marvelous contributor from outer space back to the people on our planet. In the same way, G/T programs can maintain and potentially increase the total support from our citizens first, by providing improved education for their targeted students; and second, as a by-product, to have a positive impact by having some of their improvements be spread to other students at the same and higher levels.

One best example is to have challenging content and creative activities functioning successfully to stimulate increased curiosity, questioning and exploratory frontiering thinking *in all students* at the same level. However, what have students and what has our nation gained if curiosity, open questioning, exploratory thinking, inspiration, risk taking and creativity decrease in students as they move upwards in the total educational system? It doesn't make sense to have these potential vital assets decreasing through secondary schools, higher education and even through the highest levels of graduate and professional schools.

From evidence available to date, such talents and attributes can be elicited and can improve the functioning of students through appropriate and systematic training attempts. Furthermore, evidence shows that they can continue to improve when such training is sustained upwards through elementary schools. However, through much of secondary and higher education, odds are that such emphasis in education will currently be diminished and curtailed or such talents and attributes will be controlled to be non-functioning or even to be openly stifled and negatively rewarded. This continues even up to and through the beginnings of graduate schooling.

Talent-trained fifth graders easily outperformed students in my undergraduate class when the two were combined and intermixed in one classroom. This phenomenon was repeated and captured a second year on videotape. This recurred even after I had worked hard for several weeks to have my college students practice using their high-level thinking and producing talents. And the *Nation at Risk* report has probably had as much or more of a negative than a positive effect on the attempts to develop these above-named talent and attribute assets.

Upward spin-off of the development of creative excellence in elementary students is needed in colleges and universities. Some examples of this existence of only a low or even nonexisting priority on creativity in higher education can readily be cited. Explicit counter examples are not as easily found. A former U.S. Commissioner of Education, Ernest Boyer, is now the President of the Carnegie Foundation for the Advancement of Teaching. His organization sponsored a one-day conference on Creativity for 40 selected presidents of universities. The brief report of the proceedings was published in the *Higher Education and National Affairs*. Dr. Boyer (1980) reported that the nation's colleges and universities are not as creative as they could be and are tired institutions, living on the intellectual legacy of the past.

He further said that many able college presidents say they are frequently consumed and preoccupied with the processes and the politics of management of education. When the time and prospects for imagining are diminished, their institution is diminished, too. Presidents in such predicaments say that they no longer are leaders or decision makers who can move from ideas to constructive action—instead they are cogs in a big machine. Typically, people in such situations stop thinking on their own as fully as they could. The time for imagining is lost and a sense of powerlessness sets in. New ideas are snuffed out and universities become lifeless, uncreative institutions—just another regulated industry. In summary, however, Boyer did not excuse the universities from some of the blame in confining creative thought.

One of his staff told me later that this meeting had been not much more than a one day awareness session (perhaps a first-ever awareness session) for many of the presidents that the identification and development of creativity could be of some importance and concern for their university.

At present, a report is being produced by that same foundation to stir a national debate on the need for reforms in higher education. One major point for all students in higher educational institutions is to provide them with opportunities to develop and increase their creativity, innovation and risk-taking attributes. Higher educational institutions have shown little interest to test their students for multiple creative talents, even though such testing is both very feasible and economical, especially for the potential highly valued human resources (including leadership) that could be discovered. Some secondary and especially elementary schools have shown much more interest—and usually most often in G/T programs.

The time lag in receiving and implementing what has emerged successfully from basic research and development can be almost unbelievable long. In two states, the presidents of the smallest institutions in their state-supported university system missed opportunities readily available to them to be the first university in the world to give top emphasis to creative talents. Yet both institutions were designated officially by their state government to be their experimental university. One even received starter funds from a very wealthy person to start a second creative college parallel to, but very independent from, that main academic institution. However, that college failed to provide, for both the idea and the money, very much fertile soil in which to get things really started.

One remarkable exception occurred at the graduate school level. The Graduate Record Examination (GRE) Board consisting of a select group of Graduate School Deans read our *Science* article (Taylor & Ellison, 1967) and had us meet with them in New York City and at "Cal Tech." At the second meeting, they officially decided that they should add a Creativity Score to their GRE exam. Before the second meeting ended, however, the ETS representative who was present argued that since his organization was already under contract to produce the GRE exam, the GRE Board's decision should be for them to produce a creativity test and its score. This decision was made even though our sound research-based creativity test was already available.

Since then, nearly a decade and a half has gone by without any creativity test score being added on applicants to graduate schools. Our nation has thereby missed the opportunity of having the more creative prospects be selected into research and other graduate training. This outcome has occurred even though Toynbee (1964) has warned our nation that it may be neglecting its creative talents. This is a serious challenge since he also clearly let us know that creative talents, as the history-making talents, are therefore a matter of life and death for any society. Where evidence has been collected in the past, in most fields the majority of students who have completed a graduate research degree have never managed—or managed never—to undertake and produce any research again.

The national organization of graduate deans was one of the last educational organizations to ask for and schedule an official session on creativity at their annual national convention. I was the "*outsider*" invited to give a main speech on creativity research findings and their relevance to the selection and education of graduate students. Some of these deans showed a real interest, and one in particular "*caught the vision*" the most and sensed a great opportunity for him and his institution—it even became a "*burning issue*" almost immediately for him.

He returned to his campus and got things started quite promptly with some faculty members in education and in some other areas. He soon visited our valley and talked with and observed several multiple talent teachers in action. His university president still shows an interest in this approach and in what his graduate dean started. The Academic Vice-President, however, had a "*high sensitivity talent to budding ventures*" which would call for important functional changes, so he soon got the president's right ear. That only left the other ear for the capable and motivated graduate dean. By the start of the next school year, the position of the Graduate Dean was officially eliminated, with that Graduate Dean being assigned to a minor function and position. By the end of the second year, the former Graduate Dean had been successfully "*designed out*" of that "*experimental higher education institution*" and had to find a new job outside of education. How would you feel if you had that influence and effect on the life of a Graduate Dean who caught your message most fully—and immediately believed in implementing it?

We should seriously consider what has occurred to students who have stayed "*all the way up*" in our educational system. By adding multiple talent development to the existing knowledge curriculum, G/T programs can produce spin-offs to other classroom programs and thereby improve educational outcomes, a double gain at all levels of education. Then, overall, students have more nearly equal opportunities in schooling and will become more equal on the average, across multiple talents, than they are in the academic talent or in any other single talent by itself.

In my class, Mark Kouris observed that in this class "*we not only learn what schooling has done* for us, *but also what it has done* to us." McLeish (1976) has written a book concerning creativity in adults and in later years. More recently, he prepared an excellent, as yet unpublished, paper for the 1981 Montreal World G/T conference. His paper's provocative title, which reflects much of these issues about what is happening to creative talents all the way upwards through education, is "Creativity in Adults: Its Discovery and Recovery."

To summarize at this time, it appears that G/T programs are the ones where the greatest number of new things are being attempted in education. This spin-off is more likely to be possible for G/T programs which are focused primarily on creativity and multiple talents than those focused primarily on knowledge. It makes good sense that we should have the students developing their talents all the way up the educational ladder—not discontinuing doing so after they have been developing their multiple creative talents through some or all of their elementary school years. The system should ensure that they do continue to develop and practice using their talent resources systematically through secondary schools and college and through graduate and/or professional schools, for the students who manage and choose to go that far.

Summary of Three Recent Utah Articles

Searching for Student Talent Resources Relevant to All USDE Types of Giftedness. We have averaged over one biographical study per year for 25 years, involving continual construction, validation, revision and refinement in a series of successful biographical inventories collectively involving hundreds of multiple choice biographical items. This approach has been described as yielding dynamic biographical inventories. This sustained measurement work, well ahead of its day, is focused upon searching for indicators of high level talents. These newly constructed *"fresh start"* measures have been used as change agents, or improvement agents, in leading toward better identification and cultivation of high level talents. *The Form U Biographical Inventory* was designed specifically and produced in 1976 for elementary and secondary schools. The Form U Inventory yields four scores: Academic Performance, Creativity, Leadership and Artistic Potential. This Inventory and its scores are based upon sustained research across numerous studies focused mainly on adults. The biographical items from these earlier inventions have been retooled for use at earlier school ages.

Costs for the reusable Form U test booklets and the separate special answer sheets, as well as for the scoring, are very economical, especially for large samples of students. This Form U Biographical Inventory is a thoroughly developed and validated race-fair, culturally unbiased multiple talent test (Taylor & Ellison, 1967, 1983).

Attributes of Excellence in Various Professions: Their Relevance to the Selection of Gifted/Talented Persons (Taylor, Albo, Holland & Brandt, 1985). This invited article emerged from a panel by these authors at the 1983 annual convention of the National Association for Gifted Children. Its main finding is that grades and the academic-type tests will predict grades but they have been found through research studies to be poor predictors or no predictors at all of who will be the best in professions. The troublesome answer generally is that professional schools do not select the persons who will become the best professionals in their fields, nor who will best keep up-to-date with new knowledge and techniques in their careers. The main exception to this general finding occurs in the field of professional athletics and in the entertainment and artistic fields.

The example given comes from the Dallas Cowboys scouting data and outcome of potential football recruits in their professional careers. Their correlations are about .70 with career success, whereas predictors from professional schools range from zero to about +.20 or slightly higher—such predictors from professional schools still miss over 90% or even 95% of the target, i.e., what is involved in succeeding in each of the professions. Consequently, neither those chosen into most professions nor their future clients will be well served by such poor predictive and educational procedures.

Developing Creative Excellence in Students: The Neglected History-Making Ingredient Which Would Keep Our Nation From Being at Risk (Taylor, 1984). This article especially quotes Toynbee's 1964 article on creativity and Toynbee's speech at the 1967 Utah Summer Creativity Workshop as well as Dr. Machado's program in Venezuela and his human rights idea for the total world. Productive Thinking responses are analyzed according to two different qualities. Likewise, a significant scientific contribution has to be produced and the significance of the contribution depends on whether there are about three parts of creative quality for one part of the conventional *"sanitary"* quality. Two kinds of excellence are identified and shown to be quite different. Conventional Excellence tends to perpetuate and perfect the past, whereas Creative Excellence tends to produce a new future. If the slogan *Excellence in Education* means only conventional excellence, then conventional excellence can swamp the whole society to a point where creative excellence does not emerge. In comparison to other parts of the world, that society will be slipping in making further progress. Therefore, the best wisdom in a society is to foster both Conventional Excellence and Creative Excellence in a most effective combination as the way to produce a better world of their making in the future.

Toward Developing the Whole Person Through a Systematic Educational Approach

Through being involved in multiple talent approaches to teaching, one's awareness of the complexity of the human being increases. This is especially true with the multiplicity of high-level talents found through research. This is a reflection, in a still oversimplified manner, of the extreme complexity of both the structure and the functioning of the brain. An earlier article, entitled "How Many Types of Giftedness Can Your Program Tolerate?" (Taylor, 1978a), challenged gifted/talented programs about their selection and educational features. It raised the question of dealing with a program's tolerance of complexity—of dealing with a multiplicity of human resource assets.

As the former California State Superintendent said, our multiple talent program is one deliberate approach *to teach more of the whole person*—a slogan to which education has frequently given lip service, but not much more. Furthermore, as seen in recent work on the totem poles, the number of talents in our particular set can be and has been expanded.

A collection of relevant studies indicates that school grades have preciously little, if any predictive power in forecasting adult achievement, accomplishments and performances in career and life activities. Also curricular grades and extra-curricular activities of students tend to be uncorrelated. Surprisingly, however, extra-curricular activities have noticeable predictive power in forecasting who will be most effective in adult and career accomplishments and achievements. Therefore, more of the extra-curricular activities should be worked into the official curriculum or overall transcript, one way or another, if better predictive powers and better students are to come out of education as the main products.

Productive thinking both activates and involves more of the whole person than do other more typical classroom programs. That finding is even more true for creative thinking. In fact, creative thinking will generally become more of a higher creative process if it includes accompanying and supportive non-intellectual creative characteristics and attributes. Consequently, one could have a first training program on developing creative thinking, a second program on developing creative characteristics, plus a third program to have both of these working simultaneously and in harmony.

Creativity is a many splendored thing. Therefore, effective prediction of creativity requires a many splendored equation of multiple creative talents and multiple accompanying characteristics, supporting each one of the separate multiple creative talents. Likewise, the equation for education or for developing talents should be a many splendored equation including multiple creative talents and accompanying multiple creative characteristics that need to be cultivated in such a creative program.

The more of these *"intellectual talents"* that a person learns to use, especially in combinations, the higher will the level of the total intellectual processes be. Furthermore, some non-intellectual (non-brainpower) resources in students will emerge to support the intellectual brain processes and thus the activation and development of more and more of the *whole* person.

For example, in my series of articles called "Clues to Creative Teaching," one article was titled "Developing Creative Thinking" and the next article was "Developing Creative Characteristics." The process of getting creative thinking activated and functioning tends also to activate some of the creative characteristics as a by-product. The more fully the creative thinking functions and the more fully the creative characteristics are activated, either directly or as by-products, the more the total processes will tend to be highly creative and more of the whole person will be involved at that time.

In our biographical inventory approaches to measuring creativity on one hand and leadership on the other, we usually find we have almost as many non-intellectual person-resource items as intellectual brainpower-resource items. Teamed together, they prove to be valid measures. We therefore believe that whenever we are trying to activate any of the specific particular talents in the totem pole through classroom participation, the more we will have non-intellectual accompanying resources also emerging and being developed. For example, recent experiences in one school district are that when multiple talents are being developed, affective assets in students are also emerging and functioning and being developed as a positive side effect.

In talent development classrooms, a great deal of activity occurs between the students as well as inside practically all students. In fact, they are not nearly as *"bottled up"* as usual, but become more spontaneous and are functioning naturally instead of controlled unnaturally by tight disciplinary classroom rules and climates. Such talent-focused classrooms are not classrooms without laughter, nor are they classrooms so serious that everything is felt to be controlled assigned chores and imposed motivation. Instead, liveliness, joyfulness, laughter and serious playfulness occur, both in the ideas and the knowledge being exchanged and processed and in their total behaviors.

Expanding the regular knowledge curriculum to include the multiple talent curriculum moves in the direction of accomplishing all of the above points. In a way, it adds student strengths found usually only in extra-curricular activities and in experiential learning found outside of classrooms. In other words, extra-curricular and experiential and talent learning are woven into the regular knowledge curriculum ultimately at no extra time and no extra cost.

Another way to say this is that the type of career-like and life-like activities which involve experiential learning and talent development can be woven into the regular schooling curriculum. In that way, during their educational years, students will more fully be called upon to practice doing and learning to do what they eventually are going to be called upon to do in career and lifetime activities, especially of high-level types. Then more transfer of training later and more relevant preparation for life will occur through the development of more of the total person while in school.

In moving from simplicity toward greater complexity, it is always important that the approach be sound as far as the underlying research and the theoretical foundations. The approach should also show evidence that its hoped-for outcome can be feasibly attained.

The new teaching approaches should be accompanied by appropriate measures as an initial step toward improvements (as can be featured in Outcome-Based Education Programs). More of the whole person will be measured and ultimately the education curriculum will be expanded to cover the outcomes expected in developing more of the whole person. For example, we did that in our Peace Corps Project, mentioned elsewhere, and especially in our studies of medical students and physicians. We found that the set of intellectual and non-intellectual characteristics required in medical students hardly overlaps the set of intellectual and non-intellectual characteristics needed for practicing physicians to function in a high-level excellent manner. As a consequence, we have used two circles to represent the two outcome targets that are much more separate than overlapping. Then we have pointed out that both the selection and educational systems should be expanded and broadened toward the ultimate set of characteristics needed to function in superior physicians in practice.

At this time, the medical profession is probably in the greatest state of flux as far as deciding what selection and education programs are needed in order to produce those persons who eventually will become the best practitioners in their profession. That profession, however, probably does not yet realize that personnel researchers have found selection potentially to be a more powerful process than education in producing the ultimate kind of professional performances required. The epitome of good selection along with valid training is found in professional athletics. They have currently reached the highest scientific *"state of the art"* in the selection and training of persons for their profession—as some other entertainment and artistic fields have also done (Taylor, Albo, Holland & Brandt, 1985).

Grade-getting through non-thinking ways of learning is like having a tape recorder receive and later retrieve and regurgitate the knowledge recorded earlier. It's like a person having an empty capsule in one's mind to catch the knowledge being dispensed and to encapsulate it and hold it separately, in isolation from one's lifetime store of knowledge. Later it can then be retrieved in its purest uncontaminated form and then on the day of the test, dumped out on the test or otherwise emptied out. The capsule is thereby readied to retain and repeat the process of capturing the next batch of knowledge in order to pass the next classroom test. A conforming high grade getter can learn to function by minimizing any thinking, risk taking and errors. Such persons, by not stretching their minds, either brainpower-wise or knowledge-wise, can increase their chances of obtaining academic rewards and thereby keep climbing successfully all the way up the ladder into graduate or professional schools. Yet, the Parable of the Talents tells about the worker who buried his talent and preserved it just as it was given to him so he could return it to his master exactly in its original condition. However, since he kept his talent dormant, instead of having it actively bear fruit, he was called the slothful servant by his master and his talent was taken away as his punishment for not giving his talent a chance to be put to work and become fruitful (Matthew 25:15–29).

Transfer of Training and Educational Accountability: The Long-Range View

"Education is what a person has left to offer after he has forgotten what he learned in school," according to some astute observers. In light of the above, a person probably can have much more to offer to himself and to others from having effectively functioning talents than from any lasting and working knowledge still retained from his schooling. Because great forgetting can occur when knowledge is not internalized, the retained knowledge learned *earlier* in college may be far less later than the knowledge possessed *at the time* of each test. Students can learn to receive-and-return-and-forget knowledge.

At this time, it is our contention and prediction that there is less retention and less later use of knowledge acquired in school than of our new set of talents activated and developed in school. We also predict that there is less transferability later, both within and beyond schooling, from knowledge-focused than from talent-focused education. It should be noted, however, that talent-focused education capitalizes on both talents and knowledge—and certainly more so than does knowledge-focused education. Talent-focused education also moves more toward developing the whole person. This occurs not only in innate brainpower talents plus acquired knowledge resources, but also in other personal (non-intellectual) resources which emerge as accompanying by-products during talent classroom activities.

For national planning purposes, the National Research Center for Vocational Education and the US Office of Education requested that a lengthy think piece report on transferability be written by me in 1978. The main emphasis was on the great complexity of human beings. This led to the second featured point that *only a small amount of transfer of training*—definitely not a large amount—will generally occur at a later time and place from something learned earlier in school. This later spread effect, this transfer of training, just doesn't occur very much nor very often, and it is the exceptional case when it does occur to a very noticeable degree. This is contrary to thinking and to the assumptions underlying practices in education. Currently the beliefs and actions too strongly imply a simplistic concept of the human mind as largely being measured by the misnamed *"general intelligence"* (IQ) tests. In reality, the so-called "general intelligence" covers only a very small part of the total mind and total potential brainpower. Furthermore, knowledge does not readily and automatically spread and transfer into changes in behavior, an unrealistic expectation of the typical potency of transferability phenomena. Therefore, if greater transfer and spread effects are desired, different ways of teaching leading to different types of student participation in schooling are required.

In spite of the above warnings and as an exception to the non-transferable expectations, our talent teaching approach is getting remarkable spread effects or by-products in other areas of growth in students. It therefore appears that some basic or central core in students is being developed through talent-focused teaching which brings about widespread transferable effects. For example, in Project Implode the talent-focused school children beat those in the control schools all 58 times out of 58 comparisons and 42 of these were statistically significant differences. So then, good by-products were found, such as beating individualized schools in their own ballpark, even though that was not what was being focused upon. The Implode students did very well in knowledge acquisition. Without calling it motivation training, students became very involved and were improving in self insight as by-products. Some students also went back and tried to function better in the academic-talent way as a result of gaining confidence and successes in other talent areas.

A further report in 1978 by Gilbert Stevenson, the Implode Project Director and Principal at the Bella Vista School, is very revealing:

One quite notable thing is that we did rise to the number one school in Jordan School District as far as academic skills (standardized achievement test scores) were concerned, even though we were definitely not a top socio-economic school. These scores were measured with Iowa Test of Basic Skills Norm-referenced tests. It is interesting that Bella Vista has maintained that position as being very high in academics in our school district ever since. This occurred even though academic performance definitely was not the main area of our new efforts. We were, of course, aware of the academic areas of reading, writing, arithmetic and the other areas that non-referenced tests evaluate, but our main thrust was productive thinking and the multiple talents. In addition, we had some very positive types of results using some of Torrance's evaluation devices and others that Ellison and Taylor put together.

Thus we could describe our teaching approach more broadly as *Asset-focused Education* or as *Attribute-focused Education,* recognizing that our main focus has been primarily on talents, but with spread effects we have also activated a wider range of attributes and assets in students. For example, the Talents Unlimited Project worked on a special challenge in their own Mobile School District. They focused on a group of Educable Mentally Retarded (EMR) students and found that the students could function and be reached better through multiple-talent rather than through single-talent education. In fact, these students managed to work at higher levels than was possible for such students, according to the authoritative statements of the accepted text books and the expert professors. To them, it was impossible for these students to work beyond such limits, according to the firmly accepted answers on student limits in their texts and in their profession. Yet the Mobile project broke that firmly-established barrier through multiple talent teaching.

A Master's talent study has proved to be very successful with so-called mentally retarded as well as with emotionally disturbed students. When Clayton Nielsen (1972) used multiple talent teaching in Granite District on a group of mentally retarded students and on another group of emotionally disturbed students, he found that both groups flourished much more—even in terms of the knowledge yardstick of standardized achievement tests—than they had under more traditional approaches. They did better when six different ways of teaching were used per day rather than when only one type of talent was used by students six times each day. He also showed that the students classified as mentally retarded are less retarded in each of the other five talents than when they are kept functioning in school in their worst talent in which they were found to be retarded.

Talent-focused education can be used in nearly all educational programs. As the fountainhead of multiple talent teaching, we are as aware as anyone of its possible uses and of the positive results that can emerge on different educational problems and populations. For example, our first application was in a Title I program with excellent results, and it is being used widely and successfully in programs for Gifted and Talented. It also works with college students. Ultimately, its best application is in programs for all students in regular classrooms. Our evidence to date is that it would have ideal features for use with adults in their later and retiring years, as suggested by McLeish (1981) in his fiery Montreal World G/T Conference speech on "Creative Powers in Adulthood: Their

Discovery and Recovery," and in his earlier book (1976) titled ***The Ulyssean Adult: Creativity in the Middle and Later Years.***

Juntune (1978) reported a remarkable 87% of significant differences, mostly at the .001 level, in 186 comparisons during the three year developmental period of Project Reach. At the project's beginning the experimental and control schools were fairly similar. However, after three years across grades 3 to 6 on 19 creativity and multiple talent tests, 67 out of the 70 comparisons were clearly in favor of the talent-focused experimental school. From her studies of full classrooms, her summary was that "*talent-focused teaching yields new phenomena consisting of expanded growth experiences and other improvements over the phenomena in typical classrooms. It thereby provides a superior education for students.*"

Those students who have more fully developed many of their numerous talents will enhance their chance to advance in their careers and in their life activities. From all of the above evidence, it is predicted with confidence that talent-trained students will be more employable, transferable, promotable, useful and valuable as a result of having their multiple talents activated and functioning effectively.

Designing for Better Lifelong Learning and Lifelong Functioning

Considerable sound groundwork must take place in the educational procedures to ensure that an effective transfer of training will occur. If students practice and practice doing exactly what they will later be asked to do, then transfer of training can strongly occur. Later they will continue to do what they had already been doing over and over again so efficiently. A later performance could become just a continuation of the earlier functioning, using the same processes to do it in the same way.

At that one extreme, they could approach having a full carry-over of their earlier training. If nearly everything carries over and functions practically the same, then there is no major issue and no problem of transferability. That is radically different from the other extreme of having nothing carry over—the extreme case of zero transferability. In such a zero case, there is a full question and a complete challenge of transferability. If the entire issue is unresolved or completely ignored, then there is no transferability and therefore no predictability. From this logic, transferability may be one of the most crucial issues in education. Yet, both in discussion circles and in research, it is often a largely ignored issue and can, therefore, be the most unjustified assumption in all of education.

Next, let us differentiate between transfer of knowledge and transfer of functioning (of high level talents, for example). If a person acquires (learns) knowledge, the question is whether at a later time and place the knowledge will be retrievable and available to be used in the later situation and activity. Likewise, if a person learns how to function, the question is whether at a later time and place that ability to function will be retrievable enough to be useful in the later situation and activity.

During our studies of scientists in research centers, we were quickly informed that the highest degree in science is the "*On-the-job Ph.D.*" We were told that it takes three or four years to attain this degree after the academic doctorate. This occurs partly because some bad effects of our educational system have to be worn off and also because additional high-level characteristics, largely ignored in the usual education program, but needed on the job, must be developed. We sometimes shorten this by saying that for academic doctorates to become highly successful on the job, they must both "Shed and Add." They must shed some of the lasting but deterring effects resulting from their schooling and add some productive and creative attributes and ways of functioning that have been stifled or kept dormant through schooling.

As indicated above, there are two very lowly related doctoral types. One is the academic doctorate obtained through all the required selection and the knowledge learning and testing in the current type of schooling. The other type involves those who rise to the top in their career-world accomplishments, regardless of any earned scholarly degrees. The second one is called the on-the-job Doctorate. Many people who rise to the top in their fields and earn the on-the-job Doctorate do **not** have academic doctoral degrees. Even in professional fields, certainly less than the majority rise to top level performances in their professions as practitioners to become among the best persons functioning at superior levels in that field.

The further question has to do with lifelong transfer of knowledge on the one hand, and lifelong transfer of functioning on the other. Or if these are looked at together, the joint question deals with the simultaneous lifelong transfer of both knowledge and functioning. Our notion at present is that transfer of knowledge will occur to a higher degree if the knowledge is acquired by using thinking styles rather than non-thinking (un-thinking) styles of learning that knowledge. If better thinking ways of acquiring knowledge are used, better later transferability of the knowledge will occur. We further believe that both short- and long-range types of transferability can occur.

Awareness is emerging in professional fields as to whether the current ways of acquiring knowledge through large classroom lecture sessions and being tested for knowledge will produce very much later transfer of knowledge after either a short span or a long span of time. As far as accountability is concerned, this suggests that the style of lifelong thinking type of knowledge-learning will be superior to lifelong non-thinking type of knowledge learning. Unfortunately, the latter is what often occurs in lecturing classroom situations.

Likewise, transferability of the knowledge-acquiring methods used by students in a lecturing, teacher-focused classroom is a crucial issue. When the student is told by the teacher what to do, how to do it, and when to do it, the expectation for that method of learning knowledge is that it will not transfer and function at all effectively later in the radically different situation when the professional person is in practice. The total situation plus the professional and financial status of the person and the motivation have all changed to such a degree that there is not much in common as a basis for transference either of knowledge or of study methods. A crucial point is that the motivation has changed primarily from external motivation imposed on the students by the instructor to inner motivation that must be largely self-initiated and acquired on-the-job by the professional persons. If later office situations and motivations and functioning of professional workers differ from the earlier school situations, then the predictability will almost vanish about who will be most effective in keeping up-to-date with knowledge and, therefore, will become the most knowledgeable and be functioning the best as a professional practitioner.

In such instances, the entire educational procedures leading to such poor predictability and poor transferability are certainly of highly questionable validity. In fact, this is one of the first points in which reform is occurring in premedical and medical education. The methods students use in acquiring knowledge in schooling should be nearly the same as the best methods they can use later in keeping up-to-date with knowledge when they are on their own in their professional careers. The methods which will ultimately prove to be best in schooling will be those which continue to work for them with little or few changes when they switch from functioning in a professional school to practicing in the profession. In other words, this congruence will produce an extremely high degree of transferability of both knowledge and effective talent functioning of study methods from educational settings into professional practice situations.

Traditional curricular activities are often teacher-centered and are typically focused primarily on two things: (1) on how the teacher functions and (2) on what subject matter the teacher imparts. In sharp contrast and with more concern about transferability issues, our classroom methods deliberately place the emphasis and focus on the students rather than on the teacher. We ask what subject matter is being acquired by the students and what talent processes within the students are functioning to acquire the subject matter. In other words, the question is how effectively each student's inner talent processes function to acquire knowledge and how well the knowledge is acquired so it will be retrievable and available in a working form to be used later.

This focus is on what is happening in students both knowledge-wise and talent-wise. The teacher and all of the equipment and the total surrounding environment *are the means to the end for producing what should ideally be happening in the students.* The total setting surrounding the students should be adjusted and readjusted until the desired talent-and-knowledge results do occur in the students. To illustrate this point, if teachers are to be effective in developing the creative mindpower in students, the teachers have to become creative mindpower producers in others, not just creative persons themselves.

To avoid misunderstandings, let us realize that the Multiple Talent Approach is not an open plan, permissive, unstructured classroom. Instead, it is a *multi-structured classroom* with each structure eliciting a different talent to be functioning in students. It is true that each structure could fall some place within the range of being highly structured or much less structured, but still it would be sufficiently structured and properly structured to elicit and "mine" for a specific talent. Alternately, this multi-talent or multi-structured classroom has been called a multiple situation classroom or a multiple-structure-setting classroom. The teacher is a multi-structure setter, a multi-situation setter, a multiple-opportunity setter or a multi-stage setter for the students.

Another more realistic and exciting description is that the teacher sets the stage appropriately so the students learn to become aware of opportunities. In other words, it is a *multiple opportunity classroom* in which students learn to sense and take full advantage of each opportunity by responding effectively through unharnessing and using the appropriate set of their talents.

A World-Class Case of a Student's Inner Motivation to Develop and Use His Full Brainpower

During the 1983–84 school year, a student took a couple of classes from me during his last two (Autumn and Winter) quarters at the University. At the end of his last quarter, he vigorously raised a clenched fist and loudly declared *"Revenge!"* So I asked him to explain what he meant. His story was so interesting that he then wrote it up for me, together with another brief story about the midterm and term papers he produced in another class that quarter. With his permission, I am including them below. Then our new University President invited all the highest GPA students who would finish during that school year to compete for being the first person chosen to be the valedictory speaker at our June commencement that we have had for several years. To do so, students had to write a paper and then give it as a speech.

He wrote the paper for the deadline and then gave his speech two days afterwards. He later told me he figured that other competitors would read or lean on notes in giving their speeches. So he decided to leave his paper completely aside and to speak extemporaneously. He won both the written paper and the speaking contests, so his valedictory speech is also presented below.

He calls my classes and his insights of himself from our multiple totem pole talents "*his mentor.*" He rose to the top of our graduating class of thousands by his strong inner motivation to draw upon and develop all his inborn thinking talents and resources in order to beat the system which was not well designed to fit him. He has also learned to function much better for career and other life-like activities than most graduating college students.

He has wondered what would have happened if he had settled down and fulfilled the school system's second grade prediction of his future potentials versus where he is now in his total acquired knowledge and in his functioning capabilities. He has compared these two paths, especially throughout his future full career, in potential life accomplishments and in potential total earned income. Applying his experiences to others, his conclusion is that by systematically activating and developing multiple talent potentials in large numbers of students throughout their full schooling, any educational system could produce positive differences in many and even in nearly all students so trained. His "Revenge" paper, his story of two term papers and his valedictory speech are printed below in sequence.

Revenge — by Craig Embley

As a young boy I had an experience that I believe has been responsible for my academic success ever since.

As a second grader, it was determined that I had a learning disability and was taken out of the regular school and placed in a class for "special" children. Teachers and administrators are, in my opinion, not sensitive to the blow that being considered a "retard" by your friends can do to a young person. One may respond to opposition in many ways: one can give up, or rebel, or just plain decide he is what he has been labeled—I chose another course—Revenge! I decided that the only way to get even with them for what they had done to me was to beat them at their own game.

One may use other talents than those being taught to achieve an "A," so I learned to use them well. I have just graduated Magna Cum Laude from the University of Utah with a B.S. degree. It took me two and a half years to complete the degree. I will be going to Law School next fall at one of the top schools in the country. Some would say that those who made decisions for me in my early years were right in taking me out of the mainstream school system and that it was they who taught me to succeed. But I would disagree, for in the light of my seemingly excellent academic record, it should be noted that in my last quarter at the "U" I attended one class, once a week, did four one-page papers, and yet pulled down straight "A's" in 15 hours of upper division graded coursework. I have learned to manipulate the system to my advantage. I never did feel comfortable in class in all my years of school, for I felt forced and stifled when I tried to learn things in their way. What I did get from my early years of school was an intense desire to "show" them. That anger drove me to work harder than anyone else in an effort to escape my label. I also began to understand that there is more than one way to do something right. It didn't need to be the teacher's way, it could be my way.

I think I have beaten them at their own game, and I did it while playing by their rules.

Success is the sweetest revenge!

(Editorial Comment: If he were in a school system totally designed for the creatively talented, he would excel in that situation, too—and do it more naturally and more joyfully.)

To Learn or Not to Learn — by Craig Embley

I have wondered at times what the real purpose of attending a University was. I have often hoped it was to learn, but some of the experiences I have had here cause me to wonder. Last quarter, I had a class in which the Final Exam consisted of two take-home papers.

The first paper did very little to excite me. I had very little interest or information on the topic. However, I had taken copious notes during class on the subject so I gave them back to him almost word-for-word. There was no learning involved, no thinking, no interest, only parroting. For this effort I received an "A."

The second paper was on a topic that excited me. I enjoyed thinking about the subject and I developed some of my own theories. I read two extra books, gathering ideas to back up my own ideas. The paper was well written, but it did not contain only those ideas that the teacher had presented. For this extra effort I received a "C."

I ask in all sincerity—should not those two grades have been reversed? If learning is our goal, the goal was achieved with the *second* paper—not the *first* one.

(Editorial Comment: Conversely, if grade getting is our goal, the goal was achieved with the first paper, not the second one. This is like the Yale student's term paper graded "C" which was a plan for starting what turned out to be Federal Express.)

Becoming — by Craig Embley

My friends,

For the past years we have been engaged in the process of becoming. Upon introduction to a new acquaintance on this campus, most commonly asked questions have always been, "What are you studying?" and "What are you going to be?" Now, upon this graduation day, we feel a mix of triumph and fear. Triumph because in response to those questions, we have dreamed greatly and we have become those dreams. Fear, because of the end of one crusade is but the beginning of another and we know not what our futures hold. While hoping for high achievement, we fear the unknown of a new beginning. Once again we must go about the task of becoming. To ease these fears associated with all new endeavors, we may look back upon our experience here at the University. Shadows of the future can be seen in the examination of the past. The University experience is in many ways a microcosm of our lives. Here, as in life, we progress in stages of maturity both intellectually and emotionally. There are times of pain and growth as we fall short of our expectations, as well as the euphoric highs of great achievement. Here, as in life, we come to know the frustrations that are rooted in a lack of understanding and gain a thirst to overcome. The same types of obstacles that we met here at this University, we will meet again. With the skills and tools we forged as we battled here, we will succeed anew, in our occupations, in our families, and in our communities.

As we begin again, we would do well to catalog that which we have acquired in our experience here. That which comes to mind first is knowledge. Not a command of facts alone, but an understanding that transposes information into enlightenment. The ability that education fosters, to be treasured above all other gifts, is not found in what is learned, but rather, in the ability to learn. Discovery need not end with the cessation of formal education. Mastery of the ability to learn enables the acquisition of wisdom to continue, never ending.

As with the skills of the mind, the practical skills developed in competition for academic excellence are not lost in the transition to the world of work. Finesse in the management of people, ingenuity in the use of time, and endowment of grace under fire, these techniques have been ingrained on our souls by the time-honored test of trial and error. We were allowed to win, though there was displayed a certain willingness to let us fail. We learned to do both with honor and poise. To these traits we added the capacity to dig, to work, to sweat, and to meet a deadline. We developed a touch of genius in dissecting a problem and then putting it back together in a way that works. We came to know what it means to pour love into a difficult project. These talents, fine honed by the pressures of final's week and term papers, we take with us as essential parts of our characters.

We may, with heads held erect, take pride in that which we have accomplished. What we have, we have earned. On this campus we were given the opportunity to excel, to crusade for just causes, to learn, to be empathetic, to fight injustice, to fall in love, to do—or not to do; all as we saw fit. To the degree that we have taken advantage of these opportunities, we have risen to that urge that is within us all, to touch upon greatness. All that we have done is now a part of us. What we are is the sum total of all our efforts and thoughts.

We have now completed our preparation and finished our course. We have reached that crisis point for which we have prepared so long and so well. As we now stand upon the brink of a fresh start, I wish you luck. May you be successful and, thinking back to the answers you gave when asked what you were going to be, may you find as much happiness in *being* as you did in *becoming*.

In a rare moment of candor, President Carter (Swift, 1977) discussed "What are the Advantages of Youth?" with a group of high school scholars honored by the White

House. He said that there are literally hundreds of thousands of young people in our country who might be intellectually superior to those scholars and whose aspirations might be higher than their own. But because of the deprived economic and/or limited backgrounds of the others, they haven't had a chance to nourish and to develop those innate talents that they possess; and a feeling of superiority on the part of the scholars because they had been honored would be a very serious mistake.

In one of his last repeated 1984 election TV broadcasts, President Reagen stated that in our nation, which he called the Opportunity Society with Opportunities Unlimited, people can go as high as their talents will take them.

Redesigning for Improved Human Effectiveness, Naturalness, Joyfulness and Wellness

Reforms are difficult to bring about in any organization, according to George Washington, because one must do so through those who have been most successful in it, no matter how faulty the organization is. Why would they be highly motivated to change the organization which had rewarded them so well—more than anyone else had been rewarded? Abigail Van Buren expressed this even more directly. She said that reform is almost never initiated from the top, because no one who has been dealt a hand with four aces ever asks for a re-deal.

If a mother told all her children, *"go to school and learn how to use your mind,"* one or more of her children might soon come back and say that in some classrooms, it wasn't a very welcome thing to do. Actually, students may not be rewarded for such an attempt. Perhaps it would make the situation worse and more tense than if the students would stop trying to learn to use their minds. Instead, they might realize that it is better just to humor their teachers and do exactly what their teachers want them to do.

The evidence is growing that thinking ways of learning knowledge and working with knowledge will produce not only more knowledgeable, but also more effectively functioning, multi-talented, efficient people. However, this approach has not yet become known generally, nor accepted, nor widely practiced through formal schooling at any level in education. Major reform is possible and is sorely needed in this area.

A few years ago, the editor of my university's alumni magazine invited me to write a companion article on creativity to one by Toynbee. At that time I argued for the importance of creativity in science and in all other fields as a great way to strengthen and perfect our way of life. The main point at the end of that report is that the struggle for men's minds—in fact, the future—may be won by the countries which learn best how to identify, develop and encourage the creative talent potentials in their people.

The international challenge may well be whether other nations, through their intellectual dedication to science and education, may rise to greater heights than ours to fulfill their conceived mission, while our nation in comparison, levels off; or whether our nation will learn to use its creative talent potentials more fully in all fields and thereby surge anew to greater heights than those of more *"hungry"* and perhaps currently more motivated nations (Taylor, 1962).

When any society catches the vision that its future can be created by having the history-making creative powers of its people functioning effectively, the statement of Godard, our nation's missile pioneer, can then apply. He said that the dreams of yesterday can become the hopes of today and the new realities of tomorrow. That society can soon become ahead of the world as a result of being the first to catch the visions and cultivate them into the new improved realities of tomorrow.

The word *natural* seems appropriate to use and even overuse in thinking of educational reform. If things are ill-designed for students, the result may be unnaturalness. If natural (inborn) human resources are activated in natural ways, and start to grow and develop and function more fully and naturally in students, this outcome should result in increasing wellness in students. Contrarily, when schooling's procedures and processes prove to be unnatural for students, the outcome may lead toward unwellness, i.e., to frustration and toward illness on a wellness-illness chart and to uncomfortable feelings from such unnatural functioning. The main finding in a survey of Japanese students in Hokkaido was that the students reported that schooling was unnatural for them. Wherever this outcome occurs, we believe that it should be changed—and should be avoided by others.

A writer once said that true wisdom is never scowling and severe. The fact that there are classrooms without laughter is no laughing matter. Wherever the world-in-school is joyless and school is like being assigned to several years of hard labor, where laughter is rarely observed or fostered, and where the atmosphere of most classrooms is emotionally flat, all is definitely not well. At such times, an observer viewing the students in such classrooms would get the impression that *the program doesn't believe in life after birth.* If this is the case, we had better become concerned about redesigning the situation and programs in new directions. Instead, the class (at least part of the time) should be redesigned to have a combination of serious playfulness of the mind and toying with ideas, fostering serious fun and delightful responsibilities and experiences.

Another way to illustrate the multiplicity of talents besides the multiple totem poles is to consider that each student, individually, is like a large flowerpot, with a lot of different kinds of seeds scattered throughout the soil (suggested by Steve Plewe, my graduate student). If a subset—or the total set of seeds—sprout and develop in one pot, certain flowers will be readily noticeable as the featured attractions in a given pot and other flowers will be a little smaller, less developed and less noticeable. In a second pot, a different set of flowers will be predominant, with others being smaller and less noticeable to different degrees, including one or two barely breaking through the surface of the soil—with other seeds still unearthed—dormant and hidden away.

Botanists in their greenhouse labs try to provide the best total climate for the growth of plants. The plants cultivated in such ideal atmospheres can grow so fully and beautifully that they might be described as almost completely happy in their total situation. Ideally, classrooms and organizations should provide comparable greenhouse-like atmospheres for students and workers, so that they will also grow and function fully and naturally and project radiant waves of wellness.

In summary, the long-range challenge is to determine what effects we want people to receive from their environments. Do we want them to have troubled minds and hearts from the ill-designed, or peace of heart and mind from the well-designed?

From all these results comes the recommendation that the natural talent resources in every person should be activated and growing and developing and functioning as naturally and fully as possible. Broadening the band of talents functioning in schools can increase human capabilities, thereby strengthening the total health of students of all ages. Education would then become a major part of the wellness-enhancing and health-strengthening system of the world.

If portions of education do keep the students' minds in bondage instead of freeing them to think and produce and create, then education has the responsibility to overcome what has been done. That would require deprogramming such students' minds and reprogramming them to become more healthy, normal and naturally functioning creative persons. Otherwise, education would deserve Jefferson's wrath in that he swore eternal hostility against every form of tyranny that binds the minds of men.

Students have expressed some exciting insights when they have had experiences in using their multiple talents. One example is a young child from Shirley Warner's talent class in Putnam City, Oklahoma, who wrote, *"I liked your class a lot because it gave me fluency and it made my brain feel refreshing."* (Some other child might say that this class makes me feel like my brain is working well—and I am learning to use my mind in school, as my parents have told me to do.)

Sara Waldrop also reported that when a child in Mobile was asked what it meant to him to be in the talent program, he responded, without hesitation, *"Talents burn a candle in my mind."* Thus, talents can light candles in youthful minds and can thereby beam a talent-type of light throughout the world. They can change this current Pre-Dawn Era for Talents into a new era of a glowing Sunrise for Talents.

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Footnotes

Footnote #1. Relevant dissertations in Utah are by Hutchinson (1963), Ellison (1964), Clark (1967), Winters (1973), Secrist (1974), Reynolds (1978), Wheeler (1978), Seghini (1979), Fox (1981), Lloyd (1984), and Stevens (1984). Masters projects and other graduate student studies are by Stevenson (1959), Ellison (1960), Stevenson (1971), Stevenson (1978), Lloyd (1972), Nielson (1972) and Deis (1979).

Footnote #2. My world-of-work experiences have been plentiful, especially in doing research underlying measurement of job performance, selection, and training research, plus information and analysis of jobs and occupations. A first example was in doing research underlying the United States Employment Service including prediction research, data analysis, and development of selection batteries for various occupations; development of General Aptitude Test Battery (GATB) norms for most major professional schools; job analysis, job evaluation, and job family techniques and studies; teamwork with those developing and updating the Dictionary of Occupational Titles; and offering courses in Occupational Information.

Further experiences were in developing appropriate trade tests for over 50 military occupational specialties, written, oral, picture, performance, situational, and biographical types of tests were developed. Training manuals on how to build each type of these tests were written and produced. As Director of Measurement Research for Navy-wide personnel research efforts during a year's leave of absence with staff assistance, I developed a COMPASS (computer assisted) program to maximize the simultaneous total placement of 1,500 Navy recruits. These recruits filled the total quota in 60 entry Navy training schools and jobs with 83% being placed where they had above average potentials. Also for the DOD Research and Engineering Program in the Pentagon, I produced a coupling (bridging the gap) report between Basic Research, Technology, and Implementation into military programs and establishments. To accomplish this report, I visited the U.S. Department of Agriculture to learn how their total Extension System functions at successive levels. These are from basic research programs at Land Grant Colleges (Universities) through technical specialists of various types to the County Agents who demonstrate and educate farmers to keep them rapidly and continually up-to-date with relevant basic research that can improve their farming practices.

Footnote #3. Dr. T, as Thurstone was informally called among graduate students, finished a degree in mechanical engineering and worked as a research assistant for Thomas Edison before seeing the light and completing his graduate work in psychology. We were never able to get him to talk about Edison, but it was clear that those two great minds were once together in the same organization. Edison was very fluent and fertile in ideas, innovations in experiments and inventions, while Thurstone had a penetrating mind which opened mathematic approaches, psychophysics, and psychmetrics. He initiated the Psychometric Society and its journal ***Psychometrika,*** wrote a first measurement book on "Reliability and Validity of Tests" and emphasized the difference between earlier predictor measures and later outcome criterion performances. He also said from his background that the worst practice of the century was that if a student is sufficiently stupid in school, that student would be counseled, among other things, into becoming a mechanic. He knew from his background that important mechanical talents are much more in the head than in the hands — and none of us want our airplane or auto mechanic to be "stupid in the head" in mechanical talents.

Footnote #4. A complication, communication-wise, of Dr. Machado's program and title "The Development of Human Intelligence" in Venezuela is that his meaning of the word "intelligence" is extremely broad. It covers the total brainpower or the total intelligence, not just the very limited and largely non-creative portion of the brainpower measured by IQ scores from group intelligence tests.

Footnote #5. Probably the most work by Thurstone's students in carrying forward and implementing this type of program initiated by Thurstone and his wife, Thelma, has been done by the Utah team.

Footnote #6. We recorded and transcribed verbatim every speech and all of the discussions during the presentations and from final subgroup reports. I proof-listened to check everything recorded in each full conference and edited the chapter drafts sent to all participants from which they produced their final polished chapters. Consequently, I became extremely well-versed and knowledgeable, having heard and read, several times, every report at each conference.

Footnote #7. This can be illustrated by recent thoughts about Arnold Palmer of golfing and television fame. In the sports world, he showed remarkably great physical talent in golf. In brainpower talents, he has been a thinking golfer, especially when he has had to scramble. In the world of work, he has also done extremely well in thinking and producing golf equipment, in designing golf courses, and in rising to the top in many other business, marketing, and advertising performances on TV. To me, in a third type of human resources, his greatest area of functioning is his highly influential, charismatic personality. He created and sustained "Arnie's Army" of empathizing fans and boosted and produced an unparalleled interest in pro golf, plus a recent second boost in helping to establish the senior golf tour.

Palmer and his architect teammate had "*double vision*" in designing for both golfers and spectators. The natural amphitheater-mountainsides provide probably the best super-spectating course found in golf or even in all other sports. Furthermore, on 3/4ths of the holes, minor man-made terracing will change the hillsides into stadium-amphitheaters. The greatest spectator participation, both mentally and physically in wide variety, can occur there for huge crowds.

In the full report of our theory, we covered all three broad human resource areas in which Arnold Palmer excelled. However, in implementing our theory into practice, we focused initially on a set of the highest level brainpower talents and have still largely postponed focusing on other personal and physical resources.

Footnote #8. This is contrary to a typical focus in an input-output model and to an extreme behaviorist approach. In this case, the ultimate focus or essence of what is important in what is happening inside the "*box*" between the input and the output. That is, what is happening inside the student mainly in the central nervous system — which is the center of the problem, a vital center of the potential human resources.

Footnote #9. The Talents Unlimited research report states that "One of Taylor's hypotheses that 90 percent of the students in a school are above average in at least one talent was tested and the results are presented in Table 4 (titled "Percentage of Students Ranking Above Average in at Least 1 of the 5 Talents by Grade Level Across 4 Project Schools"). The findings show that, although Taylor's hypothesized criterion of 90 percent was not achieved, a percentage of approximately 85 percent at each grade level is remarkably close (Congressional Record—Senate, September 11, 1980, p. S12410).

For grades 1–6, the rounded-off percentages were 85, 87, 87, 86, 84, and 85. (*Editorial Note:* If 6 talents had been used by including the academic talent along with the 5 new talents, then the results across 6 talents would have definitely been in the high 80's, even nearer to the 90% predicted by Taylor.)

Footnote #10. The main exception to the above is for the Academic Talent. Generally speaking, it almost always functions best, primarily as a conventional talent—in returning only what students have learned from the teacher and the assignments. If students want to break away from the conventional functioning of the Academic Talent, they do so (at their own risk) by using some of these other "Non-Academic Totem Pole Talents"—by using them either creatively or conventionally or both.

Discussion Questions

1. Discuss the basic ideas and research behind the teaching-for-talents concept.

2. How is the multiple talent approach implemented?

3. What are the goals involved in the double-curriculum theory for developing human resources?

4. What were the talents on the original set of six totem poles? What additional talents are in the extended version of Taylor's Talent Totem Poles?

5. What are some potential problems that students face who are labeled as "gifted?"

6. How is the multiple talent theory of education evaluated? What research results are found from this evaluation?

7. What do the findings suggest about extra-curricular activities as predictors of future performances and accomplishments?

8. Discuss how teachers are trained to implement the multiple talent teaching approach.

9. How can talents be used conventionally and/or creatively?

10. What are some of the new concepts for identifying and developing G/T students?

11. Discuss traditional classroom methods versus talent classroom methods in regard to their focus.

12. How can we redesign classroom programs to improve human effectiveness, naturalness, joyfulness and wellness?

Carol Schlichter

XII

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Summary

Talents Unlimited: Applying the Multiple Talent Approach in Mainstream and Gifted Programs

Talents Unlimited is a teaching/learning model for thinking skills instruction—it represents a classroom level, research-based implementation of the multiple talent approach to teaching (Taylor, 1967). The model features four major components: (1) a description of specific skill components in the multiple talent clusters of productive thinking, decision making, planning, forecasting and communication; (2) model instructional materials which demonstrate the function of the multiple talent thinking skills in enhancing academic learning; (3) an inservice training program to assist teachers in the recognition and nurturing of students' multiple thinking abilities; and (4) an evaluation system for the assessment of student development in the thinking skill components.

Original research on the Talents Unlimited model documented its effectiveness with heterogeneously grouped students representing diversity in intellectual ability and achievement, socioeconomic level, and interests; rural and other minority groups also were represented in the study. Subsequent adoptions of the model reflected its success with special populations.

The Talents Unlimited model can be useful in a variety of ways to teachers in programs for gifted students. Like many other teaching/learning models designed to enhance higher order cognitive and affective skills, this instructional model can be implemented as a support system in assisting gifted students as they uncover and solve problems of interest to them. Specifically, the talent thinking skills can be focused to assist students in developing inquiry skills needed to pursue the investigation of a problem or the development of a special product, and they can be used to help students develop the skills necessary for organizing and managing the implementation of such activities.

Talents Unlimited: Applying the Multiple Talent Approach in Mainstream and Gifted Programs

Recent national reports on the status of education in America's elementary and secondary schools have pointed to the declining quality of students' ability to think creatively and critically about ideas and issues. In a flurry of response, many states have developed detailed plans of excellence to improve the quality of education, and a frequently mentioned instructional goal is to develop the higher order cognitive skills of all students.

Thinking Skills Instruction and the Pursuit of Excellence

The idea that the teaching of thinking skills may be an important but underdeveloped component of the "*basics*" of school instructional programs is gaining wide support. Educational literature and research reflect this movement. In 1981, a major portion of the October issue of ***Educational Leadership*** addressed thinking skills instruction. Both the 1984 September and November issues of that same journal were devoted entirely to thinking skills in the school curriculum; a feature section of the June 1983 issue of the ***Phi Delta Kappan*** and the March/April 1984 issue of ***Childhood Education*** also addressed the teaching of thinking. In addition, "Thinking Skills for Gifted Students" was a special theme of the April 1984 issue of ***Roeper Review***.

The National Institute of Education (NIE) has supported a number of studies on the nature and acquisition of thinking and learning skills. Publications for practitioners which synthesize what is known about the teaching of cognitive skills have been developed through an NIE-supported contract with Bolt Beranek and Newman, Inc. (Segal & Chipman, 1984). Nickerson (1984) described major research projects on thinking skills programs such as Feuerstein's *Instrumental Enrichment* program (Feuerstein, Rand, Hoffman, & Miller, 1980), de Bono's (1983) CoRT program, and Project Intelligence, a collaborative effort of Harvard University, Bolt Beranek and Newman, Inc., and the Venezuelan Ministry of Education.

In addition to interest in the teaching *of* thinking skills, considerable attention is being given to teaching *about* thinking, i.e., helping students become aware of their own thinking processes at a conscious level (Babbs & Moe, 1983; Brown & DeLoache, 1978; Markham, 1977; Sternberg, 1981a). The abilities involved in thinking about thinking are metacognitive abilities, and they are involved in planning and monitoring cognitive ability. Sternberg (1981b) identified metacognitive abilities as skills that can be taught.

Not since Sputnik have we seen such interest and support for thinking skills instruction. But, unlike much of the Sputnik inspired instructional activity, the new movement to teach thinking appears to address the needs of learners with a wide range of abilities.

Enrichment for All Students

The development of creative and critical thinking skills has long been a stated goal of American education; educational models defining different approaches to cognitive skills instruction, such as Guilford's Structure of Intellect model (1956) and Taba's

Teaching Strategies (1962), have received sustained attention. But the implementation of this goal generally has been reserved for bright students. In fact, one of the most popular models of cognitive skills, Bloom's ***Taxonomy of Educational Objectives*** (Bloom, 1956), sometimes has been divided artificially into lower order cognitive skills (i.e., knowledge, comprehension, application) and higher order cognitive skills (i.e., analysis, synthesis, and evaluation). The spurious suggestion has been made that the instructional program for students of average and lower intellectual ability should focus on the lower order skills and that students of higher intellectual ability (i.e., gifted students) should spend more instructional time using the higher order cognitive skills.

The long-standing tradition of training gifted individuals in higher order thinking processes has its philosophic roots in concerns about conditions of a rapidly changing world in which new knowledge is proliferated at a rate paralleled by the rate at which the known information becomes obsolete. The need for independent, creative, and critical problem solvers led to a major emphasis on learning through inquiry and discovery, problem solving, and creative thinking. Over a period of nearly two decades, the use of what Kaplan (1974) termed *"teaching/learning models"* (e.g., Bloom's *Taxonomy*) assumed a role in gifted programs which some writers felt was excessive (Renzulli, 1977; Stanley, 1976).

Renzulli advocated a broader conception of programs for gifted students. He suggested that the use of teaching/learning models by themselves failed to provide for individual differences in content, learning style, and teaching strategies. Further, Renzulli proposed that the use of teaching/learning models to train students in creative and critical thinking processes was appropriate for all students, not just those considered gifted.

Through his Enrichment Triad Model, Renzulli demonstrated what he considered a more defensible role for teaching/learning models. Type II enrichment activities provide all students with systematic experiences in cognitive and affective processes—necessary tools for more advanced types of problem solving. These *"practice"* experiences are viewed as stepping-stones to the youngsters' investigation of real problems. In contrast, Type III enrichment is considered appropriate primarily for gifted students (Renzulli, 1977). This broader concept of programs for gifted children has led to reevaluation of the use of teaching/learning models in educational programs. The prevailing view seems to be that developing these higher order cognitive skills is a basic goal for *all* students.

Barriers to Effective Thinking Skills Instruction

In spite of the fact that development of thinking skills has been a major instructional goal in American schools since the beginning of the twentieth century, there is evidence to suggest that we have *"miles to go and promises to keep"* in achieving this goal (Costa, 1981; Beyer, 1984a). In a pair of articles, Beyer (1984a, 1984b) identified several obstacles to effective teaching of thinking skills and some practical approaches to improving thinking skills instruction.

First, there is a lack of consensus among educators about which thinking skills we should teach. Several factors contribute to this problem: (1) the confusion of terms used to refer to thinking skills, (2) the complexity and diversity of thinking skills and (3) inaccurate definitions of thinking skills. Beyer suggested that part of the solution to this problem is distinguishing among several different kinds of mental operations that comprise thinking: broad, general processes (e.g., problem solving), discrete micro-operations (e.g., recall, extrapolation), and combinations of the first two, such as critical thinking.

A second problem in thinking skills instruction is a lack of precisely defined skill components. Beyer suggested that effective thinking involves more than process; it involves knowledge of ***"operating procedures"***—rules that provide guidelines to the student about when to begin using a skill, about what procedure to use next, about what to do when the procedure fails, etc.

Inappropriate instruction is a third problem clearly related to the second problem. Beyer claimed that teachers tend to confuse teaching thinking skills with testing thinking skills, that is, they ask students to perform thinking skills without giving them instruction on how to perform the skill. The solution involves giving direct instruction to students on how to use thinking skills, making students aware of what they are doing, providing frequent guided practice in using the skills in a variety of contexts, and providing feedback and opportunity for students to discuss their efforts in using thinking skills.

Still another obstacle to effective instruction in thinking skills is the attempt to cover too many skills in a short amount of time. Insufficient practice of skills and isolation of skills from one another and from subject matter drastically reduce the likelihood of transfer of skills to other situations, a major goal of thinking skills instruction. Beyer recommended systematic instruction in thinking skills across all grade levels and subject areas with the development of each thinking skill moving through four stages: introduction, reinforcement, extension, and practice.

A final problem in teaching for thinking skills suggested by Beyer is inappropriate testing, e.g., using measures of students' performance of isolated thinking skills to assess outcomes of an instructional program in problem solving. Beyer outlined a straightforward solution: *"Teachers and test-makers should use the same skills model"* (1984b, p. 560).

The renewed interest in teaching for thinking has raised a variety of questions for educators and researchers: How do students best learn to think creatively and critically? Should thinking skills instruction be incorporated into regular classes or taught separately? How can schools effectively plan thinking skills programs? When should thinking skills instruction begin? How can we evaluate student improvement in thinking? Although it is likely that different research models will yield diverse answers to these questions, the belief that we may be learning how to teach cognitive skills directly (Sternberg, 1981b) is an idea whose time has come.

The Multiple Talent Approach and Talents Unlimited: Theory and Research

The multiple talent approach to teaching, defined by Taylor (1967) and linked to Guilford's (1956) research on the nature of intelligence, is a system for helping teachers identify and nurture youngsters' multiple talents in productive thinking, forecasting, communication, planning, decision making, and academics. In this approach, traditional academic talent helps students to gain knowledge in a variety of disciplines, while the other five talents assist students in processing or using the knowledge to create new solutions to problems.

Underlying the multiple talent approach are the following assumptions: (1) people have abilities or talents in a variety of areas, (2) training in the use of these thinking processes can enhance potential in various areas of talent and, at the same time, foster positive feelings about self, (3) training in particular talent processes can be integrated with knowledge or content in any subject area and (4) the multiple talents are linked to success in the world of work (Schlichter, 1979).

The blending of the multiple talent approach to teaching and the world-of-work focus has been a major goal of the Talents Unlimited project in Mobile, Alabama, 1971–1986. Talents Unlimited is an innovative educational program developed under an Elementary and Secondary Education Act of 1965, Title III grant. It was designed in response to a local district need for an instructional program which would stimulate student interest and involvement in learning, enhance the academic performance of students representing a wide diversity of achievement levels, and, at the same time, provide for the development of a wide range of talents not measured by commonly used standardized tests. Table 1 describes the talent areas included in the Talents Unlimited model as well as illustrative instructional activities.

Table 1
Description of the Talents Unlimited Model

Talent Areas	Definition	Sample Activity
Productive Thinking	To generate many, varied and unusual ideas or solutions and to add detail to the ideas to improve or make them more interesting	Students working in a math unit on surveying and graphing are asked to think of a variety of unusual topics for a survey they will conduct and graph during the day.
Decision Making	To outline, weigh, make final judgments, and defend a decision on the many alternatives to a problem	Students who are preparing to order materials through the Scholastic Books campaign are assisted in making final selections by weighing alternatives with such criteria as cost, interest, reading level, etc.
Planning	To design a means for implementing an idea by describing what is to be done, identifying the resources needed, outlining a sequence of steps to take, and pinpointing possible problems in the plan	Students who are studying the unusual characteristics of slime mold are asked to design experiments to answer questions they have generated about the behavior of the mold.
Forecasting	To make a variety of predictions about the possible causes and/or effects of various phenomena	Students who are conducting a parent poll on their school's dress code are encouraged to generate predictions about the possible causes for low returns on the survey
Communication	To use and interpret both verbal and nonverbal forms of communication to express ideas, feelings and needs to others	Fifth graders studying the American Revolution role-play reactions of both Loyalists and Rebels, as they hear the reading of the Declaration of Independence, in an attempt to describe the different emotions of these groups of colonists
Academic	To develop a base of knowledge and/or skill about a topic or issue through acquisition of information and concepts	Students read from a variety of resources to gain information about the Impressionist period and then share the information in a discussion of a painting by Monet

The Talents Unlimited project represents a classroom level, research-based implementation of the multiple talent approach. In an analysis of trends in curriculum research and development, Goodlad (1969) accused researchers in curriculum and instruction of restricting themselves to a limited repertoire of methodologies instead of employing and inventing methodologies suited to the peculiar character of the problem at hand. He suggested that field studies not requiring rigid hypotheses and controls might be fruitful in generating significant hypotheses for subsequent tests in more structured experiments. He added that there must be naturalistic studies of *"the way it is"*—research which has a one-to-one relationship to what students and teachers are above their ears in each day—research which is exploratory and predictive.

"Exploratory" and *"predictive"* are appropriate descriptions of the objectives of the Talents Unlimited project, since the overriding goal of the project was to translate an exciting theory on multiple talent development into classroom practice through developmental research and, thereby, provide a base of information for making reasonable predictions about student achievement in many different intellectual talents which have been ignored on so-called intelligence tests of the past 75 years.

Objectives of the Talents Unlimited Project

The major objectives of the Talents Unlimited project were directed toward the development of a three-faceted multiple talent development model which included (1) the training of teachers in the recognition and nurturing of students' multiple abilities, (2) the development of materials to support the integration of the talent processes into the regular instructional program and (3) the enhancement of student performance in the multiple talents, including academic achievement; in creative thinking; and in self-concept. Though the project was validated on the basis of its success in all three objectives, the component most important for purposes of demonstrating support for multiple talent theory is student performance.

Initial Research

Four experimental and four control schools, matched for socioeconomic level and racial composition and representative of the highly diverse population of Mobile County, were used in the experimental research design. Thirty-seven regular classroom teachers in grades one through six were trained and participated as *"talents"* teachers for the entire three-year period of the research. Students in the experimental and control schools, representing a wide range of intellectual ability and achievement, were pre- and posttested on the Torrance Tests of Creative Thinking, the Coopersmith Self-Esteem Inventory, the Stanford Achievement Test, and the Criterion Referenced Tests of Talents (CRT). The CRT (1974) is a battery of 10 measures developed by the project staff and a university research team to assess changes exhibited by students in each of the talent areas. These tests formed the basis for comparing students who participated in the Talents Unlimited program (experimentals) with students who did not participate (controls) in the project research and in many of the adoptions of Talents Unlimited (Chissom & McLean, 1980).

In a technical report on the research findings of the Talents Unlimited program, Chissom and McLean (1980) discussed the impact of the use of the multiple talent model on student performance during the second and third years of the project. Measures of creativity and self-esteem were reported for the second year only.

Analyses comparing the experimental and control groups over the four dimensions of the Torrance tests (i.e., fluency, flexibility, originality, and elaboration) showed significant differences ($p < .05$) favoring the experimental group for all measures. Of the three grade levels (grades three through five) assessed on the Coopersmith Self-Esteem Inventory, experimental groups in grades four and five performed significantly better ($p < .05$) than the control groups; results at grade three were nonsignificant.

Notable differences between experimental and control groups occurred between the second and third years on measures of academic achievement and talent development. At the end of the second year (approximately 14 months of talent training), results on the Stanford Achievement Test for grades two through five indicated great variation within the battery of subtests as well as among the grade levels for both experimental and control groups; no definite pattern in achievement was suggested by the data. At the end of the third year (approximately 22 months of talent training), the results revealed significant achievement ($p < .05$) in favor of the talent group. Results on 14 of 35 subtests indicated significant gains ($p < .05$) from pretest to posttest for the talent group, while the control group indicated significant improvement on only three of the subtests. Results from 18 subtests were not significant.

On the 10 measures of talent development (CRT) administered to grades two through five, student performance at the end of the second year of the talent program revealed significant differences ($p < .05$) in gain scores in favor of the experimental group. Results on 18 of 40 measures favored the talent group, while only one measure of 40 favored the control group. Twenty-one of the measures were nonsignificant. CRT results at the end of the third year indicated that experimental students continued to exhibit significant gains over the control group.

In more detailed analyses, Chissom and McLean reported the following findings on the CRT at the end of the third year: (1) the talent groups at grades two and three showed significant differences on all 10 of the talent tests with all but two of these being significant beyond the .001 level, (2) the talent groups at grade four showed significant differences on seven of the 10 talent tests with six of these being significant beyond the .001 level and (3) the talent groups at grade five showed significant differences on five of the 10 talent tests. No differences in gain scores favored the control groups at any grade level.

Taylor (1968) postulated that 90% of the children in school can be identified as above average in at least one of the six talent areas, provided these talents have an opportunity to develop through the total instructional program. This hypothesis was tested in the Talents Unlimited research and the findings on the CRT showed that a percentage of approximately 85% of the students at each grade level (grades 1–6) was achieved (Chissom & McLean, 1980). It should be noted that the 85% did not include the academic talent.

Validation and Diffusion

The success of the Talents Unlimited program in identifying and developing individual student talents resulted in national validation of the project by the Joint Dissemination Review Panel (JDRP) and its membership in the National Diffusion Network as a developer-demonstrator project. This and other innovative programs are described in ***Education in Action, 50 Ideas that Work*** (Park, 1978) and ***Educational Programs that Work*** (1978), both published by the United States Office of Education.

During eleven of the twelve years after Talents Unlimited was validated, the project received federal funds for dissemination of the multiple talent model. Currently there are approximately 2,000 adoptions of the Talents Unlimited program in 45 states, the U.S. Virgin Islands, Puerto Rico, and Mexico. In an impact study of this project, McLean and Chissom (1980) summarized experimental results from a sample of the adoption sites. The results support the validity of the Talents Unlimited program. All of the results favored the use of the multiple talent model, and most of them achieved statistical significance ($p < .05$). Data were included from all talent areas, grades one through six, and from all areas of the continental United States and Alaska.

The Talents Unlimited project was validated on the basis of results from the initial research with students in grades one through six; some of the subsequent adoptions included secondary students. There is ample evidence that the thinking skills instruction based on the Talents Unlimited model is applicable with students K–12.

In 1979 project evaluators prepared a guide to provide assistance to adopters of the Talents Unlimited model in establishing the validity of the program at the school level (McLean & Chissom, 1979). The guide described procedures for conducting summative evaluations of the Talents Unlimited program which, in turn, served as the basis for evaluation of the Mobile Talents Unlimited model as a developer-demonstrator project of the National Diffusion Network.

Adoption and Monitoring Processes

Maintaining the integrity of the original model is a special concern in the face of numerous and widespread adoptions of the Talents Unlimited model. One of the positive approaches taken to enhance commitment to a rigorous adoption is the use of a written contract between the developer-demonstrator project and the adopter. While the contract is not legally binding, it does provide a means for articulating the essential features of an effective adoption; further, the contract outlines the type of technical assistance which the developer-demonstrator project provides to ensure that the adoption is on target. One of these services is a monitoring process. Talents Unlimited trainers make visits to adoption sites and provide feedback based on observation and other documentation related to key program elements (see Figure 1).

Providing teacher training to numerous adopting school districts is another concern in diffusion efforts. A major aspect of the Talents Unlimited developer-demonstrator project is to certify a limited number of "*turnkey*" trainers in states or areas where large numbers of adoptions develop. These trainers are experienced teachers of the multiple talent approach who have demonstrated competencies in conducting teacher-training workshops on the Talents Unlimited model. A separate program was developed to train and certify scorers of the CRT (1974). Both certification processes are conducted entirely through the Mobile developer-demonstrator project which maintains a listing of all certified trainers and scorers.

The Talents Unlimited Model

The major method employed in achieving the kind of student talent development described in earlier sections was the training of teachers in the multiple talent approach to teaching through the use of a competency-based training program designed and implemented by trained personnel. It is not the purpose of this chapter to address all the details of the extensive teacher-training model; a thorough description of the in-service training model and accompanying materials is contained in project-developed materials (*Teachers in Training*, 1974; *Criterion Referenced Tests of Talents*, 1974; *Trainer's Manual*, 1981). This inservice model also has been adapted for a three-semester-hour university course.

(1)	(2)	(3)
Component 1: Student Instruction		
Students are taught systematically the skills of the talent clusters: Productive Thinking, Decision-Making, Forecasting, Planning, and Communication.	Students are taught the skills of the talent clusters with only occasional emphasis placed on the talent processes for each.	Students are never told what the talent processes are, but are asked only for responses using each talent skill.
Component 2: Curriculum Integration		
Talent teaching is integrated into general curriculum and into all subject areas.	Talent teaching is integrated into some subject areas.	Talent teaching is not systematically integrated into curriculum and most subject areas.
Component 3: Talent Skills Emphasis		
Teacher emphasizes all of the talent skills in Productive Thinking, Decision-Making, Forecasting and Planning (e.g., the teacher asks for all four processes in PT each time PT is used).	Teacher does not emphasize each skill for Productive Thinking, Decision-Making, Forecasting and Planning (e.g., the teacher asks only for many and varied ideas when using PT).	
Component 4: Student Reinforcement		
Teacher gives individual students specific reinforcement according to the talent skills they are appropriately exhibiting.	Teacher gives "blanket" reinforcement to students for appropriate demonstration of talent skills.	Teacher gives no reinforcement to students for appropriate demonstration of talent skills.
Component 5: Materials		
Teacher introduces all talent clusters to the class.	Teacher introduces some of the talent clusters to the class.	Teacher introduces only one of the talent clusters to the class.
Component 6: Student Grouping		
Teacher balances total group activities with individual activities to allow both for modeling by others and for individual student effort.	Teacher organizes mostly group or mostly individual activities when using the talent clusters.	Teacher organizes talent teaching using only group or only individual instruction.

Figure 1. Talents Unlimited Monitoring Guide

This section will focus on the major components of direct student instruction in the Talents Unlimited model. Subsequent sections will address key teacher behaviors involved in implementation of the model and issues related to curriculum materials development.

Introducing Students to the Multiple Talent Approach

One of the major tenets of the Talents Unlimited model is that students should be actively involved in efforts to improve their thinking skills. An important part of that involvement is **teaching the model**—i.e., making youngsters aware of what multiple talent development is and how the Talents Unlimited model works. Just as teachers are trained in the rationale and goals of Talents Unlimited as part of the effort to enhance their commitment to teaching for talent development, so students are encouraged to share the ownership for their personal talent development.

The initial effort to teach the multiple talents model involves the use of a bulletin board or display of some kind as a vehicle for a brief and simple explanation of the concept that people have different kinds of "smarts" or talents and that while everyone is not good in every area, we all have at least one area in which we can be successful. The discussion of the six kinds of smarts or talents is accompanied by models of people using the skills of the various talents. Two examples illustrate this approach.

Figure 2 shows a display theme used with elementary students. As the teacher begins the talent by talent description, s/he places the engine, labeled *"academic talent,"* on the board and explains that the academic talent is the engine because it is the first talent used to learn about ideas and to develop important skills in reading, writing, math, etc.; a specific example appropriate to the age group is used (e.g., learning the names of numerals for counting or using a dictionary to find word meanings). Another train car, labeled *"productive thinking talent,"* is hooked to the engine in the display, and the teacher explains that another important type of talent is the one people use to think of many new and unusual ideas and solutions to problems (e.g., Steven Spielberg's unusual idea for the movie character E.T.). Additional talent train cars are added to the display with accompanying descriptions and illustrations until all six talents are included. The teacher explains that during the school year students will have many opportunities in their classwork to practice the different kinds of thinking skills and discover their best talent(s) while improving other areas.

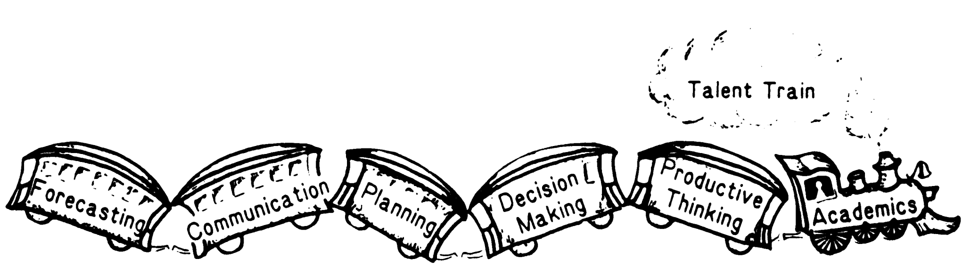

Figure 2. Display Example for Introducing Primary Students to Talents
Illustration by Donna H. Goodman

Figure 3 shows a sample display board for this introductory activity with older students; the McTalent Burger was an idea developed by a teacher of 10th grade English classes in Las Cruces, New Mexico. The fast food theme is an excellent vehicle for exploring the relationship between the academic talent and the other multiple talents. The burger bun is labeled *"academic talent"* to illustrate the idea that academics are basic and serve as a support or knowledge base to which other kinds of multiple thinking skills can be applied. More sophisticated examples are used to illustrate the role of each talent (e.g., learning to distinguish between compound and complex sentences or learning the names of certain chemical elements are used to illustrate the academic talent, while choosing an elective course might be used to illustrate the decision making talent).

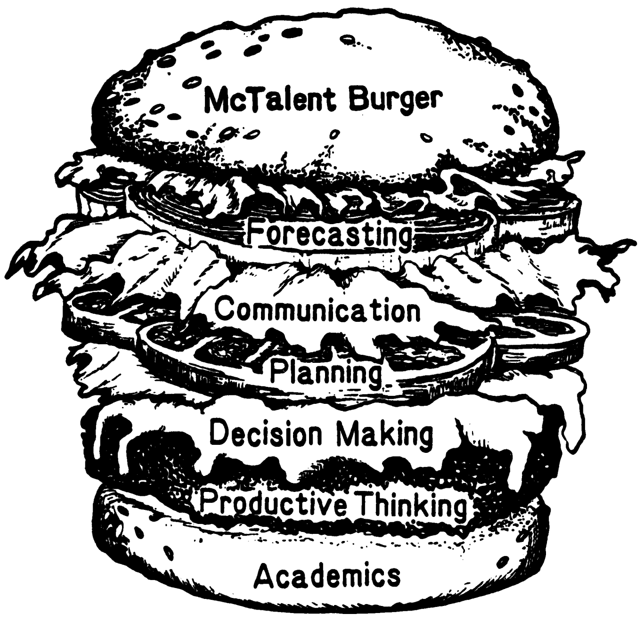

Figure 3. Display Example for Introducing Secondary Students to Talents
Illustration by Donna H. Goodman

Helping students understand the function of each of the multiple talents and learn the specific skills that make each of the talent clusters operational is further strengthened by the use of Kid Talk charts (see Table 2). Kid Talk represents months of effort in working with students during the initial research and development period to simplify and refine the operational definitions of the talent clusters with language that students could understand and use (Talent Activity Packet, 1974). Each time the teacher asks students for use of one of the multiple talents in an instructional activity, s/he directs students' attention to a flash chart showing the skills of the particular talent cluster. In this way, students are helped to focus on the specific skills they will use to solve a problem, develop a plan, describe an event, etc. Even the youngest students are encouraged to learn the language of the talents model and to recognize when they are using specific thinking skills in different situations. These strategies are an important part of the developmental process of transfer of skills, i.e., being able to use skills independently in contexts different from the ones in which skills were originally learned.

Teaching Productive Thinking

The four skills of the productive thinking talent, as defined in the Talents Unlimited model (see Table 2), are synonymous with Torrance's (1962) creativity factors: fluency (**many** ideas); flexibility (**varied** ideas); originality (**unusual** ideas); and elaboration (**add** to your ideas). The major goal of productive thinking is ideation, the generation of

Table 2
Kid Talk

Productive Thinking

1. Think of MANY ideas.
2. Think of VARIED ideas.
3. Think of UNUSUAL ideas.
4. ADD TO your ideas to make them better.

Forecasting

1. Make many, varied PREDICTIONS about a situation.

Communication

1. Give many, varied SINGLE WORDS TO DESCRIBE SOMETHING.
2. Give many, varied SINGLE WORDS TO DESCRIBE FEELINGS.
3. Think of many, varied THINGS THAT ARE LIKE ANOTHER THING IN A SPECIAL WAY.
4. Let others know that YOU UNDERSTAND HOW THEY FEEL.
5. Make a network of ideas using many, varied COMPLETE THOUGHTS.
6. Tell your feelings, thoughts, and needs WITHOUT USING WORDS.

Planning

1. Tell WHAT you are going to plan so someone else will know what your project is.
2. Tell all of the MATERIALS AND EQUIPMENT you will need for your project.
3. Tell, in order, all of the STEPS NEEDED to complete the project.
4. Tell the varied PROBLEMS that could keep you from completing the project.

Decision Making

1. Think of many, varied things you could do. ALTERNATIVES
2. Think more carefully about each alternative. CRITERIA
3. Choose one alternative that you think is best. DECISION
4. Give many, varied reasons for your choice. REASONS

ideas; these ideas may take a variety of forms (e.g., transformations, functions, designs, topics, examples, strategies, etc.). As in other models involving divergent thinking (Guilford, 1956; Parnes, Noller & Biondi, 1977), deferred judgment is a critical element of productive thinking; judgment or evaluation is the major role of another talent, decision making.

Introducing Productive Thinking

Students are initiated in a talent cluster with a warm-up activity; the purpose of a warm-up activity is to help students get the feel of the particular skills of a talent by using their own talent thinking powers in a simple but exciting activity. The initial activity is usually broad-based and does not draw from a specific subject or content area which might require prior knowledge or experience.

A line transformation is used to introduce students to productive thinking. Student attention is directed to the Kid Talk chart for productive thinking and students are reminded that "when we do productive thinking we think of many ideas, we think of varied ideas (not all just alike), we think of unusual ideas (trying to think of something nobody else would think of), and we think of ways to make our ideas better by adding to them" (Trainer's Manual, 1981). Then, each student is given a piece of drawing paper with an incomplete figure (e.g., a wavy line) drawn on it and is directed to transform the line into something else by thinking of many, varied and unusual things the line could be changed into. After a brief thinking period, students are encouraged to draw on the paper their most unusual idea, something no one else in the class would think of, adding as many lines as they wish to make their ideas complete. A label or title for the picture is then added.

The sharing time which culminates the warm-up experience contains some very important instruction. At this time, the teacher helps students understand the concepts involved in the productive thinking skills (i.e., many, varied, unusual, add to) with illustrations from the students' own work. As students share ideas with each other, the teacher points out the quantity of responses to the line drawing and reinforces the concept that there are many appropriate responses to the task.

Then the teacher collects the students' papers and suggests that they put their ideas into categories to find out how many varied ideas they had. Beginning with the first paper, the teacher might say, "This line became a butterfly; that's an insect. Joey, please be the keeper of the insect category" (hands the butterfly drawing to Joey). The teacher continues in this manner until all the papers are with category keepers. Then, the category keepers are counted: "Let's find out how many different kinds of ideas this group had. All keepers of categories raise your hands, please. One, two, three, four, five . . . different categories. That's good productive thinking. Now let's see how many category keepers have only one paper in your category. One, two, three. . . . Now, that's what we mean by unusual, something that no one else in this class thought of." The teacher works through the one-of-a-kind categories to reinforce what the term "unusual" means. If a certain category had four or five papers, the teacher might say, "The people whose ideas were all in the 'land transportation' category probably will think of something no one else will think of next time. All of you did a good job with your first productive thinking" (Trainer's Manual, 1974). Finally, the teacher returns each drawing to its owner and has students share with a partner how they added other different lines to change the figure into a particular object; the teacher uses this time of discussion to reinforce the fourth skill of productive thinking.

The choice of the line transformation as the initial productive thinking activity is deliberate. The incomplete figure stimulates immediate interest for most youngsters and their pleasure and excitement in changing the line in some way allows them to relax and play around with their ideas; encouragement to toy with ideas is a subtle but critical aspect of teaching an affective component to divergent thinking—the willingness to take risks by trying out new ideas. Another part of the rationale for selecting the line transformation as the first productive thinking activity is that it has many easily arrived-at possible responses. Research on brainstorming suggests that if easier tasks are used first, a "*set*" of high fluency seems to be generated and carried over to more difficult tasks (Callahan, 1978). Helping students see for themselves the number of possibilities that exist for transforming a simple line is the first step in establishing the idea that for many problems/situations there is more than one correct or appropriate answer.

Connecting Productive Thinking with Subject Matter

The next opportunity which students have to practice productive thinking should demonstrate how these skills can be used in a subject area. A major idea in teaching students about talent development is that the talents can be used to help them in learning math, social studies, language, science, etc., and in dealing with everyday problems. Two examples at the elementary level (Schlichter, 1985) and one at the secondary level illustrate the use of productive thinking in extending students' academic base.

A kindergarten teacher working with students on numeral concepts shared John Drinkwater's poem, "Two's," which names a variety of things (some ordinary and some surprising) which come in twos—eyes, arms, legs, luggage straps, collar studs and pigeon's eggs. Students were invited to add several of their own ideas to this list of things that come in twos. Then the teacher continued with these directions: "Now I want you to do some more productive thinking, this time about the numeral three. We are going to go on a search for all the varied and unusual things that come in sets of three. Start your search in our classroom and around our play area" (students named a three-drawer filing cabinet, a three-sectioned window, a three-speed record player, a three-wheeled toy, three-seater swing set, etc.). "Add other ideas for things that come in threes even if you cannot see them here" (students added triple-scoop ice cream cone, wheels on a tricycle, etc.). After the class had collaborated on a list of things that come in threes, individual effort was focused with a final instruction: "Now, try to find a set of threes that no one else in our class would think of and draw your unusual idea of something that comes in threes on a piece of drawing paper."

In this activity students not only were using productive thinking to gather examples for learning a numeral concept, they were developing observation skills and experiencing both cooperative effort (contributing to the class list) and individual effort (finding and sharing an idea no one else would think of).

In a third grade classroom, a social studies unit on American Indians was the context for using productive thinking. Students already had been engaged in learning experiences which helped them understand how American Indian tribes used different and unusual ways of indicating the achievements of their tribe members (e.g., the use of an eagle feather as a headdress to indicate deeds of bravery and leadership). A picture in a textbook showed a Seminole Indian woman wearing many strands of colored beads which indicated acts of virtue or other achievements. As the teacher pointed to the Indians as models of productive thinking, she invited students to *"think like Indians"* with this challenge: "Imagine that you are an Indian of some American tribe and draw or write all the different, unusual ways your tribe could show the accomplishments of its people. You will need to see everyday things of nature in new and different ways. You may want the boys and girls of your tribe to show their achievements through something special they do to their home or belongings. Think of really unusual things you could do to show special honors." Students initially tended to give responses which fell into the category of jewelry or headdress, but with patient probing and encouragement began to add such responses as: paintings on shelter depicting accomplishments; specially carved or sculpted ornaments; special privileges; special hair fashions, etc.

A high school sociology class was the setting for another exercise in productive thinking. Students were discussing selections from their text which described the research methods social scientists use; survey research was the particular focus of this discussion. One of the ideas that the teacher wanted students to understand was the process social scientists use in selecting a group for a survey which will be representative of a larger population. Typically, the teacher gave a standard presentation on the concept of sample and described the procedure of random sampling, but she recognized an opportunity for students to get more involved in their learning. So, after a brief explanation of the rationale for population sampling, the teacher asked students to use their productive thinking to generate possibilities for a hypothetical problem: "Suppose you wanted to survey the opinions of students in our school about the student dress code defined in our school handbook. The population of the school is 1200, and you have been advised that a sample of 10% (120 students) would serve as a sufficient sample for your survey. Use productive thinking to generate possible ways to determine who would be in the sample."

Some of the ideas generated by this group were: each student in this class could give the opinionnaire to five friends; use one class from each grade level until you have 120 people; use the teachers' roll books and pick the first two or three names in each one; stand in the school lobby in the morning and give the opinionnaire to the first 120 students to arrive; put the 120 opinionnaires on a table in the lobby and let students who want to participate take them; select a color, such as orange, and survey the first 120 people we meet wearing something orange; use the student directory and take a certain number of names from every page until you have 120, etc. All ideas were accepted and recorded. Then, the list of ideas generated with productive thinking was used as the basis for a follow-up discussion calling for different talent skills; specifically, students were engaged in decision making as they were asked to evaluate their ideas and select the best approach. The discussion, quite naturally, uncovered problems involved in sampling procedures and, with teacher guidance and encouragement, students were able to generate the basic criteria essential for random sampling. The teacher is convinced that students' comprehension of the concept of random sampling is more enduring under this condition of instruction than with the lecture and recall method.

The possibilities for using productive thinking to enhance and extend academic concepts and skills are limitless; students can be asked to use their productive thinking to think of uses people make of the freedoms guaranteed in the Constitutional Amendments, to think of ways to map a particular area, to think of places/sources they could get information on a topic for a science project, to think of things a Jabberwocky could be, to think of situations in which you would need to know how to make change for different amounts of money, to think of ways Hester could have responded to ostracism by the townspeople in ***The Scarlet Letter***, etc. The sophistication of applications of productive thinking can vary widely depending on the age, ability level, and knowledge/experience base of the learners, from first graders generating many, varied, and unusual signs of fall to calculus students generating examples of problems in which someone might want to find maximum or minimum quantities (Talents Unlimited for Secondary Classrooms, 1984).

Teaching Decision Making

In the Talents Unlimited model, decision making is defined by four observable student behaviors; (1) identify many, different alternatives for solving a problem; (2) use criteria to evaluate each of the alternatives; (3) select the best alternative; and (4) state many, different reasons for the final choice. The sequence of skills in this definition is notable, since it differs from the standard textbook order of skills in which the generation of solutions (alternatives) comes after the development of criteria. The Talents Unlimited model places ideation before evaluation, reflecting support for the importance of deferred judgment (Brilhart & Jochen, 1964; Parnes et al. 1977).

Implementers of the Talents Unlimited model often refer to decision making as the "*piggy-backing talent*" for productive thinking. This term reflects a common practice of using productive thinking for the generation of alternatives and then employing decision making for the evaluation of those ideas. While this relationship is useful in many situations, it is not appropriate for all decision making tasks. Some situations may have a somewhat limited number of alternatives or may not call for especially unusual solutions; in fact, the term "unusual" is used only when productive thinking is invoked.

The rationale for this careful use of terms is based on the belief that a student can be a good decision maker, able to analyze and evaluate alternatives, without necessarily having generated novel or original solutions. This distinction is consistent with multiple talent theory which suggests that there are different kinds of smarts and that people vary in their abilities to use the different talent clusters.

A final point about the general goal of decision making is important: while the specific delineation of decision making skills may vary from one model to another, the message is clear: choosing is not decision making. Smaby and Tamminen (1978) noted, "To choose is an act, but to consider possible choices is decision making" (p. 106). Learning to make decisions involves understanding of self, acquiring of information, and developing strategies for dealing with problem situations.

Introducing Decision Making

Using hypothetical situations for the practice of decision making can be useful, but the initial activity for instructing students in decision making skills will be more powerful in demonstrating the realness and usefulness of this talent if it is related to an actual decision students need to make and act on. An example of an introductory decision making activity is described below.

A teacher of primary-aged students initiated her class in the decision making process by asking them to select a game to play inside on a rainy day. The alternatives were given eagerly and included a variety of choices, ranging from familiar favorites to a few lesser known games. As the teacher pointed to the second skill of decision making ("think more carefully about each alternative"), she asked students to think of some questions they would need to ask (i.e., criteria) to help them think about the choices. Because students had a vested interest in this decision, questions came readily: Do I like this game? Does the class know how to play it? Will many people get to play? Do we have the stuff to play the game with? The teacher also suggested a question for consideration: Will this game create too much noise for our neighbors? Students were guided in asking these questions for each of the games being considered and then were asked to make their choices and be ready to give reasons to support those choices.

The process of generating reasons to defend a choice is one of the more complex skills of decision making, and it is imperative that the teacher provide clear instructions about this process. Specifically, students need to understand that the source for their reasons for a given decision is the list of questions they used in considering each alternative. The teacher can provide a model when a student makes a decision but is unsure in stating a reason, e.g., a young student selects his favorite game, Seven-Up, to play inside and all he can say in defense is "because I want to." The teacher might ask if he means that he likes the game; if the student answers "yes," the teacher can point to the criterion question, "Do I like this game?" and explain that the student has answered this question and that his answer can be a reason: "I choose to play Seven-Up because I like this game." This process can continue as the teacher asks the student to answer other criteria questions and assists him in turning his answers into reasons. Sometimes, a fill-in-the-blank approach on the chalkboard (or an activity sheet for older students) can help to demonstrate the process:

I choose to play ______________________________

because ______________________________

because ______________________________

because ______________________________

In a decision making activity such as the rainy-day game in which a rather quick group decision is the goal, not every child may be asked to voice all the different reasons for a decision. After several students have stated reasons for their choices and the various criteria questions have been accounted for, the teacher might simply ask students to write or tell their final decision based on the questions and take a count. In instances where the outcome is of greater critical value or has more far-reaching implications for individual members (e.g., selecting books for a Scholastic Books order or nominating candidates for the Student Government Association), more attention and time should be given to working through the fourth skill of decision making.

Connecting Decision Making with Subject Matter

The principle of choosing incidents or issues that will engage the students' interests and emotions as the basis for decision making activities is also important in the subject areas. Examples of teachers' applications of this guideline can serve as illustrations (Schlichter, 1983a).

In a second-grade classroom, students were engaged in a math unit which focused on the use of simple graphs (e.g., picture graphs). As part of their exploration of this topic, these second graders had taken some surveys on the school grounds. In one survey they counted and recorded with a simple tally the number of different kinds of trees in the area of the campus playground. Later, the teacher helped the youngsters translate the tally figures into a picture graph, and the students discussed how a graph can provide many pieces of information in a quick and interesting way.

Near the end of this unit, the teacher was preparing to conduct a culminating experience suggested in the teacher's edition of the math text. The assignment was to have each student survey the number and kinds of pets in his/her neighborhood. As the teacher visualized the lesson plan, it occurred to her that the use of the decision making process could provide for greater student involvement and interest in this learning activity than the original design. So instead of assigning one topic for a survey, the teacher involved the second graders in generating many, different possible things they might like to survey in their own neighborhoods; they listed more than 40 ideas about topics they would be interested in! Then the teacher assisted the students in the process of raising criteria questions which could help them think more carefully about the alternatives (e.g., How long would it take to survey this topic? Can I do this survey by myself? Would I find these things in my neighborhood? Am I interested in this subject?). After a period of discussion and reflection, each student was asked to record the one best topic for his/her survey and to give reasons for the choice.

The next day the teacher had abundant evidence of the success of this approach to capturing the interests of students. Every second grader excitedly shared the results of an individual survey. The topics represented great diversity, from the kinds of cars in the neighborhood to "the number of red, yellow or green traffic lights I saw as my school bus came to each intersection on the way home!"

Another important guideline in teaching decision making is to prepare exercises which are real-life situations that assist students in defining their own sense of purpose and identity. One approach which a teacher used to help students deal with the potential personal conflicts involved in taking mental and emotional risks is described below.

In a study of man in space, a group of fifth graders encountered the law of gravity. As the teacher shared information on the discovery of this law by Sir Isaac Newton, the students became aware of the ridicule that Newton suffered from many people around him. The students learned that Newton became so sensitive to criticism that it required frequent pleading from his friends to get him to publish his most valuable discoveries. Recognizing a similar problem many of her bright students faced in a world which values convergent thinking more than divergent thinking, the teacher posed this problem for decision making: "Put yourself in Newton's shoes and tell what you think he should have done when he received so much criticism of his new ideas." After students offered different alternatives (e.g., give up and not share his ideas, fight anybody who ridiculed his ideas, hold special classes to teach about his ideas, publish his ideas under a different name), the teacher encouraged students to weigh the alternatives by getting them to pose questions that would help them think through the varied alternatives. The following questions were raised: How important are my ideas? Will others understand my ideas? What will others think of me? As youngsters made their choices in this simulated experience, they were asked to defend their decisions with a variety of reasons stemming from their examination of the criteria questions. An important aspect of this decision making exercise was the youngsters' grappling with the values expressed in many of the potential solutions, not unlike the thinking and feeling processes needed in the resolution of real conflicts in their own lives as they dared to be different from their peers.

A group of bright middle school youngsters presented their teacher with a source of material that stimulated a heated discussion and some subsequent decision making action. One morning, David came rushing into class waving a section of the local newspaper and telling anyone who would listen, "It doesn't make sense; it's a stupid answer!"

In a calmer moment, David explained that he disagreed vehemently with the advice given in a syndicated column by a psychologist who answered questions sent in by teenagers. As he shared both question and answer, David sparked a discussion among the entire group about the effectiveness of the psychologist's answer to the teenager. With little effort, but much foresight, the teacher was able to focus student interest by asking if they would like to do something about the advice and their reactions to it. Further discussion led to the generation and evaluation of what the students felt were more appropriate responses to the teenage writer's question. The results of the problem solving session were sent to the columnist. This experience served further as a stimulus to several students who began their own advice column for teenagers in the school newspaper.

It is important in teaching decision making to provide a means for student responses, oral or written, which establishes the individual student's decision, and the basis for the decision (a reflection of the knowledge about the topic or situation, as well as the values on which the decision was based). The idea here is that the decision making process used in small group or class settings need not be limited to decisions based on group consensus. Many decision making situations can be developed that encourage different individual decisions which can then be used as the basis for discussion. Further, the articulation of individual decisions by students, in written or oral form, provides a means for formalizing the cognitive and affective processes involved in generating alternatives, evaluating possibilities according to criterion satisfaction, reaching a decision, and defending that decision. This articulation process can aid the teacher and student in evaluating student skill in the various processes involved in decision making. In addition, an oral or written record of a decision which will be implemented in order to accomplish some task gives direction to planning. It also serves as a basis for follow-up evaluation of the decision (i.e., asking "Was that a good decision for me?").

As an illustration of the importance of having students articulate their decisions, recall the earlier story of the second graders who made their own decisions about a subject to survey. After students had brainstormed more than 40 ideas, the teacher reviewed the list on the board and asked each student to draw or write on a sheet of paper the four or five subjects s/he was most interested in surveying. Then, using the list of criteria questions generated by the group with the help of the teacher, each student was asked to draw a circle around the best choice. The actual *"circling"* activity is considered an important ingredient in helping a student make a commitment and take a stand. Finally, students were given an opportunity to draw, write or tell the reasons for a choice.

On the following day when students brought their completed surveys and graphs to share in class, they were asked to evaluate their choice of subject from the perspective of implementation, putting the decision into action. Some youngsters were confident that their choices had been good ones "because I got it done," "because it was fun," "because no one else surveyed the same thing I did." Other students, even some with completed graphs, indicated that if they had it to do again, they would make different choices "because it got dark before I finished" (survey of cars in neighborhood which required that users of cars have returned from work, school, etc.) and "because some people thought I was just joking when I asked them questions about the TV shows they watched on Monday night." In the discussion which followed, the teacher was able to help students identify other criteria questions which might be important in making decisions. This kind of consideration of consequences is not too dissimilar from the *"Monday morning quarterbacking"* engaged in by many adults. And it is this follow-through evaluation which can help youngsters to better understand the process of decision making and to improve their skills based on experience.

One other aspect of teaching decision making requires attention: the process of helping students prioritize criteria generated for use in weighing alternatives—that is, helping them to discuss and evaluate the relatively greater importance of some criteria over others in making a satisfying decision. The process of weighing criteria requires sophisticated cognitive skill, and teachers should carefully evaluate students' readiness for this process.

As teachers work with groups of students who are ready for this concept of prioritizing criteria, they might begin with a simple procedure of asking them to rank order the list of criteria they have generated. Then students use their individual rankings as part of the discussion when decisions are shared. For the older or more sophisticated decision maker, the introduction of a decision-finding grid or matrix would be appropriate. An example of such a procedure can be found in Unit 5 of ***Guide to Creative Action*** (Parnes et al. 1977).

Teaching Planning

The major goal of the planning talent is organizing for the implementation of a project or a problem solution. The Kid Talk chart (see Table 2) defines the four skills of planning for students. In general terms, these four skills include (1) stating the objective or goal for the plan, (2) identifying resources needed for implementation, (3) stating and organizing the steps or procedures for implementation and (4) considering potential problems in implementing the plan.

The use of the planning talent often follows decision making, since a problem solution usually requires a plan for implementing the solution or decision, but planning and decision making require different kinds of abilities. Planning calls for skill in forming a big picture or outline, in conceptualizing a schema, and it calls for the ability to flesh out the specific details of the schema. It is entirely possible for a person to have skill in generating new ideas or in deciding on the best solution for a problem without having equal skill in planning a design for implementing or putting the idea into action.

Introducing Planning

The initial planning activity used in the Talents Unlimited project with students of all ages drew on an experience common to all students: planning a sandwich. The choice of a planning topic familiar to students was deliberately made to ensure a measure of success. For young students, a planning booklet (see Figure 4) was designed from 12" × 18" drawing paper and children drew the four parts of their plans for a sandwich: **What** kind of sandwich they wished to make; **things** they would need for making the sandwich; **steps** they would take in making the sandwich; and **problems** that could occur in carrying out the plan. Teachers or older students helped young students in writing labels for pictures in each part of a plan. If a teacher chose to do the initial planning activity as a group effort, a chalkboard or chart was used to record the four parts of the plan for one kind of sandwich. Older students were provided with a worksheet (see figure 5) to help them in completing the four parts of a written plan.

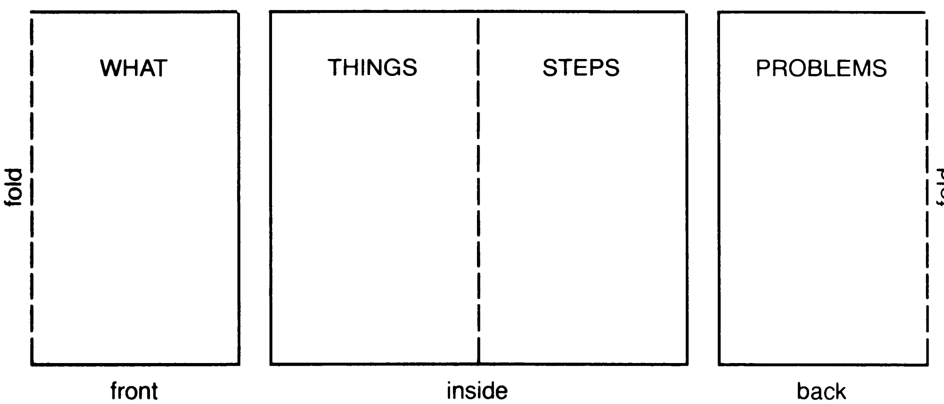

Figure 4. Planning Booklet for Primary Students

The old adage, "the proof of the pudding is in the eating," has important implications for the planning talent. Students who only draw or design hypothetical plans and never implement plans have little idea of the importance of planning. The choice of planning a sandwich for the initial activity has additional merit in that it lends itself to implementation. Students in the Talents Unlimited project were invited to implement their plans by swapping plans with a partner and observing each other implement the plan as drawn or written. Follow-up discussion provided a means for evaluating the plans and a basis for modifying and improving plans. Students were quick to see the need for spelling out details in their lists of *things* and *steps*; further, many students understood the importance of trying to solve some of the *problems* they had listed by going back and modifying other parts of the plan. Taking plans off the drawing board for implementation and then evaluating the effectiveness of the plan in terms of its workability is critical if students are to realize the true value of planning.

1. Tell WHAT kind of bulletin board you would like to make; make a sketch if necessary.

2. List the THINGS (materials/resources) you will need.

3. List the STEPS, in order, you will take to make your bulletin board.

4. Describe any PROBLEMS you might have in making your bulletin board.

Figure 5. Planning a Bulletin Board (Worksheet)

Connecting Planning with Subject Matter

While the planning talent lends itself readily to typical classroom projects, such as planning class parties, field trips, holiday projects, club activities, etc., there are numerous opportunities for using planning in academic content areas. Some examples of both elementary and secondary classroom planning activities are described below.

A fourth-grade teacher involved students in a planning activity related to a health unit focusing on the combined roles of nutrition and physical fitness in general health. Much attention in this unit was given to helping students plan ways to reduce the consumption of junk foods in their daily diets. Students became eagerly involved in planning with their parents more nutritious snacks for morning and after-school breaks. But the same students were not so excited about participating in the daily program of calisthenics which was part of their physical education training, in spite of the notable fact that many of these fourth graders were overweight! The teacher realized the importance of generating student enthusiasm as she pursued the issue of physical fitness and posed the following situation to challenge her fourth graders to use their planning skills: "Suppose that many other fourth-grade students disliked exercising as much as you say you do, and suppose that you were invited by the school principal and teachers to act as a consultant to plan interesting exercise routines for these students. See how well you can use your planning skills to plan an exciting exercise routine for students who dislike calisthenics."

The challenge was accepted and the fourth graders quickly became irnmersed in detailing some interesting (and sometimes complex and unorthodox) approaches to exercising. The teacher found that intermittent discussions regarding which body muscles were exercised by different positions and location of resources about warm-up procedures and timing of exercises were important academic ingredients in helping youngsters plan more realistically. Evaluation of plans was two-fold. First, a local physical fitness specialist was invited to the class; students had an opportunity to demonstrate and discuss their exercise plan with the specialist. Comments of the specialist and other class members provided a basis for final modification. The second evaluation came as a surprise to students. The teacher arranged for her students to be guest leaders of the calisthenics program for all fourth-grade classes in the school. Not only did students implement their exercise routines but they had an opportunity to get feedback from their peers on how well their plans worked. Not surprisingly, one of the things the fourth graders discovered was that exercise is not so bad if you do something different, especially if it was your own idea.

A high school English teacher used a hypothetical planning activity to help students studying the Shakespearean play, ***Romeo and Juliet,*** be more aware of the subtlety and complexity of relationships among the feuding family groups (Talents Unlimited for Secondary Classrooms, 1984). After the reading of the play and some initial discussions of central issues, the students were asked to design a plan to convince Juliet's parents that Romeo was a suitable mate. The teacher chose to conduct the planning activity orally so that discussion could flow continually during the planning process. Half the class was asked to do the actual planning aloud (state the goal; list resources needed; identify sequence of steps for accomplishing the goal; and consider possible problems of implementation); the plan was recorded on the chalkboard for all to see (and alter when needed). When the plan was completed, the other students, who had heard all the discussion as the plan developed, were asked to evaluate the plan; evaluative comments served as take-off points for discussion and, sometimes, as the basis for modification of the plan when the actual planners determined that the modifications were an improvement. The teacher found that this planning exercise served as a highly stimulating way to engage students in using their own ideas to discuss the finer points of a piece of literature.

Integrating planning into specific subject area content for secondary students can be illustrated in many ways: in a social studies class, students involved in a unit on criminology were asked to use information they had studied to plan a new state corrections system based on diminished recidivism; in science classes, students were asked to plan a lab demonstration of constant acceleration and, later, to plan for the evaluation of lab exercises without the requirement of a written lab report; in a math class, students were asked to plan and implement a method for finding the volume of the school. Numerous planning exercises for elementary students are found in ***Talent Activity Packet*** (1974); several for very young students are described by Schlichter (1985).

Teaching Forecasting

Forecasting is defined by the Talents Unlimited project (see Table 2) as having one basic goal: the generation of many, varied predictions about a situation or event. The term *"forecast"* suggests looking ahead, imaging the future; and many questions which call for forecasting are stated in the future mode (e.g., What might happen if all plants were eliminated from earth? What could happen next in this story?). Cast in these ways, forecasting deals with the prediction of consequences, effects or outcomes. But, in spite of the future orientation of the talent name, the forecasting talent has been defined to include predicting about events in the past. Specifically, students also are asked to make many, varied predictions about the causes of some event or situation (e.g., Why was George Washington willing to become leader of the Continental Army? What caused the extinction of dinosaurs?). In summary, then, the forecasting talent as defined by the Talents Unlimited model includes prediction of both causes and effects.

Introducing Forecasting

The forecasting talent is perhaps the easiest of all the talent clusters to introduce to young children because of their natural curiosity and their inclination to ask "what if" kinds of questions. Many of the Talents Unlimited teachers introduced forecasting to students in the context of an instructional experience which often begins the school year: the development of standards for student classroom and school behavior. After students had participated in generating and discussing the standards, the teachers posed this forecasting question: What might happen if we did not have any rules for classroom behavior? (or What might happen if no one followed standards for behavior?). As students make predictions about possible outcomes (e.g., some people would never get a turn to do things, we might argue a lot, we wouldn't learn to read, etc.), they were helped to see problems that could occur if people did not have some guidelines or rules. In this sense, forecasting can be viewed as problem identification.

The other face of forecasting, predicting causes, could be introduced in the same setting described above. At the end of a discussion of the class standards for behavior, a teacher might ask: "What are all the varied things that might cause someone not to follow the rules?" This type of predicting can help youngsters investigate their own, as well as others, motivations.

For secondary students, a variation of these initial forecasting activities could be made: What if there were no student behavior or dress codes in our school? What are the many and varied causes for non-compliance with school behavior and dress codes? Many secondary teachers have found it useful to follow this initial activity with similar issues related to a current topic of study (e.g., in a social studies class, the teacher asked students to predict all the varied things that might happen if advertisers were not restricted by truth in advertising laws, and a chemistry teacher asked students what might happen if they ignored guidelines for using the lab equipment).

Connecting Forecasting with Subject Matter

Forecasting is a very useful talent in helping students become sensitive to possible problems. A well-timed forecasting question can help students move from somewhat naive assumptions to positions which reflect a more critical awareness of the implications of an issue. The description of a forecasting activity given below illustrates this point.

A class of fourth graders was discussing the change over of the United States from its present English system of measurement to the metric system. The teacher pointed out that while many countries used the metric system exclusively, the United States had been involved in the change process for years. Some problems resulting from the slow change over were discussed. Suddenly, one impatient fourth grader exclaimed, "Well, why doesn't Congress just pass a law and say that on a certain date we'll all go on the metric system? That would put an end to all our problems!" While the urge was great to give a lecture in response to this rather simplistic kind of thinking, the teacher recognized an opportunity to encourage youngsters to think more critically about the suggestion and posed this forecasting question: "Suppose Congress did pass such a law which required that in six months the United States would change to complete use of the metric system? What are the many and varied things that might happen as a result?"

A flurry of responses ensued, focusing initially on all the things that would have to be changed to metric. Then, some youngsters began to point out the amount of time and people it would take to make all the changes and the number of products that would have to be produced (new highway speed limit signs, new maps, etc.). As one prediction led to another, youngsters began to see many of the connecting implications—industrial machines would all have to be reworked, new packaging for consumer products would be required, people of all ages and occupations would have to be reeducated, including sports announcers, etc. Within a few minutes (and without benefit of a lecture from the teacher), the fourth graders realized that what sounded like a good solution had many problems attached. They were able to think more realistically about this complex issue and understood that much more problem solving activity had to occur before the change over could be effectively made. Forecasting was a practical tool for helping students examine more critically this kind of *"off the top of the head"* approach to problem solving. Other uses of forecasting with elementary students were described by Schlichter (1979; 1983b; 1985).

Subject matter in secondary classrooms also is fertile with opportunities for forecasting effects and consequences. A class of high school students engaged in a study of ***The Scarlet Letter*** was asked to predict the many and varied consequences if the story had taken place in a different time (e.g., the twentieth century) or in a different setting. A science teacher asked students to predict the effect of increased worldwide volcanic action on the weather; and a business education teacher challenged students to predict the outcomes if a company did not prepare departmental margin statements (*Talents Unlimited for Secondary Classrooms*, 1984).

Other situations which call for predicting can be focused on the generation of causes which might explain a situation or event. For example, kindergarten students involved in planting seeds in paper cups were prepared for the possible "no show" of some plantings by being asked to predict all the different things that could keep their seeds from growing into plants. Some of their responses were too much or too little water, not enough or too much light, bugs, wrong fertilizer, somebody disturbing roots, bad seeds, etc. From the predictions, the teacher was able to assist these young scientists in generating some possible solutions to the problems they had uncovered with their forecasting (i.e., developing strategies for ensuring that plants got the right amount of water and light).

Using forecasting to help students explain apparent discrepancies is an effective strategy used by secondary teachers. A teacher of eighth-grade social studies shared with students an excerpt from "Diary of John Quincy Adams" (Bergen, 1960) in which Adams described a very negative image of Thomas Jefferson, a view that differed dramatically from textbook descriptions of one of our founding fathers. Students were asked to dig deeper into a variety of resources to generate possible explanations for this discrepancy in viewpoints.

Digging deeper is often called for in forecasting activities. An English teacher asked students studying *"Jabberwocky"* to predict why Lewis Carroll made use of coined words in this selection. Then students were encouraged to do some research to try to verify some of their predictions. This kind of follow-through activity in forecasting is crucial. When a particular activity lends itself to the gathering and sorting of additional information, the teacher should encourage each student to engage in the necessary research for (1) critiquing the quality of the initial predictions in light of the insight gained and (2) producing new and better predictions for the same situation (*Talent Activity Packet*, 1974).

Teaching Communication

The general goal of the communication talent is to increase students' facility in using verbal and nonverbal language to share their thoughts, ideas and feelings; specifically, the objective is to increase the richness of expression and move students away from cliche-ridden expression. The communication talent focuses on the more standard structure and use of the English language to a greater extent than the other talent clusters and, thus, reflects some correlation with the traditional language development components of the academic talent. Fluency and flexibility in the use of language are major aims of the communication skills, but form, clarity, expressiveness and completeness of ideas are supporting goals.

The specific definition of the communication talent includes six skills (see Tables 1 and 2). According to the operational definition developed by the Talents Unlimited project, each skill may function independently (i.e., each may be the focus of an entire activity) even though it is acknowledged that the skills are not mutually exclusive in general practice. For example, the describing words generated with the first skill may be used in the development of a descriptive paragraph as the fifth skill is focused on. A closer look at the skills of communication suggests that there is an implied hierarchy of complexity, ranging from the generation of single words (skills one and two) to phrases (skill three) to a network of ideas (skills four, five, and six). It should be noted that the skills reflect the use of both cognitive and affective abilities, and skill six draws specifically on psychomotor ability.

A point that needs to be made is that the choice of these six specific skills to represent the communication talent is arbitrary. Choice from among many possible communication abilities was made on the basis of an analysis of academic needs of the students involved in the original research. The Talents Unlimited project staff acknowledges that the communication talent definition should be considered open-ended and that adopters of the model may wish to define additional skills pertinent to their participants. The research related to the Talents Unlimited model however is limited to the six specified skills.

Introducing Communication

Introducing the communication talent to students takes a somewhat different form because, unlike the other talent clusters, each skill of communication may be used independently, or two or more skills may be linked for one lesson. Further, the teacher may begin instruction in the communication talent using any one of the skills, as opposed to working through the skills from first to last. Because the communication skills lend themselves so readily to academic contexts, the initial activity may be done in connection with a content area. For example, an English teacher focused a discussion of ***Julius Caesar*** with skill two by asking students to use a variety of words to describe how they would feel if a friend betrayed them. Then, switching to skill five, students were asked to use their word lists and compose a short speech to the betraying friend. The session concluded with a discussion of student-composed responses and the literary response of Caesar to his betrayal.

With younger students, the initial activity may require more teacher instruction in the use of the same communication skills. For example, a teacher might ask students to look at a picture of a runaway child in their reading text and to describe the child's feelings with many, varied single words (skill two). It would not be uncommon to have students offer words in the form of a noun such as fear. At this point, the teacher would engage students in some academic activity, showing them how to use a suffix to change the word to describing form, that is, fearful, or to state the word in a different descriptive form such as afraid or scared. Then, students might be asked to search the next page of the story for describing words which the author used for the child in the story as well as for any of their own describing words. Finally, students might be asked to read the sentences describing the child in the story (the author's use of skill five) and then make up their own sentences using the describing words they generated. This technique of focusing attention by first using single describing words and then using the words to compose complete thoughts is a valuable tool in helping beginning writers.

Connecting Communication with Subject Matter

The first skill in the communication talent is very useful in vocabulary development, especially in helping students realize how many words they have available in their understood vocabulary, if not in their spoken and written vocabulary. Unlike the second skill, the first communication skill focuses on cognitive describing words, words that describe the look, sound, taste, smell and feel of something, as opposed to its emotional state. In a study of ***The Scarlet Letter,*** a teacher and her students made use of the first two communication skills to analyze the main character. Students were asked to give single words that the townspeople might use in describing Hester (skill one) and words describing their feelings about Hester (skill two); subsequently, they made three other lists of describing words that might be used by Mr. Dimmesdale, Pearl, and Hester herself. The four lists of describing words were used to help students develop flexibility in analyzing Hester from different points of view.

The third skill in communication focuses on helping students create their own comparisons (in the form of similes) rather than relying on cliches. A kindergarten teacher used this skill in helping students develop these opposite concepts: rough and smooth. Students were given pieces of sandpaper and silk to touch and were asked to think of things in their own experience or imagination to complete these sentences: This sandpaper is as rough as ________; this silk is as smooth as ________. Not surprisingly, the activity did not end with the ideas generated in the few minutes of this lesson; for several days, students continued to point out things around them that were as rough as sandpaper and as smooth as silk. The culmination of the activity came with the development of a class book in which students illustrated and labeled many of their comparisons.

Skill four in the communication talent was identified originally with the intent of helping students to develop empathy, to participate in the feelings of another person by sharing similar experiences. In practice, it was found that the expression of ideas and feelings actually took the form of a network of meaning and thus reflected skill five rather than a distinct form of its own. As a result, skill four is now used simply as another form of skill five.

Skill five of the communication talent focuses on the development of complete thoughts, ideas or feelings in spoken or written language. The products of this skill are varied and can range from the development of sets of questions for an interview to the writing of poetry, letters, news articles, lab reports, stories or essays. One teacher used this skill in helping students examine an issue of heated discussion with a more scientific approach. Following the reading of an article on recent attempts to prove the existence of the Loch Ness monster, students were excitedly discussing their different points of view. Capitalizing on the students' interest, the teacher used skill five to focus the discussion and posed this challenge: "What are all the different questions you would need to ask to determine if there is a Loch Ness monster?" Just this listing of questions helped most students realize how many unanswered questions there still are in this exciting mystery. For a few students, the list of questions was a spur to further investigation of the issue.

The role of clarity in written language also can be emphasized through the use of skill five. A math teacher asked students to use this skill in writing their own word problems, incorporating processes studied earlier. Having other students try to work the problems as written led to some excellent discussion and subsequent rewriting efforts.

The sixth skill in the communication cluster focuses exclusively on nonverbal language. A typical activity calls for pantomime, role play, or movement exercise. A first grade teacher engaged students in using this skill following a visit to the local zoo. After a warm-up activity in which students imitated the movements of various animals they had observed, the teacher posed more challenging situations for role play: "Without using words, show in many, different ways how the animals would act in these situations: a bear who can't catch the peanut a boy is throwing across the fence; a monkey who has found a new play mate; a giraffe who has been fed enormous amounts of peanuts or popcorn that giraffes are not supposed to have; a tiger just before feeding time and just after feeding time." Follow-up discussion of student interpretation took into consideration facial expression, gestures, body movement, etc. A variety of other examples using the different communication skills can be found in ***Talent Activity Packet*** (1974).

Basic Instructional Strategies for Teaching the Talents

Classroom strategies for implementing thinking skills instruction were developed and tested in the Talents Unlimited project. These strategies reflect much of what we know from research on the kinds of behaviors teachers use that seem to enhance student learning (Costa, 1981). Specifically, teachers were trained in the following instructional skills: (1) giving directions or asking questions which contain specific cues for the cognitive tasks the student is to perform, (2) providing time for students to respond, (3) accepting/rewarding students' ideas and building upon their ideas and (4) modeling the thinking skills for students.

Teacher observation and feedback plus self-evaluation are used to assist teachers in the development of these skills. A self-rating scale which addresses the major instructional competencies is found in Figure 6.

Giving Specific Directions

In the Talents Unlimited instructional model, how directions are given or questions are asked to stimulate particular thinking skills is a critical factor. The cues for what cognitive task the student is to perform are embedded in the teacher's directions or questions (see Table 2). The use of precisely-stated instructions in the Talents Unlimited model is a deliberate technique to help students focus properly on the learning activity. Kounin (1970) and Dalis (1970) suggested that the clarity of teacher directions has an impact on students' behavior; directions which are confusing, incomplete or too

Name ____________________ Date __________
School ____________________ Grade __________
Talent ________________ Curriculum Area __________
Title of Activity____________________

MOTIVATION

A. Situational — I feel that the way I developed interest in the situation or identified the context for this activity was successful to this degree:

1 2 3 4 5 6 7 8 9

Comments:

B. Process — I feel that the way I used one of the four approaches to process warm-up was effective to this degree:

1 2 3 4 5 6 7 8 9

Comments:

TEACHER TALK

I feel that the questions, statements and/or directions that I used were successful in eliciting the type of student responses appropriate for developing this talent to this degree:

1 2 3 4 5 6 7 8 9

Comments:

STUDENT RESPONSE

I feel that I was successful in stimulating the student behaviors I had selected to emphasize for this lesson to this degree:

1 2 3 4 5 6 7 8 9

Comments:

REINFORCEMENT

I feel that in this lesson my use of oral praise as well as nonverbal encouragement reinforced student behaviors positively to this degree:

1 2 3 4 5 6 7 8 9

Comments:

Figure 6. Teacher Self-Rating Scale

complex adversely affect student learning. Further, research by Cole and Williams (1973) indicated that "the cognitive level, length and syntax of pupil responses are highly contingent upon cognitive level of teacher questions (p. 144)"—i.e., you get what you ask for.

Another aspect of the rationale for instructing teachers in the systematic use of specific skill component cues for each of the talent clusters is related to evaluation of student performance. When teachers understand and use specific skill components in their instruction, they are more likely to identify those skills when they occur in students' performance and they are able to differentiate students who are making progress in thinking and those who are not. The examples of classroom instruction in the various talent clusters given in the preceding section illustrated the systematic use of specific cues in the questions or directions given by the teacher.

Providing Time for Students to Respond

Giving students time to reflect and generate ideas or responses to questions is especially critical when the questions call for higher order thinking skills rather than for mere recall. Rowe (1974) found that the "*wait time*" between teacher question and student response is usually one or two seconds. An increase to three seconds or longer in the time a teacher is silent after asking a question produces substantial changes in student-to-student interaction, creativeness and speculativeness of student response, and nonverbal students' participation.

The work of Paul Torrance (Torrance & Meyers, 1970) has long supported the importance of time in enhancing the quality of creative response. Torrance advocated warm-up time as a way of helping students become familiar with a new way of thinking. In this process youngsters are encouraged to continue reflecting on a question or idea to generate more and better ideas. Torrance advised teachers that students tend to go through several stages or plateaus when they are asked to think creatively. At first, ideas will be rather common and ordinary. As continued thinking is encouraged, ideas may become whimsical and even appear "*silly*." When students are given even more time and encouragement to think creatively, original thinking often emerges. Teachers trained in the Talents Unlimited model are encouraged to provide this kind of approving wait time in expectation of progressively improving student response.

Accepting/Rewarding Students' Ideas

Research has demonstrated that cognitive achievement and student attitude toward learning are enhanced in classrooms where teachers accepted, built upon, restated or extended students' ideas (Flanders, 1960; Wallen, 1966). Many writers have supported the importance of a responsive environment in the creative growth of students (Maslow, 1968; Rogers, 1962; Torrance, 1962). Torrance and Myers (1970) listed a variety of teacher behaviors for encouraging creative and critical thinking in students: (1) listen or watch with interest as students share ideas, (2) agree with, approve, or praise students' ideas, (3) encourage further inquiry and (4) provide time and resources for students to implement ideas.

Simple verbal praise of a student's idea (e.g., "That's an interesting strategy for taking a random sample, Mary") or a smile in recognition of a new solution are strategies for providing a responsive environment that are familiar to most teachers. In the Talents Unlimited model, teachers are trained to be specific in the praise they offer (e.g., "Good, Mike, you used your answers to three of the criteria questions to support your decision"). The aim is to help students clarify goals of their thinking efforts and to develop strategies of action to achieve goals.

Modeling Thinking Skills

Modeling behavior is associated with the tendency of people to match their behaviors to those people in their environment who are important to them. Bandura (1963) suggested that new patterns of behavior can be acquired through observation and imitation alone.

In the Talents Unlimited instructional model, teachers are encouraged to provide students with models of the various talent clusters. Teachers use their own creative and critical thinking efforts as a personal model for students. For example, when a teacher explains a project she wants the class to undertake, she also can describe how she used her decision making talent to select the project. This kind of *"thinking aloud"* serves as a model for the skills being taught to youngsters. In much the same way, teachers encourage peer modeling. In the discussion following the use of a talent cluster, the teacher asks students to describe aloud the way they used a particular skill or the strategy they employed to get through a difficult place in the activity (e.g., how to shift into another category or viewpoint). Encouraging students to evaluate their use of specific thinking skills and discuss ways to improve their uses of those skills also is part of the modeling process.

When students are encouraged to think about their own thinking, metacognitive abilities are being tapped. While metacognition was not part of the popular psychological terminology during the initial development of the Talents Unlimited model, the process of helping students exert conscious control over their cognitive processes is a fundamental goal of the project. Teaching the talent model openly to students, using specific cues and feedback, providing models and encouraging self-evaluation are all basic components of the effort to help students internalize the model and use the thinking skills in all areas of their lives.

Developing Materials for Talent Instruction

In the introduction to this chapter, several barriers to effective thinking skills instruction were discussed. One of these obstacles was defined as insufficient practice of selected skills and isolation of skills from one another and from subject matter. Beyer (1984b) suggested that effective instruction in thinking is developmental and requires practice over a long period of time; he described the development of sequential curricula to teach thinking skills throughout the grades K–12.

The Talents Unlimited model is based on the concept of developmental growth of students' thinking skills. Many of the classroom examples given in an earlier section detail the differentiation and variation of the thinking skills instruction. For example, illustrations of decision making instruction outlined a progression of teaching activities from assisting primary students in asking questions to help them "think more carefully about their alternatives," to soliciting criteria from older students, to teaching the process of weighing criteria for the more sophisticated and experienced decision maker. The initial research results on the Talents Unlimited project reflected the need for long-term instruction before significant results can be attained. In the development of curricula for implementing long-term practice of thinking skills, three major factors were addressed: (1) integration of skills instruction into all subject areas, (2) development of talent instructional activities for various student groupings and (3) variation in the mode of student response.

One of the concepts that emerged quickly during the early development of the Talents Unlimited model was that students vary in their use of certain talent skills across subject areas. Apparently, students' preferences and aptitudes for certain subject areas interact to some extent with their skill in using the talent clusters. Based on that observation, plus the goal of demonstrating to students the usefulness of the talent clusters in all areas of academic study, activities were written and implemented so that all subject areas were tapped by each talent cluster with approximately equal frequency.

Varying the size of the instructional group was another consideration in the development of talent activities. Some talent teaching lends itself nicely to a large group setting. For example, a total group productive thinking session to generate a variety of subtle and unique ways in which senior citizens are stereotyped in our society is an effective way to initiate interest and discussion in a unit on gerontology. Implementing talent instruction in a whole class context provides the potential for a great deal of hitchhiking of ideas and for peer modeling; however, without sensitive teacher leadership, a few high productive thinkers could dominate such an activity. Sometimes small groups might be organized for initial brainstorming before a general sharing session with group leaders assuming responsibility for eliciting ideas from all group members.

Small group instruction in the talent skills also can be implemented at the elementary level through the usual grouping patterns used for instruction in certain academic subjects such as reading and math. For example, a reading group which is focusing on a selection about the fear and loneliness of a child who has just moved to a new school might be asked to do some on-the-spot productive thinking: "What are all the varied and unusual ways you could help a new student in our class feel less lonely and afraid?" Or a math group being introduced to fractional parts might be asked to think of many, different, unusual situations in which it would be important to know how to divide things into halves or fourths.

Individual instruction in the talents is important too. A student who is working on a project for a science fair may have sound data for a study but fail in the effective presentation of ideas; an observant teacher might engage the student in using productive thinking to generate a variety of unique strategies for displaying the project. This kind of individual application of talent instruction also contributes to the student's concept of the practical, day-to-day value of the talent skills.

One other factor addressed in the development of talent activities is the variation in mode of student response which is elicited. Talent activities designed for very young students typically call for oral responses or drawn responses with labels added by the teacher or other helpers. A variation of oral responses for older students includes the recording of ideas on a chalkboard or chart by the teacher or a student. Kinesthetic responses are appropriate for all students, depending on the nature of the activity. Written responses are more frequently used with students having the ability to write independently; it should be noted however that oral responses are equally effective with older students and often facilitate purposes of a class discussion. Teachers who are alert to variations in the preferences of their students for different modes of response will find that variety is the key to effective use of talent instruction. ***Talent Activity Packet*** (1974), as well as curricula developed by adopters of the Talents Unlimited model, reflect the integration of talent instruction in all subject areas and the use of a variety of grouping strategies and student response patterns.

Using the Talents Unlimited Model with Gifted Students

As the only project on the National Diffusion Network approved for gifted/talented programs, the Talents Unlimited model has been reflected frequently in special programs for these exceptional students. The usefulness of the multiple talent model as one component in program development for gifted students has been documented (Schlichter, 1981). This instructional approach, like many other teaching/learning models designed to enhance higher order cognitive skills, can be implemented as a support system in assisting gifted students as they conduct investigations of problems of interest to them. Regular classroom teachers, as well as special teachers of the gifted, can organize the multiple talent skills as a strategy for helping these students focus an interest, define the interest in terms of a problem, and move through a process of solving the problem in a manner appropriate to students' interests and abilities.

The most appropriate use of the multiple talent skills with gifted youngsters has been as a training process for helping these students organize and manage the investigation of a major problem or topic. The talent skills are a means to an end, not an end in themselves; they provide the mental calisthenics for the primary goal of gifted education: independent investigation of real problems (Renzulli, 1977).

Implications for Gifted Students in the Regular Classroom

The initial research on the Talents Unlimited program reported in this chapter was conducted with heterogeneous groups of students in the mainstream and the resulting data do not address specific questions concerning the effectiveness of the multiple talent model with identified gifted students. A subsequent replication study using gifted students produced significant results for all talents (Chissom & McLean, 1980). Taken together these data give some direction in suggesting possible implications for gifted education in the areas of identification and enrichment. These implications are discussed in the context of a broad rationale for gifted programs, as proposed by Renzulli (1977). Research is currently being conducted to examine specific aspects of the usefulness of the Talents Unlimited model as a support system in the context of such a comprehensive approach to programming as the Enrichment Triad Model.

Student Identification

The Criterion Referenced Tests of Talents used in the summative evaluation of student progress in talent development, as well as the teacher's use of guided observation to determine progress in talent areas on a regular basis, provide information for determining individual student performance which can be rated as below average, average, above average and outstanding. This information on a wide range of thinking skills, including creative thinking abilities, has implications for assisting classroom teachers in identifying students with superior potential in a variety of areas.

Teachers have ample opportunity to observe and identify above-average performance in a variety of thinking processes in many disciplines with the use of the Talents Unlimited model. Further, the staff development involved in the implementation of this model can play an important role in sensitizing teachers to specific behaviors of students which indicate talent potential and in enhancing teaching strategies for the encouragement of these specific talents. Teacher training in the use of the Talents Unlimited model may be an important step toward more effective teacher referral of youngsters with outstanding abilities. The use of the talent assessment data on individual students may go a long way in reducing the bias of teachers in referring as gifted only those students with high scores on intelligence tests.

Another implication of multiple talent teaching relates to its potential use in identifying large numbers of minority and disadvantaged gifted youngsters. In the Talents Unlimited research, successes in student talent development were as well represented in the predominantly rural and black experimental schools as in the predominantly urban and white middle-class experimental schools (Chissom & McLean, 1980). Because success in the Talents Unlimited model is not limited to performance on traditional academic criteria and because success in the use of the talents may be demonstrated in a variety of disciplines or contexts, youngsters from varied backgrounds have many opportunities to reveal their potential. For rural and disadvantaged youngsters with high potential, the systematic use of multiple talent teaching in regular class programs may lead to greater identification and inclusion of these underrepresented groups in programs for the gifted.

Classroom Enrichment

Teachers of the Talents Unlimited model are trained to provide systematic opportunities for all youngsters in a class group to develop potential in all talent areas and especially in the one or more talents identified as a student's particular strengths. Often these group activities can stimulate possibilities for individual youngsters to pursue an idea or project further, as well as provide opportunities for training in specific thinking skills. Two examples of this kind of classroom enrichment are described below.

A classroom teacher helped third-grade students involved in a map study unit explore the variety of tasks a mapmaker engages in. The teacher showed students a number of maps, ranging from the usual world geographical maps and state highway maps to some unusual special interest maps, including one locating all the tourist attractions in a particular city. Students expressed surprise and curiosity about the special interest maps; drawing on this interest, the teacher asked students to use productive thinking to think of all the different kinds of unusual special interest maps they would like to have a cartographer design. A long list of ideas helped students realize that there are many topics that can be the subject for a map and that a cartographer's work may be quite varied. While the formal lesson ended as this point was made, the impact of the discussion continued through the interest of one student who wanted to make a special map he thought was needed. With the help of the classroom teacher and a special resource teacher, this student spent a portion of the next several weeks developing a color-coded map that located the main car racing sites in the southeast for various seasons of the year. The audience for this map was a group of friends with whom the boy and his father spent many weekend hours attending racing events.

An ecological awareness activity provided a similar stimulus for middle school students. Participants in a science class were asked to make some observations over several days of ecological practices and problems in their community. The follow-up discussion included an analysis of the observations which the teacher then focused in the form of a decision making activity: "What ecological problem is the worst in our community?" More discussion followed the decision, including some initial brainstorming of solutions, and the teacher suggested that students might use some of the identified problems as the basis for a project.

While student projects do not necessarily result in what Renzulli terms a Type III activity, this use of a talent cluster demonstrates a strategy for engaging students in exploratory activity that uncovers possible topics for further investigation. Additionally, this use of a teaching/learning model in the regular classroom provides some continuity between the regular program and special services for gifted students as the regular classroom teacher assumes some responsibility for identifying special interests and abilities of students who may require additional services to realize their potential.

Talents Instruction in Special Programs for the Gifted

In the last section, implications of multiple talent teaching for gifted youngsters in regular classroom programs were discussed. The purpose of this section is to discuss implications of the Talents Unlimited model for gifted youth who are served in special programs for at least a portion of their school time.

A Problem-Solving Model

To understand one application of the multiple talent model in special programs for the gifted, it is important to recognize that the components of this teaching/learning model interact dynamically; the multiple talent model is cyclical rather than linear in nature. The major talent processes form natural linkages for a comprehensive problem-solving model not unlike well-documented models used by adult problem solvers in the world of work, such as the Osborn-Parnes model (Parnes et al. 1977).

For example, second-grade gifted students in a resource room program became interested in animal welfare as one student told of her feelings about seeing many injured and slain animals along the highway she traveled on a weekend trip. Sensing a strong interest and concern on the part of the students, the teacher arranged a trip to the city's animal shelter and humane society office. The director expressed concern about the possible closing of the animal shelter because of under-funding and lack of public support.

Using the forecasting talent as a guide, the teacher had students predict the consequences of closing the shelter. The decision making talent processes were used to decide which of the predicted consequences presented the most pressing problem. After generating criteria and weighing alternatives, the students felt that making people aware of the important work of the humane society was most important.

The continuation of this problem-solving process took place primarily with a smaller group of highly interested students. The next step involved use of both the productive thinking talent to generate possible solutions and the academic talent to research the situation. Briefly (though the entire process involved weeks of time and effort), these second graders completed the problem-solving process with the following steps: (1) they evaluated possible solutions to determine which was best (a return to decision making), (2) they used the planning talent to develop a plan of action for implementing the solution, a process which incorporates special cases of forecasting (predicting possible problems within the plan of action) and productive thinking (thinking of all the different things they could do to solve the identified problems in the plan), (3) they used communication talent skills to present their ideas to others and (4) they began implementation of a solution which involved the development of a junior Humane Society and the presentation of special programs on the animal shelter to students in local elementary schools.

An organizational strategy may be developed by which a teacher, trained in the use of the multiple talent model, might assist and instruct gifted students in focusing an interest, defining it in terms of a problem, and moving through a process of investigation for solving the problem in a manner appropriate to the students' interests and abilities. An important aspect of such a process is open discussion with youngsters about what is happening as they work through a problem and a discussion of the problem-solving model itself (i.e., the teacher helping the youngsters articulate what they are doing by thinking out loud or, on occasion, the teacher observing aloud what he or she sees happening as the youngsters wrestle with the problem).

The linking of talents for problem solving does not necessarily have to include all the talent clusters; two or three talents may interact to assist students. Such a situation occurred with a group of bright middle school students who were involved in survey research. Following a work session with a resource person on the selection of questions and development of procedures for implementation of an opinion poll, students were discussing the management of data. The issue of confidentiality in handling data developed during the session. To help students explore important implications of this issue, the teacher asked students to predict the different things that might happen if confidentiality of information were not honored in the survey process. The resulting generation of possible problems led students to ask what could be done about protecting confidentiality. The obvious next step was productive thinking for the development of possible safeguards and, then, decision making for the selection of the best ideas to implement to ensure confidentiality.

The key to using talent instruction effectively as a problem-solving model is the teacher's sensitivity to the natural opportunities for focusing a discussion or situation with a well-framed question. In addition, the teacher can assist students in developing greater awareness of their use of problem solving skills with guided discussion.

The act of analyzing and reflecting on the process of real problem solving may be more critical in the transfer potential claimed for the use of higher order cognitive processes (Taylor, 1969) than the mere opportunity to use the processes. The linking of the talent processes in dynamic interaction, as opposed to their use primarily as discrete skills in unrelated exercises, may be a more powerful model for helping bright students make the connection between their problem-solving activity and the problem-solving activity in the world of work.

Developing Methodological Skills

In earlier sections, a case was made for the training of all youngsters in a variety of thinking skills. Descriptions of uses of the Talents Unlimited model in providing instruction both in the regular classroom and in special programs for the gifted illustrated the fit of this teaching/learning model in what Renzulli (1977) terms Type II enrichment.

Type II Enrichment activities can assume a different dimension of specificity when they are focused on assisting gifted students who have defined a specific problem or topic for investigation. In describing the kind of enrichment appropriate mainly for gifted students (i.e., Type III), Renzulli discusses activities in which youngsters become actual investigators of real problems or topics by using appropriate methods of inquiry, the methodological skills of professionals. He proposes that helping students assume the posture of beginning investigators by using the methods of the historian, anthropologist, or other professional makes it easier for the student to learn and to develop a positive attitude for a field of study than if the student is continually engaged in presented exercises, mere practice sessions in skills bearing little relationship to those used by real investigators. An illustration of the use of talents instruction to assist students in the development of methodological skills is given below.

A group of elementary gifted students became interested in a community effort to revitalize one of the historic sites of the state's capital in their own county. After youngsters worked at length with the local historical society, a university historian, a restoration architect, and members of a special city commission, a decision was made by one group to work on the problem concerning the lack of geneological records on the two cemeteries at the site. The teacher provided technical assistance to the students in the use of maps and grids to record grave locations, and a local librarian provided information to assist in the design of a form to record geneological information. The design and use of the geneological form involved specific use of the planning talent; further, the students were encouraged to use productive thinking skills to devise ways of making the records on the two cemeteries more complete and interesting for people who would use such information.

Another use of the talents model in developing methodological skills is of a more comprehensive nature: the development and management of an overall plan for an independent project. For example, the use of Renzulli and Smith's (1977) ***Management Plan for Individual and Small Group Investigations*** involves critical use of higher order thinking skills implicit in the Talents Unlimited model. The planning talent assumes a dominant role as a student identifies goals, lists resources and describes procedures and time table for getting a project under way. In addition, a teacher or mentor working with the student in the development of the management plan might make use of productive thinking and decision making in generating and selecting the product(s) and audience(s) for the project. Forecasting could be useful in progress report conferences as the student analyzes the causes for successes and failures and makes predictions and revisions for what might happen next. The culmination of the investigation (i.e., the presentation of product to audience), would draw heavily on skills of the communication talent.

The Talents Unlimited model can be useful in a variety of ways in programs for gifted students. The use of the talent clusters can help bright students uncover and focus special interests as well as provide general training in a variety of cognitive and affective processes. In addition, the talent skills can be focused specifically to assist students in developing methodological skills needed to pursue an investigation in the manner of a professional, and they can be used in the development and implementation of an individual management plan for an investigation.

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Discussion Questions

1 Why is instruction in higher order thinking processes important for all students? What role does such instruction have in a program for gifted students?

2 What obstacles have hindered the effective teaching of thinking skills? What practical approaches might be used to overcome these barriers?

3 What basic tenets underlie the rationale for the multiple talent approach to teaching?

4 Define the talent clusters which comprise the Talents Unlimited model.

5 In what ways has the success of the Talents Unlimited project been demonstrated?

6 How does "teaching the model" contribute to the overall instructional component of the Talents Unlimited program?

7 How does student instruction in the talent skills vary at the elementary and secondary levels?

8 Discuss the importance of these basic instructional strategies in the Talents Unlimited model: (a) giving specific directions, (b) providing time for student response, (c) rewarding students' ideas and (d) modeling thinking skills.

9 How can instruction in the multiple talent approach to teaching help regular classroom teachers identify gifted students and provide enrichment for them in the general instructional program?

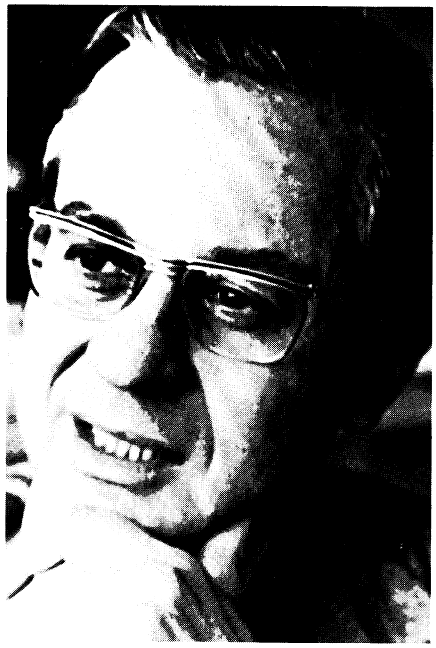
10 In what ways can the Talents Unlimited model provide differentiated instruction for gifted students in special resource programs?

11 Think of a content/interest area in which you provide instruction/exploration for students. Develop your own application of the talent skills by designing at least three teaching activities that use the behaviors of three different talent clusters.

12 If you used the Talents Unlimited model in your gifted program, in what ways might you evaluate its effectiveness in meeting the goals of the program?

Abraham J. Tannenbaum

XIII



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Abraham J. Tannenbaum, a Ph.D. in social psychology, is professor of education and psychology at Teachers College, Columbia University, where he directs programs in the education of the gifted and of the behaviorally disordered. He entered the field of the gifted in 1954 as a student assistant in the Talented Youth Project at the Horace Mann–Lincoln Institute of School Experimentation, Teachers College, Columbia University. Upon assuming his current post in the Department of Special Education in 1965, he accepted the responsibility for designing and implementing masters and doctoral programs in the gifted, and he has maintained that responsibility continually to this day.

From 1975 to 1980 Dr. Tannenbaum directed the federally sponsored Graduate Leadership Education Project, which involved seven universities in concerted efforts to produce future leaders in the field of educating the gifted. He has served as president of the Metropolitan Association for the Study of the Gifted (1964–1965) and of the Council for Children with Behavioral Disorders (1975–1976), and he is a recipient of the Hollingworth Award for research on the gifted (1981) and of the National Association for Gifted Children's Distinguished Scholar Award (1985). His most recent major work in the field is a book, ***Gifted Children: Psychological and Educational Perspectives*** (Macmillan, 1983), which he describes as *"a critical success and a commercial flop."*

Summary

The Enrichment Matrix Model

The Enrichment Matrix is designed to nurture the potentialities of children who seem to show early signs of someday becoming high-level *producers* (not just consumers) of ideas, or *performers* (not just appreciators) of artistic feats and of services to society. Since there are no valid measures for identifying these kinds of early promise, much depends on how children perform on tasks similar to those featured in the Matrix. The procedure for identification is therefore not the usual two-step diagnose-and-then-treat sequence; instead, the direction between diagnosis and treatment is both ways, back and forth, in which response to enrichment experiences is a *means* of determining who may be gifted as well as a *consequence* of such a determination.

The Matrix is intended to be *programmatic* rather than *provisional*, in the sense that it is designed as an educational imperative, not an elective. It offers conventional subject matter and allows for the addition of content areas that are usually absent from the pre-college curriculum. It then calls for adjusting the content in the following ways: (1) *telescoping the common core*, in which qualified students are accelerated through conventional subject matter; (2) *expanding basic skills and competencies*, which emphasizes the "tools of learning" needed for becoming a producer or a performer; (3) *programmatic augmentation*, or prescribing supplementary, related content in order to add dimension to the regular scope and sequence; (4) *provisional augmentation*, which enables teachers to share their own cultural passions with children; and (5) *out-of-school augmentation*, which enables children to pursue their own cultural passions under the aegis of off-campus experts. Higher level thinking skills are emphasized in all basic and adjusted content areas. Finally, the social and affective consequences of being gifted in the various disciplines are addressed by all participants in the program.

The Enrichment Matrix Model

An encouraging trend in the education of the gifted is the emergence of conceptual frameworks for curriculum development aimed at replacing the usual *ad hoc*, add-on, enrichment offerings in our schools. It is by no means a megatrend since the overwhelming majority of children with extraordinary potential have never been exposed to *special* classroom experiences designed to stretch their minds as far as reasonably possible. And the fortunate few who benefit from such exposure often have to settle for a patchwork of off-beat activities, put together haphazardly, that amount to curriculum ornaments rather than staples. Many so-called "*enrichment*" exercises consist of nothing more than brain twisters, intellect teasers, conundrums and puzzles that may be attractive to anybody whose mind craves such stimulation. But the effect is that of a quick fix, satisfying for the moment or even intoxicating for as long as the supply lasts, while the complex needs and capacities of the gifted child remain largely ignored. The only viable alternative is the creation of instructional models for the gifted which enable educators to follow guidelines rather than "*seat-of-the-pants*" inclinations in planning enrichment for children they consider able and ambitious.

The proposed Enrichment Matrix attempts to offer educators a programmatic framework for educating the gifted. It is predicated on several assumptions regarding **how** to define giftedness, **who** qualifies as gifted, **what** constitutes an appropriate curriculum, **why** enrichment is important, and **where** special educational experiences should be offered. It also postulates qualifications for teachers of the gifted and differences between quality education for all children and uniquely appropriate ways of challenging the gifted. Finally, it suggests an isomorphic relationship that threads through the proposed definition of giftedness, identifying giftedness in children, the Enrichment Matrix, and a design for evaluating the effects of such a framework on nurturing giftedness.

A Definition of Giftedness

Judging from the many ways in which giftedness has been defined, there appears to be general agreement about some basic issues. First and foremost, there is no hesitation to focus on children, since precocity among the young is seen as a reasonably good forerunner of their future distinction. These children are not seen as a "breed apart" with unfathomable mental powers or mindsets for finding and solving problems in ways that seem miraculous for others of their age group. Rather than being characterized as *qualitatively* different, they are singled out for having *quantifiable* gifts such as accomplishing unusual and important things *faster* at a *younger* age than expected, with *greater* efficiency, and *more* imaginatively in comparison with their peers. Finally, the fact that gifted children are heterogeneous in the talents they possess is generally accepted without controversy, although schools still nurture academic skills more ardently than any others.

But despite the general consensus on basic issues, there is still some confusion about the term "*giftedness*" and its practical application. Part of the difficulty lies in the fact that a large body of literature equates it with high IQ. Most modern writers on the subject deny the association by saying it is too simplistic, but many ignore their own denials by generalizing about the nature of giftedness on the basis of studies of high-IQ

This chapter is based on sections of the author's book,* **Gifted Children: Psychological and Educational Perspectives (Macmillan, 1983).

children. Of course, it is not easy to avoid such a trap since much of the published research has been conducted on this kind of population. Nevertheless, some caution has to be exercised or educators will be forever trapped by the "*giftedness-equals-high-IQ*" myth despite popular protests to the contrary.

What makes the concept of giftedness even fuzzier is a tendency among some educators to separate it from the label *talent*, thus referring to the target population as "gifted *and* talented." Such a division can be misleading—dangerously so. It creates an impression that the children within each group resemble each other intellectually and personologically, but in the aggregate they differ from those in the other group. The truth is that children cannot be homogenized, even the ablest among them, and the variability should not only be recognized but also respected. A gifted-talented dichotomy can also mislead people into taking sides as to which type of aptitude is more precious or vital to public interests. This would allow room for favoritism toward some children over others, depending on whether their special abilities classify them as gifted or as talented, a prospect that sounds like foolishness, but borders on prejudice.

Differences Between Promise and Fulfillment

Since it is generally agreed that giftedness exists in children as well as in adults, a clear distinction has to be made between them. Work accomplished during a person's maturity can be evaluated by objective standards if its aim is, for example, to prevent rejection of transplanted human organs. Or it can be subjected to critical review, as in the case of poetic composition, to determine whether it deserves to be disseminated and treasured. Not so with children's achievements. Although history records many cases of immortals whose childhood accomplishments are among the most celebrated in their fields, children who are usually identified as gifted would fail to represent greatness if they were judged on the basis of universal criteria. Instead, they have to be compared with others of their age for early signs of talent that is amenable to nurturance and that promises to live up to high expectations in the future.

Of course, there can never be any assurance that precocious children will fulfill their potential. Defining giftedness among them is therefore necessarily risky. One set of criteria may be *ineffective* because it excludes too many children who may grow up to be gifted; other qualifying characteristics may prove to be *inefficient* by including too many who turn out to be nongifted. There is inevitably a trade-off between effectiveness and efficiency, and educators tend to opt for a definition that enables them to cast the widest possible net at the outset to be sure not to neglect children whose high potential may be all but hidden from view. On the assumption that developed talent exists only in adults, a proposed definition of giftedness in children is that it denotes their potential for becoming critically acclaimed performers or exemplary producers of ideas in spheres of activity that enhance the moral, physical, emotional, social, intellectual or aesthetic life of humanity.

In essence, then, giftedness is generated by either of two broad categories of ability: (1) skills in **producing** important new ideas or material inventions, or (2) skills in **performing** brilliantly before appreciative audiences or in the service of various kinds of clientele who benefit from such services. In one sense this definition is broadly inclusive, embracing a wide range of talents; from another perspective it is restrictive, since there is no place in it for rapid learners of existing ideas or for admirers of great performance. It further distinguishes between the "*potentially gifted*" who show early signs of someday producing or performing with distinction, in contrast to the "*gifted*" whose exceptional abilities are already demonstrated and widely acclaimed in their own or subsequent generations.

Outstanding contributors to the arts, sciences, letters and general well-being of fellow humans tend often to show signs of promise in childhood. It is therefore reasonable to identify precocious children as the pool from which the most highly gifted are likely to emerge. But precocity only signifies rapid learning of ideas or about people, the ability to grasp abstractions quickly and efficiently, and generally to display skills far beyond those expected at the child's age level. Early schooling is reserved mainly for encountering, distilling, synthesizing and *consuming* knowledge. *Producing* knowledge with great inventiveness and impact, which is a sign of giftedness, comes later in a person's growth cycle.

Frequently, even voracious young consumers remain that way without ever becoming producers; instead, they grow up as superannuated precocious children. At cocktail parties they are easily recognizable as glib, superficial bores who have ready-made and forceful opinions about any issue under discussion and are always ready to unload their vast storehouses of trivia on audiences of almost any size. Truly gifted children, on the other hand, are sometimes far more limited in what they are capable of absorbing, and their marks on standardized and teacher-made tests show it, yet they could someday prove capable of making important contributions to the world of ideas. Generally speaking, however, renowned producers tend to have a history of extraordinary consumption, and they use their storehouse of understandings to great advantage in making original contributions.

Linkages Between Promise and Fulfillment

Those who have the potential for succeeding as gifted adults require not only the personal attributes that are often mentioned in definitions of giftedness, but also some special encounters with the environment to facilitate the emergence of talent. The internal and external requirements may be illustrated in a starfish-like design, with giftedness produced by the overlap of all five factors (see Figure 1). These factors are characterized as follows:

General Ability. Perhaps the most accurate label for general ability is the so-called "*g*" factor, which is defined roughly as some kind of mysterious intellectual power common to a wide variety of specific competencies and measured most accurately by tests of general intelligence, or the IQ. These instruments reveal individual differences on tasks requiring abstract reasoning skills which figure on a sliding scale in all high-level talent areas. This means that different minimal IQs are necessary for various kinds of accomplishment—higher in academic subjects than, for example, in the performing arts. It is therefore naive to make dogmatic assertions about the IQ, such as discounting its relevance to giftedness entirely or claiming that all those destined to become great producers or performers in any area of human activity need to have IQs higher than 99% of the general population. Instead, positions along this continuum should be adjusted according to the talent area, which means taking a stance closer to one extreme for some kinds of giftedness and nearer the opposite extreme for others.

Special Ability. It is meaningless to regard children as gifted in general intelligence, even though the "*g*" factor may figure prominently in many kinds of outstanding performance and productivity. Giftedness means being exceptionally bright at doing something that is highly respected, and most people are unable to do many things equally well. Instead, they have special capacities and affinities for particular kinds of work. These aptitudes are becoming more and more recognizable in children, albeit not at the same chronological age. Some kinds of musical talent appear as early as the preschool years, whereas insight into social and political structures develops much later

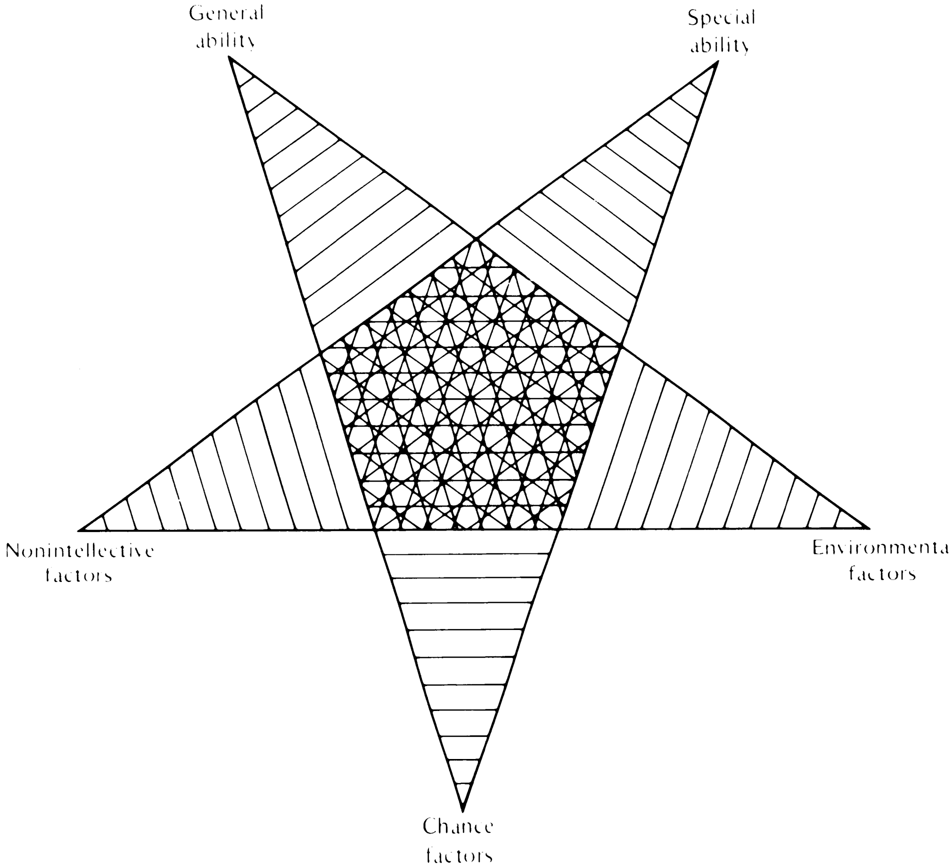

Figure 1. The five factors that "mesh" into excellence.

in childhood. Whatever the aptitudes may be, it is necessary to assess them as soon as they become measurable so as to determine the extent of the child's special talents and whether to design appropriate curriculum modifications to cultivate these talents.

Nonintellective Factors. Ability alone cannot facilitate great accomplishment. It also requires a confluence of various nonintellective facilitators such as ego strength, dedication to a chosen field of productivity or performance, willingness to sacrifice short-term satisfaction for the sake of long-term accomplishment, and many others. These traits are integral to the achieving personality regardless of the areas in which talent manifests itself. However, it is not known which of the nonintellective attributes are *responsible* for creative achievement, which are merely *associated* with it, and which are *by-products* of it. Among the facilitative traits, there are two types that function in different ways. Some are of direct help to individual performance, and these include the familiar advantages of ambition, dedication and intellectual "perspiration." Others are unrelated to the product or performance at hand, but they help make it possible for gifted individuals to maximize their impact on audiences, patients or clients by calling attention to themselves and their work through personal charm or through a keen sense of promotional acumen. As important as these traits are for the fruition of giftedness, they tend to be unaccountably underplayed in comparison to intellective characteristics in studies of excellence.

Environmental Factors. There are no universal conditions under which all talents flourish. Conventional wisdom suggests that excellence thrives best in an atmosphere of love and encouragement. Yet there are some children who seem to respond to pressure or even adversity that galvanizes them to fulfill their potential. They succeed apparently *because* of the pressures, not just *despite* them. Obstacles that discourage most people from achieving, somehow challenge a few to "beat the odds" and "make it big." Their drive toward excellence may be basically an act of defiance against what they consider hostile, inhibiting forces in the world. For most children, however, stimulating home, school and community settings are indispensible not only for maximizing potentialities but also for helping to determine the directions they take. Parents serve as role models through their own achievement orientation while creating an enriched educational environment outside of school and urging their offspring to advance their studies to the fullest extent. The quality of classroom instruction also makes a difference, as do the attitudes of peers in and out of the classroom toward the life of the mind. As for the resources in the neighborhood, there are formal cultural institutions such as local museums, concert halls and libraries as well as human resources that can inspire and instruct. Without proper stimulation—supportiveness for some children, stressfulness for others—there is often a danger that those with outstanding mental endowment will "hide their lights under a bushel."

Chance Factors. Generally overlooked in studies of the fulfillment of talent are the entirely unpredictable events in a person's life that are critical both to the realization of promise and to the demonstration of developed talents. It is not only a matter of being in the right place at the right time, although that is important, too. There are many unforeseen circumstances in the opportunity structure and in the prevailing lifestyle that can make a big difference in the outlets for gifted performance. A brilliant medical researcher who is ready to achieve a breakthrough in disease control may suddenly and unpredictably be distracted by a personal crisis or by the lure of a social issue that is considered more immediately relevant to human concerns. The "market" for lawyers may be so glutted that even those with freshly minted doctorates of jurisprudence who have leadership potential in the legal profession find that there is little room for them to get started in their practice. Chance factors can also serve as facilitators of achievement, as in the case of the gifted young singer or actor who happens to meet and study with the right coach and makes the most of the opportunity.

In essence, then, great performance or productivity results from a rare blend of (1) superior general intellect, (2) distinctive special aptitudes, (3) the right combination of non-intellective traits, (4) a challenging environment and (5) the smile of good fortune at crucial periods of life. Each of these factors has a fixed threshold that represents the minimum essential for giftedness in *any* publicly valued activity. Research has not yet succeeded in revealing what thresholds are necessary for each of the five qualifiers of giftedness. But it is safe to say that whoever achieves some measure of eminence has to qualify by all these standards, and the person who is unable to measure up to just one of them cannot become truly outstanding. In other words, success depends upon a *combination of facilitators*, whereas failure results from even a *single deficit*. This truism should form the basis for understanding the relationship between promise and fulfillment.

For each of the five intellective, personological and social-situational factors connecting potential with high level accomplishment, there is also a threshold level that varies according to *specific* areas of excellence. Thus, for example, gifted artists may demonstrate exceptional talent in various art forms even though their general academic abilities are no greater than those of most college students. On the other hand, it is doubtful that science students without high academic promise could eventually become acclaimed as creative scientists. A reasonable assumption would therefore be that the IQ, along with spatial and scientific aptitude thresholds, have to be different for artists and scientists. Those who fail to measure up to any of these minimum essentials for their respective fields of endeavor could never compare with those who excel in these fields. By virtue of its "*veto*" power, then, every one of the five qualifiers is a *necessary* requisite of high achievement, but none of them has *sufficient* strength to overcome inadequacies in the others.

From the foregoing comments, it seems as if the causes of extraordinary accomplishment can be described best as resembling some kind of not-so-clear, complex moving target. The number and variety of antecedent variables preclude any easy designation of a child as gifted on the basis of a few performance measures. Besides, the causes are not the same for all kinds of giftedness. Every area of excellence has its own mix of requisite characteristics, even though general ability, special aptitudes, non-intellective, environmental and chance factors under which they are subsumed apply to all kinds of talent. These categories could be viewed as "*common denominators*" that are always associated with giftedness, no matter how it manifests itself. Yet within each of them, the threshold levels, below which outstanding achievement is impossible, have to be adjusted to fit every talent domain, and that adds to the difficulty of making predictions about the fulfillment of promise.

Conspicuously missing in this discussion of linkages between promise and fulfillment is the concept of creativity. Why not place it alongside general intelligence, special aptitudes, non-intellective facilitators, environmental influences and chance or luck? The answer is that it is not an additive to these factors but rather is integrated in each of them. In fact, creativity is synonymous with giftedness, which is defined as the potential for becoming either an outstanding producer or performer, not just a consumer, spectator or amateur appreciator of ideas. To the best of our knowledge, creativity (or giftedness) consists of a not-yet-known combination of general and specific abilities and personality traits associated with high potential that can be realized in a stimulating environment with the help of good fortune. Creativity, like giftedness, is judged by two criteria: the **extent** and **quality** of its inventiveness, *not* simply by skills in brainstorming or divergent thinking generated by a mind that is facile in such operations. Too often, the quality dimension is overlooked in favor of the offbeat and the profuse, and there is a tendency to forget that what is rare is not necessarily valued. Because it denotes rare *and* valued human accomplishment, creativity should be considered interchangeable with giftedness. For after all, giftedness is reflected in the ability to be an innovator of what is new and treasurable, not just a curator of what is old and treasured.

Identifying Giftedness

High potential in children means different things to different people. But no matter what definition is acceptable anywhere, identifying high potential in children has to be counted among the inexact sciences, partly because the methods and instruments available for that purpose are imprecise. Besides, childhood is usually too early in life for talent to be full blown, so it is necessary to settle for dealing with talent-in-the-making and to keep in mind the uncertainties about the future. Identification is, therefore, a matter of locating children who possess high potential in comparison with other children, with no guarantees that they will eventually excel by universal standards as adults, even with proper nurturance. In creating a pool of "*hopefuls*," it is best to admit any child who stands a ghost of a chance of someday making it to the top in the world of ideas. Of course, most of those who seem to be "*hopefuls*" are really "*doubtfuls*," but nobody can know for sure in advance. Bringing them into the pool under liberal admission criteria cannot be helped in any effort to increase the chances of uncovering hidden talent.

As inexact a science as identifying giftedness may be, the extent of its inexactness varies with the person's age, special abilities and subcultural membership. It is easier to predict children's performance at school than it is to predict their accomplishments following graduation; it is easier to recognize early potential in physics, chemistry and mathematics than it is in art, social work, business acumen and playwrighting; and it is easier to find talent among the privileged than among the underprivileged. To compound the problem, children are rarely gifted by universal standards of productivity or performance. They can only show the promise of excellence, but the likelihood of fulfillment usually ranges from fair to good, only sometimes perfect.

Considering the various problems associated with identification, the best that can be done is to find a relatively small pool of children with high potential from which the gifted will emerge. There is something of a Hobson's choice between being too *inclusive* and admitting excessive numbers of non-gifted children into the pool, or being too *exclusive* and overlooking those who rightfully belong there. The preferable option between the two is to err on the side of inclusion, with the understanding that further discriminations will have to begin soon afterwards. These follow-up assessments should be based on the child's performance in enrichment and enrichment-like activities, not just on tests similar to the ones that created the original talent pool.

What kind of standardized measure could possibly help locate the budding poet or politician? The only way to search for poetic talent is to teach verbally skilled children how to write poetry in a variety of forms, including some that are left out of the regular language arts curriculum, and to recognize as potentially gifted those children who respond most successfully to the special instruction. Such procedures are practiced all the time in the arts and in sports with gratifying results. But they are unaccountably ignored in many other talent domains that are of interest to educators. Schools therefore have to depart radically from the usual two-step, diagnosis-and-then-treat process advocated in medicine and in the education of the handicapped. The approach recommended here is an oscillating one (not vacillating!) between diagnosis and treatment: not only should the gifted be identified and then educated, but they should also be identified *through* education. In other words, **prescribed enrichment becomes a vehicle for identification as much as identification facilitates enrichment, the relationship being reciprocal.**

Identification should begin as early as possible in the child's life, and it should go on for as long as possible, because there are always opportunities for discovering new insights and correcting old errors or judgment. The process is in three stages that can be depicted in the shape of a funnel—wide at the receptive end, becoming sharply narrower toward the middle, which has a built-in filter, and tapering off until the drainage end, which also has a sievelike attachment. As illustrated in Figure 2, the stages are (1) ***screening,*** (2) ***selection*** and (3) ***differentiation.*** This sequence is repeated continuously for children not yet screened and also for those who had previously not "made it" into the first stage.

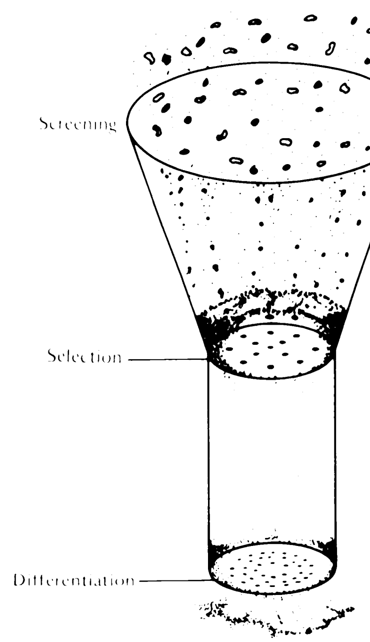

Figure 2. Three steps toward identification.

Screening

At the wide mouth of the funnel, the criteria for inclusion are liberal, and many of the instruments used at this stage assess remote and sometimes far-fetched indicators of potential, not just actual performance at school. The purpose here is to include even those children who only show vague hints of giftedness in order to determine later if they possess real potential. The identification process should limit itself only to those content areas that the school elects to emphasize in its enrichment program. It would be wasteful, for example, to seek out children who have a flair for creative writing unless plans were completed or at least underway to cultivate these skills in the overall program for the gifted. Therefore, the identification procedures have to conform to the scope and objectives of the curriculum. To obtain the proper kinds of initial information, it is necessary to consult multiple sources, including but not limited to the following:

Evidence of General Ability. If the program is geared exclusively to the academically gifted, then the major pool would probably be found among children scoring beyond one standard deviation above the mean on an IQ-type test. For disadvantaged groups, the cut off point may have to be even lower, and the role of the examiner should be that of a participant observer rather than objective monitor. Such an approach will reveal the child's modified ability under mediated learning conditions rather than the current status of functioning under poor environmental conditions. Much will also depend on other sources of information about the child's special abilities, work habits and motivation. A lowering of the cutoff point on scholastic aptitude measures and more confidence in how the child performs in curricular and extracurricular activities will also help to prevent overlooking the artistically and socially gifted for whom there are no valid formal measures.

Evidence of Special Aptitudes and Achievement. Tests of special skills are useful in assessing children's progress in a few content areas. Such measures are valid because there is good reason to assume that a student performing better than most age-mates in a particular subject will continue to do so at least in the near future. However, these instruments probably work best for identifying high potential in some subjects such as language arts and mathematics; they are somewhat less suited for the sciences, and they are usually inadequate for the social studies. Aptitude tests generally provide better information about academic strengths than about artistic or musical abilities, thus limiting the areas in which such instruments are appropriate. A serious problem can arise when schools play mostly to the strengths of these kinds of tests and restrict their enrichment programs only to the academically talented because these abilities are easiest to measure. In such cases, the instrument exercises inordinate power over the program and does not serve its intended purpose as a tool to help implement the program.

Evidence from "Creativity" Measures. The most popular of these tests measure divergent thinking, and their reliability and validity remain yet to be substantiated. Regardless of how doubtful, cautious or enthusiastic people may be about measuring creativity this way, all would probably agree that these instruments are most (and perhaps only) appropriate if the enrichment program is designed to emphasize divergent thinking. Otherwise, such a procedure is as irrelevant to assessing creativity potential as testing in acrobatics would be in a talent search for would-be dancers. But even though creativity and divergent thinking are not interchangeable concepts, there is good reason to cultivate brainstorming skills in children, with special enrichment provided for those who are adept at it and with special efforts made through formal and informal means to locate those who possess such special skills.

Evidence from Noncognitive Traits. Limitations in the predictive validity of performance measures should encourage educators to correct the underemphasis on personality variables and behaviors, including self-directedness, pride in accomplishment, persistence, dedication, efficient work habits and other traits associated with achievement. In a questionnaire developed by the Bureau of Educational Research and Service at the University of Kansas for aspiring Merit Scholarship winners, the following items distinguished most consistently between the eventual winners and also-rans: "How would you rate yourself in terms of intellectual curiosity?" "How would you rate yourself in terms of willingness to withstand discomfort (a cold, illness, etc.) in completion of a school task?" "How would you rate yourself in terms of willingness to spend time *beyond the ordinary schedule* in completion of a given school task?" "How would you rate yourself in terms of *questioning* the absolute truth of statements from textbooks, newspapers and magazines or of statements made by persons in positions of authority such as teachers, lecturers and professors?" These are examples of the kinds of information that can be obtained not only from the children about themselves, but also from their peers, parents and teachers. Since these people see the children from different perspectives, it can be helpful to obtain their ratings through an overlapping of traits. They will thus serve as a check on each other from their respective vantage points. A large number of trait lists now exists, and although they are not all fully validated for a wide range of talents, even the *"soft signs"* they reveal at the screening stage can be highly enlightening.

Evidence of Productivity or Performance. It is important for teachers to keep constant records of children's accomplishments in or out of school. A cumulative file that shows samples and other evidence of such projects may reveal unusual potential in an area of work that society values but is not necessarily emphasized in the classroom. The child prodigy is an obvious example of someone who builds up an early record of achievements, but for most other children, the evidence of talent is more obscure and harder to elicit. A source of information is often outside the school, usually in the home, but not always so. Parents and peers can certainly help to keep a child's record up-to-date, and teachers ought to be eager to obtain and record whatever information can help build a case for high potential in an individual child.

Selection

After the screening stage, it is necessary to move toward the narrow end of the funnel and thus reduce the proportion of nongifted children in the pool. This requires shifting from the remote indicators to those more clearly in the context of the curriculum. All children in the pool are then given a chance to "*prove themselves*" in real and simulated enrichment activity to show how well they respond to the challenge. For example, if a unit on the writing of psychodrama is part of a program for the gifted in language, it is obvious that no existing test of verbal skills or social intelligence can possibly reveal who will excel in such a unit. The only way in which to make the proper identification is to allow children in the pool who show any signs of unusual language development to "*try out*" for the psychodrama unit which must include basic instruction in this writing form. This is what is meant by an oscillating process between identification and enrichment. The special curriculum is not a privilege for a predetermined group of children labeled "*gifted*"; it is initially a testing ground on which the gifted sort themselves out from the nongifted, pretty much like scrimmages in football or basketball or try-outs on the stage. The quality of identification therefore depends to a great extent on the quality of the program as a vehicle for auditioning hopefuls in the talent search.

In the course of exposure to enrichment experiences, a child will reveal potential giftedness by a variety of behaviors that can alert teachers and parents to monitor the child more closely. These behaviors include the student's sophisticated use of language; the quality of the student's questions; the quality of illustrations or elaborations that a student uses in communicating an idea; the student's ability to adopt a systematic strategy for finding or solving problems and to change the strategy if it does not work; the student's innovative use of materials found in or out of the classroom; the student's breadth or depth of information relevant to a particular learning experience; the student's persistence on uncompleted tasks; the extensiveness of the student's exploratory behaviors; the students' preferences for complexity, difficulty and novelty in learning tasks; and the student's criticalness of his or her own performance. These selection criteria are more demanding than are those used at the screening stage, but even here mistakes can be made if the procedures are adhered to too rigidly. There are still possibilities of accepting some who do not qualify and of rejecting others who do qualify as potentially gifted. It is therefore important to refine the process further in the next stage, which is necessarily the longest lasting of the three.

Differentiation

The final step in identification is to move to the lower end of the funnel, which has a sievelike attachment that separates the gifted from the gifted as well as the gifted from the nongifted. This process should continue indefinitely, with several sifting and sorting educational activities to help along the way. The main objective is to begin distinguishing potential mathematicians from competent math students, historians from history buffs, and dancers from dance enthusiasts. Equally important is the need to distinguish potential mathematicians from potential literary critics, engineers from composers, historians from scientists, and so on, until the student's performance at school becomes more aligned with intelligent career choices. Much depends on the breadth and inspirational quality of the enrichment program because the gifted need exposure to a variety of opportunities to avoid being locked into an area of specialization too early in life.

Thus, progress is made from the initial screening stage, with its heavy reliance on measures that are indirectly related to life in the classroom, to the final differentiation stage where identification is mainly through the curriculum itself. If enrichment is continuous throughout the children's schooling, differentiation should never really end as long as they are in the program. In the last analysis, identification of the gifted is related not only to systematic observation and intelligent interpretation of test data but to the development of the right kinds of educational opportunities that facilitate self-identification.

Qualifiers of an Enriched Curriculum

The term "*enrichment*," as used here, refers to any educational activity designed to enhance the learning experience of potentially gifted children. Accelerating the student through conventional and advanced subject matter is a form of enrichment since it provides the necessary challenge and stimulation. The same is true for adding subject matter laterally, that is, supplementing existing requirements with content that is generally never covered in the conventional school curriculum. Since enrichment is a generic term under which acceleration and other special offerings are subsumed, it is naive to counterpose the overall concept against one of its subsidiaries. In other words, acceleration is a form of enrichment, not an alternative to it.

Some educators believe that enrichment can be accomplished without doing *anything* special for the gifted. For them, a quality program is one that stretches the minds of children at *all* ability levels, and differentiated education is what individuals derive from the *same* curriculum according to their separate capacities rather than from a *separate* curriculum reserved for a select few. They have little regard for an honors-type "presented" course of study on grounds that it is too rigid and therefore cannot satisfy each child's personal tastes for knowledge and productive activity. An example of what they prefer is that *all* children be taught to deal effectively with problems at every level of Bloom's hierarchical Cognitive Taxonomy, the expectation being that the gifted will perform better at the higher levels than will their less able peers. Enrichment in this case is defined as something the gifted take away from the experience without the teacher's having to put anything special into it.

Such an approach to instruction probably appeals to educators who are supersensitive to the threat of elitism in their schools. They worry about playing favorites with children who are already favored by their outstanding abilities, and they seem to believe that an egalitarian program requires teachers to cover a single course of study for all children (except the handicapped). But the proposed Enrichment Matrix reflects an opposite point of view. It refuses to equate equality with sameness of educational opportunity and special education with privileged education. Instead, it suggests that potential producers and performers of ideas require a unique learning experience to prepare them for the kinds of contributions only they may someday make. Training for the future concert violinist is (and should be) substantively different from that of the amateur learning to play tunes on the violin; the same principle applies to the education of promising producers versus consumers in science, mathematics, literature, art and in every other domain of the curriculum. Teachers play key roles in the nurture of talent by imparting appropriate content and inspiration to the promising few, however few they may be. By withholding or denying their responsibility to share their profoundest thoughts, teachers are in danger of short-changing children who can benefit most from them. Indeed, schools can sooner be tyrannized by mediocrity, if enrichment "extras" are omitted, then by a so-called *"gifted elite,"* if such "extras" are emitted to individualize instruction at the highest ability levels.

Programs Versus Provisions

A program is an educational imperative, not an elective; it is essential, not luxurious. Thus, while schools plan programs in the major disciplines for all children, they are less serious about the needs of the gifted and offer them only temporary provisions that are basically extracurricular. Programs are everlasting, although they can undergo revision, whereas provisions survive only at the pleasure of administrators who authorize them and of teachers who design and implement them. Education for the gifted can be truly meaningful only if schools make it programmatic, thereby incorporating it into the mainstream of individualized education for every child.

Although many schools claim to be doing something special for the gifted, what they really mean is that they are offering *ad hoc* provisions, defined here as fragmentary learning experiences lacking in complex form, long-range purpose or clear directionality. A teacher in the third grade who is committed to exposing children to extra subject matter may devote a half-year to teaching them the skills of raising chicks and then spend another half-year on an introduction to computer programming. The choice of topics is arbitrary, usually reflecting the special interest and knowledge of that teacher; another teacher of third-graders may have an affinity for the poetry of Edgar Allan Poe, in which case that would become the subject of enrichment. When these teachers have to be replaced for any reason, the newcomers will introduce different projects rather than duplicate the efforts of their predecessors. There is nothing in the second-grade classroom that prepares the gifted for what is to come a year later, and there is nothing in the fourth-grade curriculum that follows up the enrichment provisions of the preceding year. Nor are any of the special projects for gifted third-graders recorded anywhere in the school's curriculum outlines as part of the general scope and sequence.

A lay board and a professional staff may be enthusiastic about enrichment provisions in their schools, but this is not always a sign of commitment. It could mean only that the community is proud to have something extra and attractive in the curriculum and is willing to pay for the luxury for as long as there is enough popular support. When pressures to do something special for the gifted begin to moderate, or when budgetary cuts have to be made, enrichment provisions are seen as expendable ornaments to the general courses of study.

Many people who favor *"extras"* for the gifted are probably disappointed to see provisional offerings discarded; yet it is not considered nearly as calamitous as dropping science or literature from the curriculum. The *"extras"* are provisions, whereas science and literature are programs. There is never any question about whether a program should be retained. It is a learning sequence considered necessary by the school and community, declared so by tradition and popular acclaim and is therefore part of the lifeblood of the total curriculum. It is designed by a curriculum committee and codified in the school records as a comprehensive, step-by-step plan that commands attention by the lay board and professional staff and is supported solidly by a school budget. It is permissible to revise programs, as in the case of converting to a *"new"* mathematics, but it would be unthinkable to drop mathematics altogether. Whoever steps in to teach at any grade level can consult the curriculum plan to gain an impression of what the children have studied in the past, which leads up to what they are covering in the present and which, in turn, prepares them for what they will encounter in the future. On the other hand, provisions are luxury-type learning experiences that are never taken as seriously as necessities, are rarely articulated from one grade level to the next and are always vulnerable to extinction.

Unfortunately, most of what schools proclaim as their programmatic designs for enrichment are really provisional and probably short-lived. Even independent projects pursued by the gifted are in danger of being perceived by teachers and principals as enrichment provisions rather than enrichment programs, especially when these projects get their start mostly through the initiative of children who happen to be interested in them and are capable of seeing them through. The practitioner would have to remember to incorporate independent study regularly into classroom instruction with the understanding that curriculum content for such projects will keep changing as changing student bodies bring new learning preferences with them. The advantages are that moving children into time-limited projects of their own choosing takes care of their individual enthusiasms, yet reduces the possible adverse effects of separating them from peers and conventional school activities. However, there is always the danger of regarding special projects as "icing on the cake" rather than as part of the basic meal for those capable of digesting it. Also, if independent projects are poorly administered, they will serve only the self-starting, independent-minded children who pursue their interests doggedly, while neglecting those who rely on external stimulation.

The Expansiveness of Enrichment

Equitable programs for the gifted are larger than conventional life at school. They require a quickening of instructional pace, a broadening and deepening of curriculum scope, and an extension of learning space, hours and support services. They operate on an assumption that enrichment is as much an educational imperative for the gifted as is the "*common core*" for the general school population (including the gifted). The curriculum design should resemble the flag of Japan, a large circle imposed on a larger rectangular field (see Figure 3). The circle represents the "common core" experiences for all children, excluding handicapped learners.

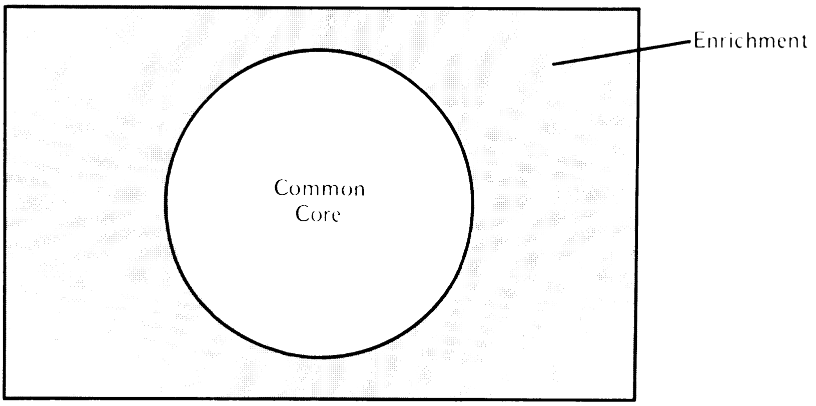

Figure 3. Framework of a program for the gifted.

The "*common core*" encompasses skills, knowledge, insights and opportunities for creative initiative that all students need in order to appreciate and function well in the world they inhabit. Unfortunately, the gifted are sometimes denied training in these competencies when teachers would rather plunge ahead to more advanced subject matter. The consequences can be embarrassing when some of these children have difficulty with everyday basics such as dealing with number combinations or putting together a grammatically correct sentence in their native tongue, to say nothing of writing with style and power. This "common core" is the fixed sina qua non of the school's offerings and therefore is programmatic rather than provisional. The area beyond the circle represents enrichment experience open on a trial basis to any child suspected of having talent and reserved for those whose signs of talent are unmistakable. It is programmatic and therefore as much a *permanent* part of the overall school curriculum for the gifted population as the "common core" is for all children. As such, the real test of the school's commitment to educating the gifted is the extent to which the Japanese flag design remains intact as a rectangle without being cut back to the boundaries of the inner circle and then decorated with some temporary frills along the edge.

The idea of reserving educational experiences exclusively for the gifted may sound like favoritism, but it is favoritism without prejudice. Instead, it represents equal educational opportunity in the sense that it helps to meet the educational needs of all children without neglecting those who have the potential for excellence. The young athlete who shows promise of competing effectively in international sports deserves and receives favoritism in the form of special instructions, training gear, dietary adjustments, rest schedules and practice sessions. Without these privileges, there is no chance for peak performance or challenges against the best competition in the world. Yet only the few with a potential for stardom can make the most of such a regimen or even withstand its rigors. That is why the coaching they receive is an *equitable* privilege for them. Similarly, plasma physics should be taught to the tiny number of students who can absorb it even though it "discriminates" against the huge majority who find it intellectually obscure. These are not violations of fair play or flirtations with intellectual elitism but rather ways of individualizing instruction for children at the upper extreme of the ability continuum.

Finally, if enrichment is to be expansive enough to challenge the gifted adequately, it is necessary to enlist assistance beyond the school building, resources and schedules. This is by no means a rationalization for schools to abdicate their in-house responsibilities to differentiate education for its ablest students. Rather, it takes into account the range of abilities and interests of gifted children, which are so wide that the school is actually a restrictive environment for them. A fifth-grader who can benefit from experience in medical research or an introduction to law practice is not likely to find much help among the people and materials at school. In fact, the aggregate range of knowledge of gifted children in a single school is often broader and deeper than is that of the entire teaching staff in the children's fields of interest. What they need is an opportunity to supplement their school experiences with apprenticeships to selected professionals in the community who are capable of elevating them to new heights of inquiry in their separate pursuits.

This also opens possibilities for career guidance in real-life settings where productivity is accomplished in the context of occupations. This is not a license for schools to divest themselves of responsibility for the children by "shipping them out" to places where people are better qualified to take care of their needs during and after school hours. The community professional may be more steeped in knowledge of a particular field, but it takes a trained educator to "package" that knowledge into a meaningful learning experience for children. School personnel have to be on hand to help the gifted understand the meaning of their encounter with the occupational world while accomplishing as much as they can in their on- and off-campus studies.

The Matrix: Structure and Applications

Based on the foregoing premises, it is possible to conceptualize an enrichment model in the form of a grid with the rows denoting content areas and the columns consisting of three sections labeled (1) *content adjustment,* (2) *cognitive processes* and (3) *personal and social consequences* (see Figure 4). The task of planning differentiated education involves filling in the cells with a graduated sequence of activities that represent the best thinking and commitment of a duly appointed curriculum committee, not just a single teacher or an informal group of staff members whose ideas stand little chance of becoming official policy. One of the most serious matters that the committee has to consider is the time frame in which it is allowed to do its planning. Administrators are sometimes under pressure to develop a viable curriculum for the gifted practically overnight. In the rush to get something underway quickly, they find themselves settling for provisional enrichment that can materialize in short order and may be useful as a quick palliative, but anything so makeshift has no lasting strength.

Content Areas/ Disciplines	Content Adjustments					Higher Level Cognitive Processes	Social and Affective Consequences
	Telescoping Common Core	Expansion of Basic Skills	Programatic Augmentation	Provisional Augmentation	Out-of-School Augmentation		
Language arts							
Mathematics							
Sciences							
Social studies							
Music							
Art							
Literature							
Supplementary area I							
Supplementary area II							
Interdisciplinary area I							
Interdisciplinary area II							
etc.							

Figure 4: The enrichment matrix.

Programmatic enrichment, on the other hand, takes a long time to plan, longer to implement and much longer to fade. Designing it requires as much hard work and imagination as writing a new K-12 curriculum in a major subject area without having access to the old one or to any other for that matter as a source of ideas. The parent whose gifted child is bored in the fifth grade is understandably impatient and would rather settle for provisions than wait for a program that may not be ready for implementation until the child is already in high school. It is therefore suggested that the curriculum committee work on two plans simultaneously, one to deal with short-range needs (since doing something for the gifted is better than doing nothing) and another to put into place at a later time (when doing something for the gifted can give way to doing what is best for them). The enrichment matrix is far more concerned with the longer perspective while respecting and taking into account the shorter one as well.

Selection of Curriculum Content

Content areas include the conventional disciplines that make up the common core (e.g., language arts, mathematics, sciences, social studies, the performing arts) plus at least one supplemental area of study not generally included in the pre-college curriculum (e.g., cultural anthropology, geopolitics, psychology, studies in ecology) and interdisciplinary syntheses (e.g., humanities, aesthetics). Introducing a supplementary and interdisciplinary content would demonstrate that the subject matter need not be reserved for college-level study. And if it ever is to infiltrate into the elementary or secondary school curriculum, it should start out in the form of educational enrichment that can then be adapted for study by all children. What is suggested here is part of a hypothesis that the education of exceptional children at both ends of the ability range is the forerunner of education for those who function closer to the norm. The *content* of programs for the gifted and the *methodology* of programs for the learning handicapped eventually affect "what" and "how" all children are taught at school.

The choice of supplementary and disciplinary content areas should be determined on two counts. First, so-called "newer disciplines," such as sociology, anthropology and psychology have matured through vast amounts of research published in the present century and are ready to receive serious attention at all school levels. Second, there are topics of study, such as geopolitics and ecology, that are becoming more and more important in helping us understand the world in which we live. the gifted should not have exclusive access to any of these disciplines, but if they lead the way, the chances are that others will follow.

Enriching Curriculum Content

The first five columns of Figure 4 refer to *content adjustment* or the various approaches to curriculum enrichment. Each subject matter area requires its own plans according to guidelines indicated in the headings and legitimized eventually as a course of study designed in advance, accepted as an educational imperative, administered by teachers who are capable of working with the gifted and sequenced from one grade level to the next wherever appropriate.

The grid may be used in at least two ways. First, it is a framework for a master plan covering all disciplines to take care of the varieties of talent included in the program. This does not mean that every cell has to be filled before any action can be taken in the classroom. Quite the contrary, in the interest of saving time it is preferable to deal with only two or three content areas at the outset, and the choices may be made for the sake of convenience. Whatever subjects lend themselves to relatively quick, easy and thorough enrichment planning are obvious first choices. It is also helpful if the talents chosen for nurturance are the ones that the community and staff clamor for most persistently and can be diagnosed with the least amount of error. For example, getting started with enrichment in academics is much simpler and more popular than is formulating a K-12 sequence in social leadership, even though a case might be made for giving priority to the latter kinds of talent in our modern world. It would therefore be a waste of time to delay serving the needs of the academically gifted until the same could be done for young social leaders.

A second use of the Matrix, every bit as important as the first, is for developing a contract with a single child who may be gifted in one or two areas and requires content adjustment only in them. Appropriate cells can then be filled in every case, thus making the overall program flexible enough to take individual differences into account. Although the contract has to be adjusted to each child's needs, whatever is written into it should come out of the master plan. Suppose, for instance, that the master plan dealt with ways in which to enrich the program in the language arts, mathematics, the sciences and social studies. Teachers would then have available to them a framework with details on how to adjust content for the gifted in these four subject areas. Once the total design is in hand, they can dole out parts of it in contracts with children possessing special talents. The Matrix covering enrichment in mathematics would go to the mathematically gifted, and the same matching of subject area to a gifted child would be arranged for language arts, for sciences and for social studies. Sometimes, the entire master plan might appear in a contract if the child in question shows enough all-around talent. Finally, the enrichment matrix encourages flexibility even within a single content area by nurturing individual student initiative as part of the overall scheme. In addition to being exposed to the same special subject matter and skills training, children possessing similar talents are helped in and out of school to pursue special topics of their own choosing. In some cases, the gifted can be released to work by themselves; most often, however, they need some guidance and instruction to help them reach their goals.

Telescoping the Common Core. One of the obvious ways of providing for individual differences between the gifted and non-gifted and also among the gifted themselves is telescoping the common core, or teaching conventional subject matter in less time in order to move up to higher levels as quickly as possible. The logic is simple: since the pool from which gifted children tend to emerge consists mainly of rapid learners, they are likely to benefit from acceleration through courses of study in which they excel. In some curriculum areas, such as mathematics, it may be particularly important that they complete the basics in the least amount of time, thereby sparing themselves the tedium of dwelling on content that they either know already or can absorb in short order. Research evidence tends to support acceleration regardless of whether it is in the form of early admittance to school, rapid advancement through elementary, junior or senior high school, or admittance to college with advanced standing. But the empirical evidence has had little impact on the schools, as educators find this type of administrative adjustment generally less attractive than lock-step arrangements with supplemental studies as time fillers.

Expanding Basic Skills and Competencies. Another method of adjusting curriculum content for the gifted is to expand basic skills and competencies in preparation for important original work. Basic skills are often known as the tool subjects, relatively unimportant for their own sake, but indispensable for enabling the learner to gain access to substantive areas of study. Among the most familiar tools, of course, are reading, writing and arithmetic. Learning how to read can be a waste of time unless it is applied to any number of situations such as understanding street signs, newspaper stories, great literature and recorded history. Writing is also intended for any number of purposes ranging from simple communication to composing memorable prose or poetry. Similarly, number facts have their use in the marketplace and as part of the language of higher mathematics. In short, tool subjects are necessary for mastering the conventional disciplines and for making original contributions to them, and they therefore serve as keys to knowledge.

It is important to keep in mind that basic skills are not uniform for all children. Even the three r's have to be modified and sometimes ignored in favor of other necessities to accommodate individual differences. For example, sign language is a tool for communication among some deaf people; the blind rely on a mastery of Braille symbols, compressed speech, and various electronic devices to transact messages and on manipulating a walking stick with laser-beam sensors for safe locomotion; and trainable mental retardates concentrating on a self-care curriculum need to engage in all kinds of activities for daily living through such exercises as manipulating buttons, zippers, spoons, forks, soap and water and whatever else can help them to function independently. In these cases of exceptionality, the tool subjects are adjusted to fit the nature and needs of special populations and are understandably excluded from the curriculum of the non-handicapped.

The same consideration should apply to the modification of basic skills and competencies for the gifted. If these children are to stand a chance of achieving excellence in the performing arts and in the service professions, or of producing knowledge in their chosen fields, not just consuming it, they need the tools for accomplishing what only they can accomplish. For example, those with unusual sensitivity to language structure can benefit from an introduction to linguistics and general semantics. Talented young writers need to learn how to express themselves in different forms of poetry, drama and the familiar essay, in addition to mastering the conventional narrative and critical writing skills that the non-gifted also study as part of the common core. And children with extraordinary reading comprehension and sensitivity to symbolism in language deserve to be taught the elements of literary criticism.

Basic skills for the young mathematician may be some extensive units in mathematical logic and the languages of computers. Children who show signs of someday becoming contributing scientists need to learn how to expand knowledge in their fields through the scientific method, which encompasses skills in finding and stating problems, developing rationales for investigating them, formulating operational hypotheses, designing plans for gathering and analyzing data and learning how to report and interpret findings. Similarly, the child with a potential for becoming an historian requires the skills of historiography, which would be wasted on a student who reads history for understanding but without any intention of creating theories about it. As for the young creative and performing artists, it is generally accepted that the basic skills training has to be special not only in the amount of time they devote to practice but also in the nature of instruction they receive.

In essence, then, the expansion of basic skills and competencies is a way of providing the gifted with the "tools of the trade" that they will need in their mature creative years. Few children can learn how to use these tools effectively, and they should not be denied that privilege even though they constitute only a minority in the schools. The potential benefits to them and to society easily outweigh any reservation people may have about enabling the relatively few gifted to excel, especially since so much has yet to be done in helping even greater numbers of children to function adequately in their studies. A program that is fair to all children does not sacrifice the needs of one subgroup for those of another. Nor should children functioning at either extreme of the ability continuum have to live up or down to the basic skills requirements that apply to the vast majority whose level of performance is closer to the mean.

Programmatic Augmentation. A third type of curriculum adjustment is in the form of programmatic augmentation. The term "programmatic" is used in a special sense defined earlier as subject matter that is prescribed, sequential and a permanent part of the curriculum, rather than an occasional frill. Telescoping the common core and expanding basic skills and competencies are also forms of programmatic adjustment, except that they deal with different kinds of content, the first with curriculum material required of all children and the second with tools of learning necessary to achieve excellence. Here, the reference is again to the common core, but this time the charge to the curriculum planning committee is to develop a course of study for each discipline that adds dimensionality to the conventional curriculum.

Thus, for example, the study of folk tales as literature might be supplemented by cross-cultural comparisons of the content of such stories and how they might reflect on the societies from which they originate. In mathematics and science, virtually every topic can be studied in greater depth with the help of supplementary material, instructions and exercises. In history, an examination of causes of the Civil War may also include a parallel investigation of European policy toward the Union and the Confederacy during that period. Or the children may be helped to understand history through art, music and literature instead of relying solely on the conventional political, military and economic data contained in so many textbooks. Conversely, music, art and literature might be better understood in the context of historical milieus.

The purpose of programmatic augmentation is to expand gifted children's knowledge base laterally to sharpen their perspectives and to help them determine what kinds of new knowledge should be developed. In many schools, this kind of enrichment is called an *"honors program"* or an *"honors curriculum"* and is presented by teachers as a scope and sequence open to those who can absorb it successfully. The rationale is that ideas often beget ideas and that children capable of learning more and better ones are most likely to create more and better ones. However, programmatic augmentation should never be confused with "more of the same" exercises that fill up the child's time with busy work and little else. Teachers are sometimes misled by a gifted student's work habits that are disciplined enough to be applied devotedly even to unimportant activity. The problem in such a situation is that there are no signs of boredom to reveal there is something wrong. The only clues are in the augmented program itself, which has to be examined on its own merits, even if it seems to satisfy the child's desire to be preoccupied with some kind of educational activity, however trivial or superficial it may be.

Provisional Augmentation. A fourth type of content adjustment is provisional augmentation. The term *"provisional"* is used here in the special way in which it was defined earlier as referring to enrichment activities that are fragmentary, teacher bound, lacking in sequence and transitory additions to the common core curriculum. Yet there is room for provisional augmentation for two reasons. First, teachers should serve as role models despite the real possibility of their having to profess a fair amount of ignorance in the fields that their gifted children excel. They can do it by cultivating their own passionate cultural interests in any field, be it raising chicks, learning computer technology, studying ancient Chinese pottery or Gustav Mahler's music, or examining anything that fires their imaginations and that they are willing to share enthusiastically with the gifted. They can thus show by example how important it is to possess knowledge, not just the skills to help others find it.

A second reason for planning provisional augmentation is that if a teacher shows enthusiasm for a particular field of interest, it may have a contagious effect on some gifted children and inspire them to delve into those fields in the hopes of making contributions to them someday. Almost any biography or autobiography of a celebrated individual contains some reference to the decisive influence of a teacher or mentor who had enough attachment to a particular subject area to stimulate the kind of inquiry that carried at least one person to greatness.

To introduce provisional augmentation, the teacher has to serve not only as a manager of learning activity who can help gifted children locate and generate ideas, but also as a possessor and dispenser of knowledge. The easiest first step toward building a program for the gifted is to allow such teachers to initiate provisions based on their own cultural strengths. Such plans can be made in relatively short order without investment of new resources. Too often, however, the schools become complacent with provisions, especially if the effects are to satisfy the children and pacify community activists who clamor for enrichment. Under these circumstances, it is easy to forget that introducing special provisions is only the first of two goals and, by far, the easier one to reach; reaching the second goal of designing and implementing a full-scale program for the gifted is far more difficult. But the qualitative differences between provisions and programs make the effort worthwhile.

Provisional augmentation may reflect the student's individual interests as well as the teacher's. Either way, the possibilities should be open for children to engage in independent activity according to their respective enthusiasms and work habits. Some of these projects may be carried out off campus, provided the logistic problems are dealt with seriously and effectively. Too often, practitioners assume that children who are highly motivated and qualified to embark on projects that reflect their areas of interest are necessarily capable of working their way through to the end without help or supervision. Gifted children who are left to their own devices frequently flounder and fail to finish their work, or if they manage to turn in a completed product or performance, the quality is embarrassingly low. There are, of course, exceptions among the gifted who are single-minded in their dedication to independent work and who can be relied on to take all necessary initiatives in assembling and organizing the best possible resources and to finish the job brilliantly. However, the gifted do not necessarily have that kind of self-discipline, and their initial enthusiasm is liable to wane unless they are kept on task every step along the way.

Out-of-School Augmentation. A fifth type of curriculum adjustment is accomplished through out-of-school augmentation and is programmatic in nature. Gifted children need opportunities to apprentice with outside producers and performers in the field at the sites where innovative work takes place. There are at least four kinds of benefits to be gained from such activity. An obvious one is the opportunity for in-depth learning in a setting and under instruction that cannot be matched at school. In a real sense, the gifted can use the field experience to extend their knowledge base through the use of higher-level thinking processes and advanced communication and study skills.

A second benefit to be derived from working in the field with gifted people who are in mid career is the opportunity to absorb various life skills that are important for productive work in many fields. Included are such personal and social competencies as leadership, conflict resolution, trust building and collegiality with other productive people. There is also the need to learn special techniques for decision making, through brainstorming and flexible responses to obstacles, and to demonstrate steadily increasing independence through initiative, resourcefulness and the wise management of time. As might be expected, the school-based specialist in the education of the gifted figures prominently as a personal counselor in facilitating life-skills growth among able children participating in the special field work.

The third advantage of out-of-school augmentation is that it makes it easier for the school counselor to help the gifted in their career development. Through guided experiences in the field, students clarify career interests and aptitudes and increase their knowledge of occupational opportunities. They also increase their familiarity with requirements for entering and progressing in the world of work. By improving the child's knowledge of career options and individual proclivities, it is hoped that the best possible match will be made between the person and the occupation.

There is a fourth benefit from out-of-school augmentation that is sometimes overlooked where these opportunities are offered but is as important in its own way as are the other three. It has to do with all the psychosocial adaptations necessary to succeed in any area of work. Children serving as interns with people in high-level occupations realize immediately that each job has its own life-style requirements for success, regardless of ability. In addition, there are life-style norms that interns can examine from close-up to see how willing they are to live by them. For example, if the research scientist customarily engages in research projects lasting a year or two, or longer, a certain capacity for delayed gratification is necessary. It may even involve frustration tolerance if results do not emerge as expected. Is the potentially gifted young science student interning in the field laboratory able to live that way? If the mentor's kind of work is in fits and starts, in which around-the-clock activity alternates with a far less frantic schedule, what are the effects on such a person's married life? Would the young apprentice want to enter such a profession even if it may cause strains in the relationship with a spouse? What are the mentor's dress codes and how do they conform with those of colleagues in the profession? If the male tends toward pin-striped suits, button-down collars, a clean shaven face or a carefully cropped beard, neatly combed hair, a stylish tie and polished shoes, does the intern see himself fitting such an image? Similar questions about conformity and dress codes can be asked of the females.

Sometimes, the realities associated with careers can lead to disillusionment, as in the case of a child who aspires to a career in veterinary medicine because of a love for animals, but is placed in an internship with veterinarians who do not share that love. The child sees them, instead, as occupying places in their profession only for the sake of financial security and social status. These perceived motives can be eye-openers to the young intern and it takes an off-campus apprenticeship to help the child experience them at all.

Considering the conditions of success in high-level careers, it is obvious that the worlds of education and work are vastly different and that the qualifications for excellence in one do not always apply to the other. This has important implications for identifying talent. For example, internships used for locating great interest in a career of serving innovatively the needs of adult mental retardates who are institutionalized, may produce unexpected results. When placed in such a residential facility, the student quickly learns that many hours have to be spent in teaching the adults not to injure themselves. Can the high IQ be a sign that the young intern will *not* be bored or even discouraged by such a seemingly tedious instructional routine? Since it is so difficult to know in advance how to establish a *"goodness-of-fit"* between the child and the internship, the exploratory aspects of out-of-school augmentation become important ways of determining who qualifies for what kind of high-level work.

Combined with apprenticeship experiences, the study of biography and autobiography can help to orient the gifted to careers and excellence in them. This material provides children with insight into the lives of the celebrated, with some emphasis on the joys and travails in the work they did. It is a vicarious "shadowing" experience that enables the reader to follow great people from one adventure to the next while learning about their innermost feelings in the process. The potentially gifted should also be allowed to "shadow" highly able living people at their places of work in the community, including the college campus, law office, hospital laboratory, dance studio, editorial office and wherever else productive activity takes place. It gives the child an opportunity to raise meaningful questions about the work being done and to explore different occupations as part of the preparation for an apprenticeship that involves on-site training.

Cultivating Cognitive Power

Out-of-school augmentation is one of the five proposed means of adjusting conventional curricula; the others include *telescoping common core subjects, expanding basic skills and competencies, programmatic augmentation* and *provisional augmentation.* In addition to modifying content, there is need to emphasize high-level cognitive processes as they apply to each of the subject matter areas and, of course, to their adjustments for gifted children. Fortunately, the literature on educational enrichment is itself rich in designs for stimulating the gifted student's intellect. But as important as it is to help the child deal successfully with complex intellectual processes, the methods of administering such assistance would have to be considered with special care in order to produce the desired effect on the child. Sometimes teachers are content to deal with cognitive operations out of context in the hope that such exercises will *"train the mind."* Unfortunately, there is no solid evidence to show a carry-over from proficiency in out-of-context training to applications in the context of the curriculum. There is also no universal consensus as to what constitutes the cognitive hierarchy or where a given problem-finding or -solving operation belongs in such a hierarchy. It is therefore advisable that the teacher accept as reasonable many ideas for cultivating high-level thinking process, as suggested in various paradigms for enrichment, without neglecting to apply them to the curriculum and without prejudging how complex each operation is in comparison to any other.

The following suggestions to teachers are intended as examples to illustrate, *not* to blueprint, activities in the classroom that may add meaning to the gifted child's learning experiences:

Discerning the unfamiliar in the familiar. Ask children to look at the shoes they are wearing (or at any familiar sight) and perceive something physical or functional that they had never noticed before. The same exercise can be applied to the Bill of Rights or the Gettysburg Address, *after* the children have read it so many times that it would seem pointless to expect any more benefit to be derived from another reading. Well-known poetry, essays, stories, art, music, and even scientific and mathematical phenomena lend themselves to rediscovery and reinterpretation. It is all part of making the familiar strange in order to take a fresh approach to its understanding.

Enhancing the familiar. Ask children how they would improve on the welfare of dogs, birds, the poor in their community, underdeveloped nations, their families and perhaps even themselves. The purpose is to show that brainstorming can be deadly serious and is a skill that is often applied to some of the most critical problems in society.

Contemplating the "might have been" and the "might be." Stimulate children to conjure up consequences of events that might have happened in the past and those that may happen in the future. Ask such questions as, *"What would the world be like if the Nazis had conquered Great Britain in 1940 or 1941?" "What would America be like today if the South had won the Civil War?" "What might happen to our daily lives if the superpowers achieved a permanent peace agreement between them tomorrow?" "Describe our society in the year 2000 if zero population growth were achieved by* *tomorrow and if the next day's headlines reported a breakthrough in medical research that could prolong a lifespan to 120 years."* Here, too, it would become apparent that imagining consequences is not always a matter of fun and games.

Speculating about human progress. Encourage children to develop skills in speculation by having them forecast possible changes in technology, politics, ecology, international relations and any other area of concern. Ask them what problems would be created by the changes they foresee and how these problems might be overcome. It is important to discourage idle speculation that derives from ignorance and to emphasize, instead, the need for a solid knowledge base that can provide some support for speculation.

Cultivating the power of curiosity. Have children reflect on what they would like to know more about in any realm of inquiry, even one that may be far removed from the curriculum. Schools often concentrate almost exclusively on problems that have been solved in the past, as if to suggest to students that it is enough for them to inquire into what is known without bothering about the unknown. Some children gain the impression that the unknown is unknowable, so why bother to explore it? Even with respect to existing knowledge, gifted children often sit back and wait for it to be served up to them instead of developing any seek and search initiatives of their own. Teachers can make up for this kind of intellectual complacency by focusing on the importance and methods of problem finding, disciplined curiosity and stimulating independent interests.

Cultivating the power of innovativeness. Teachers might ask children, *"Do you have an original idea about anything? Possibly something you thought about after reading a book, participating in a class discussion, watching a movie, doing an experiment or just plain daydreaming? It may even be an idea that turns out to be original only with you, since others have thought about it before. That doesn't matter, so long as you think it's your own."* Children have to be convinced that education is not just a matter of sponging on existing knowledge but also involves creating new knowledge. It is startling sometimes to see students delving into subject matter without feeling the urge to draw any refreshing inferences, much less having an *"aha!"* experience. The reason for it has nothing to do with their inability to make a creative leap from the subject matter at hand; they are simply not challenged to do so often enough. If the challenge were persistent, it would be easy for the gifted to develop a habit of making newness a by-product of every important learning experience. In fact, their response to such stimulation may well be the most important signs of how gifted they really are.

Separating intellectual wheat from chaff. Children have to be trained to distinguish between essentials and embellishments. They can examine advertising and propaganda to learn how language is used to enlighten, entertain, promote, denigrate and indoctrinate. Preparing to conduct an interview is also a good way in which to develop probing skills. Children might be asked to formulate what they think are the ten most important questions they would pose to a famous person of the past or present to get a better understanding of human and situational factors associated with fame. Finding the right questions to ask will also help children to understand the everyday world about them. They will come to realize that, while a city's historical landmarks are popular attractions, its survival depends far more on little known facts about the ways in which it disposes of garbage and sewage. Children ought to learn how to find the right questions so that these facts will come to light during an interview conducted with an engineer at the local waste disposal plant.

Data gathering for decision making. Teachers can help children to organize knowledge by asking not only the right questions but also enough of them to support the wisest possible judgment. This is essential for convergent thinking, especially when serious matters are at stake, as in the case of medical decisions. An intern in medicine might be presented with a case of a hypothetical patient who complains about a bellyache and seeks relief. The medical educator responsible for training the intern has put together a *"case history"* of the hypothetical patient and has *"determined"* the nature of the ailment. The intern, who has not seen any of the diagnostic data, is then invited to ask for any kind and amount of information about the patient's symptoms and to make a diagnosis based on the data requested. It is then possible to evaluate whether the facts obtained about the ailment are the right kind and in the right amount to help determine its true nature. In other words, has the intern asked *only* relevant questions? Are there any relevant questions that the intern has *not* asked? Some of the methods for sharpening techniques can be conducted in any subject matter area where things have to be explained rationally.

Studying the "crystal ball." Futurism is a popular subject in search of a methodology that will leave forecasting less and less to chance. Children might be asked to plan a house (or a city or a government) a hundred years from now. Such an exercise requires the child to have a formidable grasp of current information and enough imagination to project from the *"what is"* to the *"what might be."* Some influential factors are highly predictable such as climate, geography, the physiology of living organisms and other *"laws of nature."* It would therefore be helpful to analyze how these *"laws of nature"* set consistent limitations on the design of a house, a city or a government for all time.

Learning to live with dilemmas. Dealing with predicaments, imagined and real, is always a useful exercise. The teacher may have to start with brainstorming alternatives on matters of no consequence that pose no dilemmas either, such as imagining as many uses as possible of empty coffee jars. But eventually the technique has to be applied to political dilemmas, plights and quandaries. A group assembled on a playing field might be asked to devise a sports program with the understanding that they have no access to any kind of athletic equipment. At a more advanced and meaningful level, some students may be qualified to write scenarios for keeping the United States from being trapped into alliances with right- or left-wing dictatorships in South America. Life is filled with unappealing Hobson's choices, and children have to learn that it is necessary to live with them.

Enrichment with a Conscience

Finally, there is the matter of teaching gifted children the *social and affective consequences* of becoming a high-level producer or performer. Problems relating to self-concept, friendship and career choices, and emotional development have special meaning for gifted children because of their unique abilities and needs. Perhaps the worst possible outcome of an enriched program is that it will produce a cadre of technocrats who are brilliant in the work they do but have no conscience or commitment to a set of values and are willing to sell their talents to the highest bidder. Hitler's master architect, Albert Speer, is a notorious example of giftedness without a conscience, and there are many others in the annals of history.

There are also extraordinarily inventive people who may be well-meaning in their intentions but are extremely naive about the impact of their work on the general well-being of society. The creators of DDT, for example, intended to save crops from destruction by insects, but neglected the possible effects on the environment. They did not realize that shortsightedness is a human failing with varying consequences, depending on what is at stake. In ordinary human activity, it can produce annoyances and regrets; in highly sensitive work, it can bring on tragedy. It is therefore important for the gifted to learn that there is no self-evident virtue in possessing great brain power and in using it to its fullest extent. Creativity can be as lethal as it is constructive if there is no allegiance to a code of ethics to govern its expression. Values clarification therefore takes on special meaning inasmuch as it deals with the responsibilities of assuming some kind of leadership in the world of ideas.

Some children excel in their sensitivity to the human consequences of innovation and may someday be acclaimed as important social commentators. There is obviously a need for such specialists who can serve as the conscience of the people provided they are not seen as the sole arbiters of right and wrong and authoritative prophets of utopia or doom. Their presence can be a mixed blessing if it encourages people who are gifted in some way other than sagacity to defer only to the sages, thus absolving themselves from being accountable for any of their own innovations. This kind of indifference is displayed occasionally by young students talented in the sciences. When asked how they would feel about working on an invention that could someday be used to blow up the world, they reply simply that their job is to invent, while some amorphous entity called "*society*" and its leaders take over all moral obligations for whatever happens with their product. They rationalize their detachment further by claiming that a conscience would only inhibit their freedom to innovate. This may be so, but it is well worth the risk.

The Enrichment Matrix therefore suggests that it is necessary for all gifted children, regardless of what their special talents may be, to concentrate as seriously on the affective domain as they do on the cognitive domain in any taxonomy of educational objectives. This means developing an alertness to human values and judgments on life as experienced vicariously through reading and through everyday encounters with people. It also requires an acceptance of responsibility for developing kinship with other human beings and caring for their needs. Values are to be examined for the purpose of developing a personal code of conduct, and the choice has to be guided to some extent by universal principles rather than just by personal taste. Among the universals are (1) faith in the power of reason and in methods of experiment and discussion, (2) the need to conserve human and material resources, and (3) the preference for the general welfare of the public over the benefits to specialized and narrow interest groups. But all of this soul-searching should be combined with a commitment to action, for just as creative work without a regulating conscience leads to recklessness, contemplation without creative work leads to intellectual impotence. As John Dewey allegedly once said, "*While saints engage in introspection, burly sinners rule the world.*"

Determining the Impact of the Matrix

A viable plan for evaluating enrichment has to run a middle course between two kinds of pitfalls. At one extreme there is the temptation to opt for *precision* in the choice of assessment methods and instruments at the expense of the *relevance* of these devices to program objectives. For example, a large school system offered the gifted a wide array of studies ranging from atomic physics to opera production but used conventional achievement and diagnostic tests to measure outcomes. The results showed that experimentals outperformed controls only in the "*capitalization*" and "*punctuation*" subtests! In this case, the criterion tests were chosen because it is easier to measure communication skills than the complexities covered in the curriculum.

At the other extreme there is an overzealousness about relevance to program objectives. The data collected in this instance are merely samplings of work done at school that are hard to generalize to other kinds of accomplishment. For example, a researcher determined the value of a course in Sanskrit for the gifted by comparing experimentals and controls on a test of Sanskrit, and he discovered to nobody's surprise that those who took the course performed better than those who did not! No attempt was made to determine whether learning Sanskrit made a difference in their general language development or even whether it affected growth in other scholastic areas.

Finding ways to assess the impact of a special enrichment program is hampered by the fact that few ready-made measures are designed for such purposes. Even in cases where standardized tests are relevant, their ceiling scores may be too low to measure individual differences and comparative gains in the course of the program. Taking into account these serious problems that pertain uniquely to the gifted, schools can proceed to conduct the assessment following guidelines that would apply to the non-gifted as well.

One of the essential preliminaries is an assessment of needs as perceived by various interest groups. There are several advantages to such a procedure, not the least of which is to determine the extent of agreement among these constituencies regarding every possible aspect of the program. Sometimes a highly vocal minority can give the impression of representing the concerns of a whole community. There may also be hidden disagreements or conflicts, albeit honest ones, between teachers and administrators, between administrators and parents, between parents of the gifted and parents of the non-gifted, or between all parents and the school board. All shades of feeling ought to be brought to the surface before evaluation takes place; otherwise, the assessment may be based on criteria of a successful program as seen by some groups and not by others.

An omnibus-type questionnaire such as the one appearing in ***Gifted Children: Psychological and Educational Perspectives*** (Tannenbaum, 1983, Appendix C) can help to elicit feelings about the gifted and the enrichment offered them in a single school or school system. The first part asks for information about the respondent and for some general impressions about how well the gifted are being served in school. Parts II through V consist of a series of statements about the gifted and their education, with each statement requiring three responses. First, the respondent rates it with respect to "*priority*," or perceived importance of the idea being expressed. Thus, for example, a person can attach high, moderate or low priority to an item such as "*The search for gifted pupils at school is intense and thorough.*" The response reveals how intensely the need is felt for schools to conduct this kind of search. The reactions of one group of respondents can then be compared with those of another as part of the preliminary needs assesssment in which the various constituencies reveal whatever differences may exist among them in their attitudes toward satisfying the needs of the gifted. It will also help clarify each group's feelings about where the emphasis (if any) in educating the gifted should be placed.

After rating the "*priority*" of the statement, the respondent then evaluates the school's or school system's "*performance*" with respect to it. In the example given, the assessment of performance can range from high to low on the intensity and thoroughness of the search for gifted pupils. Performance ratings should be weighted in accordance with priority ratings to determine how much importance ought to be attached to the respondent's judgment of the school or school system. On a scale of 5 to 1 (high to low) a moderate score of 3 for priority and a high score of 5 for "performance" would yield a weighted total of 15 for that item (3 × 5 = 15). Another person may give both priority and performance scores of 5 with a weighted total of 25 (5 × 5 = 25). This shows that, although both respondents gave the highest possible score for performance, the second evaluation of the school or school system was more positive because the second respondent attached more importance to the criterion statement on which the assessment of performance was being made.

Finally, the respondent is asked to speculate as to the *"prospects"* or likelihood that the idea represented in each statement will figure significantly in the policies or practices at school in the years to come. The purpose here is to test perceptions as to whether interest in educating the gifted is deeply rooted for longevity or is a short-lived fad. Again, each "prospects" item can be weighted for its priority, thus making it possible to see how much lasting power is anticipated for the school policies and practices that are regarded as most (and least) important. Assessments can also be made of projections into the future in areas of school performance rated high as well as those rated low.

Every type of analysis of priority, performance and prospect, and the interrelationships among them, should be conducted separately for the total sample and the various constituencies within it. This will prove helpful in understanding the general mood of the community along with the areas of consensus and conflict among interested subgroups. The data can be examined section by section as outlined in the questionnaire.

Part I would provide a preliminary hint of how people react to special opportunities for the gifted. Part II deals in some detail with the idea of individualizing instruction for children at any level of ability. Part III is devoted to specific concerns about the gifted. Part IV deliberately creates an artificial split between "the gifted" and "the talented" to test whether people are more concerned about one kind of excellence than another. Since the statements in Parts III and IV are mostly identical, it is then possible to compare reactions to the needs of children specializing in the arts (who are sometimes labeled "talented") with those concentrating in the academic disciplines (who are sometimes known as "gifted"). Part V combines the gifted and talented to assess the comprehensiveness of the enrichment program. Finally, Part VI contains only one statement, but it is probably the single most important one, because it asks the respondent to judge whether enrichment is programmatic in the sense of being part of the life blood of the total school curriculum or provisional in the sense of being an *ad hoc,* add-on luxury that lasts for only as long as it is considered attractive and affordable.

Following the front-end analysis of local needs, preparations have to be made for measuring the direct impact of the program on targeted children. The proposed methods and instruments relate directly to the Matrix objectives, and precision testing is sometimes sacrificed for the sake of close relevance between instruments for assessment and aims of the program. Since the expected outcomes are extensive, it is necessary to monitor a wide variety of growth indicators in the intellective, non-intellective and social domains. Wherever possible, comparison or control populations should be designated to determine whether the gifted benefit from enrichment and whether they are penalized in some ways by their exposure to special curriculum content.

In the last analysis, an evaluation serves educators best by helping them to improve their services to children. Formative measures are therefore extremely important in calling attention to early signs of strengths and weaknesses in the program. This information can then be used to help make curriculum adjustments along the way rather than waiting until the end of the school year when evaluation can only suggest what might have been done in the past and what promises to be successful in the future.

Summative evaluation at the end of the experimental period is also important as a means of ascertaining how effective the Matrix can be after the children have had adequate exposure to it.

The specific goals are as follows:

1. to extend, broaden and deepen children's educational achievement beyond ordinary expectation;
2. to enable children to cultivate higher-level intellective processes for purposes of problem finding and solving;
3. to inspire children toward greater creative productivity;
4. to help children achieve a balanced commitment toward bettering themselves and bettering the human condition;
5. to create for children a wide-ranging encounter with the world of ideas, not just a narrow specialization in a single area of study;
6. to influence the extent and quality of children's out-of-school experiences in learning, producing and performing in the world of ideas;
7. to enhance children's self-concepts and aspirations for self-fulfillment;
8. to raise children's social status among peers;
9. to create a climate of high morale in children's homes, schools and classrooms;
10. to influence children's mental health in a positive way.

Each of the aforementioned goals has to be clarified in considerable detail in order to eliminate any possibility of more than one interpretation. Concerned citizens in the community without training in educational jargon may not understand precisely what the professional has in mind unless the language is elaborated in terminology that makes sense to them. Even among themselves, professionals can interpret program aims in different ways if there are any traces of ambiguity in the language. Anything less than complete consensus as to the meaning of every expression will hamper efforts to evaluate the program, since people will disagree as to whether the data collected are on target.

Enhancing Pupil Achievement

There are often serious problems in the use of standardized achievement tests to assess programs for the gifted, even though their reliability and validity are impressive. They can be useful primarily if the curriculum stresses rapid progress in the acquisition of basic skills in the language arts and the mastery of facts in mathematics, sciences and the social studies. Even here the evaluator has to be careful to use instruments with high enough ceiling scores to permit fair readings of the status and progress of every student. However, the Enrichment Matrix features a considerable body of content that is rarely part of the regular school curriculum or tapped by conventional achievement tests. For example, if the children are studying general semantics as part of the expansion of basic skills and competencies, it is hardly likely that they will improve their scores by much on the usual measures of skills in reading. The evaluation therefore has to forego complete reliance on standardized achievement tests, precision-made as they may be, and make heavy use of difficult-to-manage but far more appropriate teacher-made tests, work assignments and special opinionnaires.

Many teachers schedule examinations in major subject areas periodically. These tests cover the enrichment content for the gifted, revealing more or less what they can be expected to have learned or created, and the results show how well they have succeeded in their work. It is difficult to quantify these outcomes so as to compare experimentals and controls, but they do help us to understand the nature and extent of differences between them. Topics covered consistently in the Enrichment Matrix are understandably mastered only by its participants. The number and depth of such topics tell us more about the children's achievement, provided that scores on teacher-made tests exist to show the extent of coverage. Examinations designed and administered early in the school year can also provide material for formative evaluation. The children's performance on them will show whether the curriculum content is too deep or shallow, too broad or narrow, and too varied or restricted. Whatever the results show in the first rounds of testing, there will be ample opportunity to use the test data to reflect on the overall program design.

While experimentals are expected to perform better than controls on topics covered only in the Enrichment Matrix, the question is whether enrichment is accomplished at the expense of more conventional content. In other words, are the gifted so preoccupied with special topics that they are forced to neglect the basics? One way to find out is to compare achievement in the general curriculum. This means developing a uniform examination on common core areas to which all children are exposed. Such data have to be collected repeatedly to avoid making overly easy assumptions about what the gifted accomplish at school. In the educator's zeal to emphasize enrichment, there is sometimes a tendency to push the more commonplace learning requirements into the background not only for lack of time but because assumptions are made that the gifted have already met them. Besides, there is not much glamour and excitement in the commonplace; in fact, the gifted are often bored by it. But boredom is not always a sign of belaboring the obvious. The gifted may have special difficulty in building up enthusiasm for exercises in spelling and grammar and absorbing facts in any course of study. Yet their indifference should not be interpreted to mean that they are able to express themselves clearly and with grammatical correctness in writing or to draw easily on a fund of knowledge in their memory banks. Too many teachers complain about gifted children's weakness in "fundamentals," thus making it necessary to assess the extent of educational neglect as well as accomplishment.

One of the more important benefits in relying on teacher-made tests, assignments and special projects is that they provide evidence of children's progress that everybody can understand and appreciate. Instead of reporting differential gain scores between experimentals and controls on measures that are only vaguely relevant to what is happening in the classroom, the educator can now look at what the children have actually done in the course of the program. This is not just for the sake of public relations, or for *"show-and-tell"* sessions, although they are important, too. What counts most is to examine what actually went on in the classroom as reflected in student performance and productivity, the intention being to compare the general accomplishments of beneficiaries with non-beneficiaries of differentiated education and to see how well the actualized program is fulfilling the expectations of various interest groups. These kinds of data will also help school officials to decide if (and how) the Matrix in its present or modified form can be administered to the non-gifted as well. By considering the adaptability of the program to a wider audience, the school will be less vulnerable to the charge of creating its own gifted elite.

Cultivating High-Level Intellective Processes

Few standardized instruments designed to measure complex thought patterns have enough of a "track record" to permit an evaluation of their validity. None has been validated sufficiently for children who perform near the top of the scale. The educator is therefore forced to rely on non-standardized, non-validated measures derived from work in the classroom.

The evaluation can then be accomplished in two ways, both of which reveal *what kind* of thought processes are used most and least frequently in the classroom rather than *how effectively* they are used. One approach is through observing pupil-teacher interaction directly with a monitoring instrument designed to record pupils' intellective activity. Recordings can be made along a hierarchy of processes ranging from the least to most complex. The observer records each cognitive performance by a child by placing checkmarks in the hierarchy that are emphasized in an instructional sequence. After a series of such observations, a count can be taken of the relative frequency with which the higher level processes are represented in the classroom. An alternative to using a hierarchical model to guide classroom observation is to rely on a categorical model which depicts a variety rather than a hierarchy of human functioning. Such an instrument can show how many *kinds* of intellective processes are stressed in the program without judging how *complex* these processes are.

Direct observation may be difficult to manage, partly because it is time consuming and partly because observers of the same teaching act often disagree as to what kinds of thinking are displayed. An alternative approach, therefore, is to apply the same kinds of analysis to samples of pupils' homework assignments, special projects and the examinations they take on their coursework. These materials probably give faithful indications of the kinds of thinking encouraged by the teacher. It is therefore unnecessary to take the trouble of recording and analyzing such behaviors live in the classroom.

But regardless of whether gathering data is through direct observation of teachers and pupils or through a content analysis of work accomplished, the information should be used constructively, not judicially. Teachers welcome supervision, but abhor "*snoopervision*." If recordings are made early in the school year, they can contribute to the formative evaluation and thereby help to determine whatever adjustments in the program are indicated. This can be done on a periodic basis to reveal trends in the program as teachers become more and more aware of their instructional tactics. At the end of the experimental period, a summative evaluation of children's projects and performance on teacher-made tests will reveal the complexity, quality and variety of cognitive stimulation featured in the enrichment program. It will also show how well children meet the challenge.

Broadening Cultural Interests at School

It is important to prevent children from being narrowly focused in their educational experience, spending most of their time in one or two subjects and virtually neglecting the others. Sometimes there is an imbalance in the quality of teachers or in the curriculum emphasis, so that enrichment develops a reputation of being strong, for example, in science and social studies and relatively weak in the language arts and music. Children who are accepted into the program begin to specialize too early in their schooling if their strengths are in the sciences and social studies, whereas those who are equally precocious in the language arts and music may be neglected. An exciting enrichment program may begin modestly in just one or two subject areas, but eventually it ought to range broadly with no weak spots in its offerings.

To evaluate the extensiveness and uniform strength of the program, the children's independent projects should be examined for subject area variation to see whether a range of interest has developed within a classroom and also within each child. A filing system should be developed to contain children's work specimens, projects in progress, completed reports and creative products and whatever special assignments reflect on the content of the program. The *nature* and *variety* of these projects, no less than their *quality,* should reveal much about the range of interests pursued by the children and inspired by their teachers. The work files of children in the experimental program should also be compared with those in control group situations to obtain a better view of how (or whether) enrichment makes a real difference in the nature, variety and quality of student accomplishments. The file should be started as early as possible in the school term to provide evidence for a formative evaluation.

Creative Productivity

Since the nurturance of creativity is featured in so many enrichment aims, it is important to determine how well they are realized. However, there are basic problems concerning what to assess and how to assess it. As is well known, standardized tests of "*creativity*" that measure pupil performance concentrate on divergent thinking, which probably has little *independent* relationship to creativity in the arts, sciences and letters. These kinds of instruments also need further proof of their reliability before they can be used with much confidence in evaluating the effects of enrichment. Nevertheless, the test items reflect a kind of thinking process that educators ought to consider seriously, provided that it is exercised in the context of the curriculum rather than in unrelated mental gymnastics. It means little to be fluent, flexible and original if children are given opportunities to practice these skills primarily in relation to the uses of the tin can or daily newspaper. The effects of such practice are felt mostly in their own context but should not be expected to transfer from one context to another.

In other words, if divergent thinking is to be demonstrated by children's resourcefulness in conjuring up ways to reduce poverty, pollution or inflation, the teacher has to emphasize this kind of thinking in relation to such topics. The evaluation will therefore have to be conducted subject area by subject area, with the students' work at school serving again as the main source of data since there are no standardized measures to evaluate such accomplishments. Quantitative and qualitative assessments are then possible, the first deriving from a frequency count of divergent thinking exercises found in a sample of children's work, and the second based on quality judgments of that work. In the more conventional domain of creativity, such as art, music, theater, writing and the dance, evaluations are done routinely through critiquing sample projects rather than by relying on non-existent or poorly validated measures.

Unfortunately, divergent thinking measures are not scored for quality of responses. There are dangers, however, in proliferating performance and product reviews for assessing progress in creativity or anything else because of the extra responsibilities imposed on the gifted. Close physical proximity between the gifted and non-gifted makes it easy for them to compare workloads and thus create resentment among those who carry the heavier burden. Such feelings are often close to the surface except in the few instances when children are out and out workaholics who welcome the special demands made of them. Otherwise, the pressures on teacher and students to pile up observable evidence of the program's success can lead to open resistance to *any* enrichment experience.

It is not easy to know when the gifted stop being overawed and start becoming overwhelmed, or when their talents stop being showcased and start being exploited. Requiring them to develop extra samples of their work for the sake of evaluating it more closely can tip the balance and make their entire experience overwhelming and exploitative. It would be absurdly self-defeating to sacrifice morale in the program for the sake of making the data banks super rich. Moderation is necessary. The rule of thumb in conducting the evaluation is to make it parsimonious, preferably without any need for the children to show evidence of accomplishment beyond what they demonstrate in the course of the program.

Balancing Self-Betterment with Social Consciousness

An effective enrichment program should help the gifted to avoid the extremes of self-indulgence and self-denial. On the one hand, they have the potential of contributing more than their share to the common good, and it would therefore be a tragic waste for them to become part of an *"only-I-count"* sect. On the other hand, by allowing others to dictate the development and use of their talents, they can lose their individuality and become part of an impersonal talent pool that exists only to serve society. One of the objectives of the Matrix is to teach the gifted that they do not have to choose between egotism and dehumanization and that service to self can be balanced with service to society.

The instrument used to assess children's personal-social commitments could be in the form of a *"preference-remembrance"* questionnaire. It is a simple device in which they are asked to choose how they would like to be remembered by the world after they finish their occupational careers. Several possible choices could be ranked in the order of preference, each of them representing a different point of view of where the person wants to be placed in relation to society. One of them reflects extreme self-centeredness (*"someone who developed his or her abilities* mostly *for the sake of self-improvement rather than for the sake of serving society"*). Another statement reflects extreme selflessness (*"someone who developed his or her abilities* mostly *for the sake of serving society rather than for the sake of self-improvement"*). The middle choice is a balance between the extremes (*"someone who developed his or her abilities* equally *for the sake of self-improvement and* equally *for the sake of serving society"*). Between the middle choice and each extreme there should be another option that is identical in wording to the extreme statement, except that *"mostly"* is replaced with *"more."*

Children might be asked to rank the characters twice: (1) in the order in which they *prefer* to be remembered and (2) in the order in which they *expect* to be remembered. This would show some possible discrepancies between their ideal and realistic perceptions of themselves. For each of the two rank orders, the children ought to write a short essay clarifying the reasons for their choices. If the matched control group responds to the same questionnaire, comparing experimentals with controls will make it possible to see how much change (if any) in attitudes results from exposure to the Matrix and how much is due simply to maturation.

Broadening Cultural Interests Out of School

The inspirational qualities of the Matrix should extend beyond the school building into the child's everyday life experience in the community. Sometimes, the gifted show signs of quantitative rather than qualitative changes in their cultural habits, and these indicators may be misleading to parents and teachers. For example, increasing the number of books read during leisure hours could really be a sign of absorbing more of the same kinds of material that most children do at that age, not an elevation of taste and variety. The children's responses to art and music can also remain superficial even if they spent more time than ever in museums and concert halls.

Information about out-of-school cultural activities can be elicited through informal interviews or open-ended responses of parents and children to a questionnaire that is brief and to the point. Children who have enough time and interest to develop a log of such activities may be encouraged to record the titles of books they have read, activities connected with their hobbies, notes about any creative work they are doing, adventures in science or mathematics, descriptions of any apprenticeships they may have, facts and feelings about their efforts to improve community life and impressions of their visits to art galleries, libraries, historical landmarks and other points of cultural interest. It is hoped that some of these activities will be traceable to experiences in the classroom. Periodic discussions of them at school may also give children the impression that teachers are interested in every aspect of their learning experiences, not just in life within the school building.

Raising Self-Concepts and Aspirations

Enhancing children's feelings about themselves and raising their sights for the future are essential to the success of enrichment. Two instruments may be used to assess change over time, one for elementary school and the other for high school gifted populations. The one designed for younger children is in the form of a series of pairs of statements, each pair referring to a personal characteristic of the respondent. The first statement of each pair always begins with the words *"I am,"* which should produce a realistic self-rating, while the second statement starts with *"I would like most people to consider me,"* pertaining to personal aspirations. A single adjective then follows the opening of the statement, which the respondent completes by indicating how accurate a self description it is. A pair of such statements would appear as follows:

	Always	Usually	Sometimes	Rarely	Never
I am *sociable*	5	4	3	2	1
I would like most people to consider me *sociable*	5	4	3	2	1

For each statement, the child circles the number that signifies which ending to the statement makes the self-description most accurate. The number of pairs of statements appearing in the questionnaire will depend on how far ranging the adjectives or adjectival phrases are chosen to be. The school may want to include descriptors pertaining to school success, motivation, sociability, personal happiness, emotional status and any other factors pertinent to human development. The realistic self-ratings (i.e., *"I am"*) are quantified separately as are the children's aspirations (i.e., *"I would like most people to consider me"*) for the entire instrument and separately for each group of adjectives, factor by factor. Then within each pair of statements the realistic self-rating is subtracted from the aspiration score and the within-pair differences are added together, thus revealing a third body of information concerning the extent to which aspirations may be unrealized. This would help to reveal degrees of inner tension (if discrepancies are great) and complacency (if discrepancies are minimal) felt by children in the course of the program.

For high school students, the instrument is more elaborate. With two uniform statements added to the pair in the elementary school form, each adjective is then preceded by the following four stems: (1) *"I am,"* (2) *"I would like most people to consider me,"* (3) *"Most people think I am"* and (4) *"Most people are."* Such a questionnaire was developed originally by the Talented Youth Project of the Horace Mann-Lincoln Institute of School Experimentation, Teachers College, Columbia University (New York City) and was used extensively in evaluating programs for the gifted. Six kinds of comparisons can be made for each adjective: (1) *"I am"* vs. *"I would like* *most people to consider me,"* (2) *"I am"* vs. *"Most people think I am,"* (3) *"I am"* vs. *"Most people are,"* (4) *"I would like most people to consider me"* vs. *"Most people think I am,"* (5) *"I would like most people to consider me"* vs. *"Most people are"* and (6) *"Most people think I am"* vs. *"Most people are."* Comparisons can be made between experimentals and controls to reveal whether the matrix fosters snobbery and inflated egos among gifted children.

Improving Social Status Among Peers

Since the morale of the school depends to a great extent on interpersonal relations among the children, it is important to assess how the gifted get along with each other and with the non-gifted. A specially designed sociogram can be used to elicit the necessary data. Each child receives a copy of the class list with introductory instructions as follows: "This is your class roster. Write a number next to each name to show how much you would like that person to become or remain your friend. The highest possible score you can give any classmate is a 5, and the lowest possible score is a 1. You may write any number from 1 to 5 next to each name to express how you feel about every person in your class. When you come to your own name, write the number that you think most of your classmates will give you, and draw a circle around it. Whatever you write will be held in strictest confidence."

When the data are assembled, a grid can be constructed in which the names of the children head the columns and also the rows. Thus, the entire class roster appears across the top of the page to head the columns, and the same listing appears along the left-hand side of the page as labels to the rows. Each of the children heading the rows has previously rated each of the children heading the columns, and the scores should be transferred from the children's individual rating sheets to the appropriate cells on the grid. The circled number denoting the score a child anticipates from the rest of the class should be entered in the cell where the child's name labels both the column and the row and should be circled in that cell. Thus, the scores appearing across a row denote a child's rating of classmates; scores appearing in a column denote the ratings a child receives from classmates. A mean score from each row is computed and entered in a box beyond that row at the right-hand side of the page. Similarly, mean scores for the columns are entered in boxes along the bottom of the page. The sum of all mean scores for the rows is the same as the sum for the columns, and that total divided by the number of children on the roster can be entered in a special box in the lower-right-hand corner of the page. It represents the general level of friendship feelings in the classroom. Progress in the way in which children rate others and are rated by others can be monitored over time and compared with similar records of the control group to determine the effects of the program. The ratings of and by individual children can also be compared to see if friendship status is related to friendliness. Finally, the circled scores, revealing how the children *think* they would be rated by others, can be compared with the *actual* mean ratings received *from* others.

To illustrate the use of the grid as a sociogram, Figure 5 contains friendship ratings by and of a sample of 5 children, A, B, C, D and E. Child A, for example, gives classmates an average rating of 3.25 and receives an average 3.25 from them, while expecting to be rated at a level of 3. The score of 3.4 in the extreme bottom, right-hand cell of the grid shows the general level of friendship within the group.

Stimulating Appreciation of the Program

An opinionnaire that assesses feelings about enrichment in general and how well it is implemented at school is useful in monitoring the attitudes of those directly involved.

		Rated					
		A	*B*	*C*	*D*	*E*	*Mean Rating of Classmates*
Raters	*A*	3	4	4	3	2	3.25
	B	3	5	4	4	2	3.25
	C	4	5	4	4	3	4.00
	D	3	3	4	3	2	3.00
	E	3	3	4	4	4	3.50
Mean Rating by Classmates		3.25	3.75	4	3.75	2.25	3.4
Mean Rating of and by the Total Class: 3.4							

Figure 5. Friendship ratings by and of a sample of five children.

Such instruments have been developed in many school systems and should reflect local concerns. These formats can easily be adapted to highlight any issues raised during the needs assessment and enrichment planning phases of the program. Separate forms should be administered to the children, their parents, and their teachers in order to elicit some impression of morale at different times during the school year. Wherever possible, items on the opinionnaire ought to be the same for the separate groups of respondents in order to facilitate easy and meaningful comparisons. Such an analysis lends itself both to formative and summative evaluation.

Fostering Mental Health

Some children may enter the special program with various psychosocial problems. Others may develop such problems in the course of the program. These children have to be watched closely in order to put together case studies based on data derived in the course of identification and formative evaluation. The purpose is to develop some hypotheses concerning positive or negative indicators of mental health status. Such in-depth case studies are time-consuming and require considerable staff resources, but they add vital information that is often difficult to discern in mass data. Some children may react emotionally and behaviorally to being understimulated; others may be overwhelmed by the added burden of an enriched curriculum. Clinical specialists should make every effort to collaborate with the staff responsible for enrichment to adjust the program design to the needs of children so as to forestall emotional or interpersonal problems. Their working together may produce new understandings of what educational enrichment ought to be and new insights into the ways in which children respond to an enrichment paradigm like the Matrix.

In Conclusion

An evaluation design that touches on all aspects of the Matrix is enlightening to educators and non-educators alike. It helps to clarify the nature of young talent, the varieties of children who possess it, and the effects of its nurturance in and out of school. It especially reveals the *"goodness-of-fit"* among pupil, teacher and Matrix and how to improve this match through refinement in the enriched program of study. In short, what can be learned in the course of evaluation, advances the educator closer to the goal set for these children: an appreciation of who they are and what they need in the course of their schooling.

Discussion Questions

1. Compare and contrast Tannenbaum's definition of potential giftedness with other definitions that emphasize accelerated early development.

2. Discuss the ways in which the Tannenbaum Enrichment Matrix derives (or fails to derive) from his definition of potential giftedness.

3. Contrast Tannenbaum's views with those of any other contributor to this volume on the following matters:

   a. The special role and function of the enrichment teacher.
   b. The value of *"presented"* curriculum content in an enrichment program.
   c. The place (and methods) of teaching so-called higher level thinking skills in an enrichment program.

4. Describe in detail the ways in which Tannenbaum's Enrichment Matrix emphasizes programmatic rather than provisional education for the potentially gifted.

5. According to Tannenbaum, how does the process of identifying potentially gifted children relate to the process of educating these children?

6. How would you apply Tannenbaum's three-step procedure for identifying the potentially gifted in *your* school/system?

7. Explain how the Tannenbaum Enrichment Matrix is really *four*-dimensional, not *two*-dimensional.

8. Explain how the Tannenbaum Enrichment Matrix incorporates the essences of at least one other enrichment model presented in this volume.

9. Explain how the Tannenbaum Enrichment Matrix adds essences to at least one other enrichment model presented in this volume, and state why you feel that the added essences are or are not important.

10. Although Tannenbaum argues that enrichment programs should replace provisions for the gifted, he makes allowances for including provisions in his Matrix. Describe in detail the provisions you would offer if you were teaching a class of potentially gifted children.

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XIV

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Summary

Fostering Effective, Independent Learning Through Individualized Programming

The IPPM approach to gifted programming emphasizes the need for effective instruction to respond to the unique characteristics, strengths and talents of individual students. IPPM stands for "Individualized Programming Planning Model." This name emphasizes that there are many kinds of strengths and talents among students which should be recognized and nurtured in a variety of ways.

In IPPM, we use a definition of giftedness that stresses human potentials related to independent, creative learning. That is, we believe that giftedness and talents are expressed through using or applying what one learns in creative and productive ways, not merely being proficient at amassing, recalling and reciting information. Our definition emphasizes that creativity combines ability, skills and motivation (Renzulli, 1978; Torrance, 1979; Amabile, 1983).

Identification is viewed as an open-ended, flexible process, in which we are more concerned with identifying *needs for services* than with identifying *students*. The question we pose is, "Do we see any evidence of strengths or talents in a student that should prompt us to modify our present instructional program in some way(s)?" We do *not* ask whether the student is a *bona fide* gifted person or whether the student should be "in or out" of a specific "G/T program."

Programming in IPPM involves a diverse array of services which may be offered for many (and varied) students in different times and places and under the supervision of many different individuals. We believe that unique needs are not served by a single program or curriculum. We seek to differentiate *instruction* rather than curriculum, as part of an on-going process of instructional planning and decision-making. We try to consider the role of the regular program, plus additional services that may need to be offered, in six programming areas: Individualizing Basic Instruction, Appropriate Enrichment, Effective Acceleration, Independence and Self-Direction, Personal/Social Development, and Career Orientation with a Futuristic Perspective.

Fostering Effective, Independent Learning Through Individualized Programming

The fundamental premise of this chapter is that gifted education is concerned with students: their characteristics, their strengths and talents, and their needs for instructional services that are stimulating and satisfying. Our basic vision is that in an educational world which is working the way it should there will be significant attention to students' unique strengths, talents and needs. There will be opportunities for students of promise in any area to reach as high as they are able, to be creators and problem solvers (not just regurgitators), and to function effectively and independently.

Successful programming for gifted, talented and creative students demands that we establish and maintain such a vision. Such matters as identification procedures and instruments, curriculum writing, definition of program prototypes and administrative arrangements are *means*, not *ends*, although they frequently seem to be treated as though they were the ends in themselves. Too often our "vision" seems so shallow or myopic that the effects or impact on students are all but forgotten in the process. Objective identification packages and procedures, neatly packaged curriculum units and administratively simple program structures should not become so dominant in our view that we neglect the critical question, *"In what ways will this benefit our student?"* Although it is important to be able to develop appropriate means to help us attain our intended goals, means should not be equated with ends. The absence of a clear, strong vision of benefits for students may well become responsible for the demise of many "programs."

The Individualized Programming Planning Model (IPPM; Treffinger, 1981, 1986) maintains a major commitment to the fundamental goal of *promoting effective, independent learning based on the strengths and talents of the student.* This specific "vision" is a focal point which guides and directs our instructional efforts. It serves as a constant reminder that *meeting students' needs* and promoting personal development and creativity are essential commitments of a caring, progressive and humanistic philosophy of education.

The purposes of this chapter are to describe the rationale for the IPPM approach, to highlight the ways in which it contrasts with many common practices and procedures, and to describe the major considerations in translating the model into practice.

Nature and Definition of Independent Learning

By effective, let us mean successfully generating, planning and using products and actions (employing both critical and creative thinking) to solve problems. By independent, let us mean self-directed work on problems for which the individual (or a small group) has ownership. Ownership entails *influence* (being capable of and responsible for action on a problem), *interest* (personal involvement in the task and concern for action about the problem) and *imagination* (opportunity for and acceptance of new ideas). Ownership is an essential dimension of effective problem solving (Isaksen & Treffinger, 1985). Independent learning does not just mean "working alone." Much more importantly, it deals with the ability to mobilize resources (one's own and others) to bring to bear on solving problems for which there is a sense of commitment or an emotional investment; it is a responsible autonomy that frees the person from intellectual dependence on others.

Emphasizing students' strengths and talents reflects the commitment to build upon positive dimensions of human potential and ability (Taylor, 1984). To be certain, there are many kinds of liabilities and deficiencies which can seriously impair some students' ability to learn. When they exist, such difficulties will not be ignored by the wise teacher. However, effective independent learning attempts to affirm and to build upon the strongest and most powerful motivations and skills of the learner, to provide an affirmative foundation for learning and growth. Unmerciful drill on one's limitations or deficiencies can be limiting and discouraging, perhaps even counter productive to our most important goals. This does not mean that intellectual competency can or should be disregarded. Knowledge and comprehension of the content of a discipline are fundamentals upon which effective scholarly inquiry builds. Effective higher level cognitive activity, such as application, analysis, synthesis, evaluation and real problem solving call for the ability to draw upon mastery of one's field of investigation or study.

Components of Effective Independent Learning

The important components contributing to the development of effective independent learning are presented in Figure 1. These components are ***characteristics and identification, process, content*** and ***management/environment.*** These components will be presented separately, and each will be briefly discussed. Each component will be considered at two levels: first, its meaning in relation to individual students, and second its implications for effective program planning and implementation.

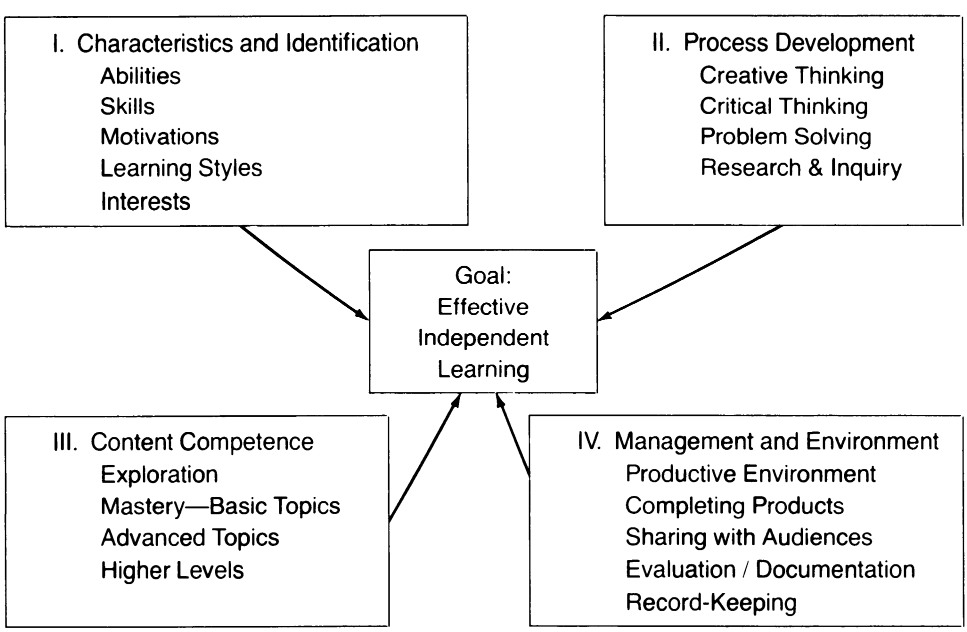

Figure 1. Components of Effective, Independent Learning

Characteristics and Identification

The first component of the model involves describing important characteristics associated with effective, independent learning and recognizing their implications for identification and programming.

Meaning for Students

In order to promote the development of effective, independent learning based on students' strengths and talents, it is necessary for us to be able to define and recognize the importance of several dimensions of cognitive ability, performance and personality that are closely associated with effective independence. This includes the student's learning ability and unique talents in specific areas, creativity, motivation, learning styles and preferences, and particular areas of experience and interest. These serve as foundations for effective instructional programming. There are many recent models to guide us in this context, and they all point towards the synthesis of three similar dimensions: one emphasizing ability, another involving motivational factors and a third dealing with specific or "domain relevant" skills. Examples include Renzulli's (1978) definition of giftedness, Torrance's (1979) definition of the basic factors contributing to creativity and Amabile's (1983) definition of creativity.

The role of learning styles (Butler, 1984; Dunn & Dunn, 1975, 1978; Gregorc, 1982; Isaksen & Treffinger, 1985; Lawrence, 1979; Renzulli & Smith, 1978; Silver & Hanson, 1980; Wittig, 1984) has also been investigated extensively. Growing evidence suggests that there are significant benefits for *many* students by using learning styles to individualize instruction and that gifted students may demonstrate unique learning style profiles which can be important to consider in planning appropriate educational programs for them (Dunn & Price, 1980; Griggs & Dunn, 1984; Griggs & Price, 1980; Ricca, 1984; Stewart, 1981). Student interests should also be considered in looking at the characteristics and needs of gifted and talented students (Eichberg & Redmond, 1984; Renzulli, 1977, 1982, 1983).

Programming Concerns

The individualized approach differs significantly from traditional "G/T Identification" procedures, however, in several critical ways. First, the individualized approach is *inclusive* rather than *exclusive*. That is, it emphasizes positive attributes that lead us to serve students in certain ways, rather than merely "lines of demarcation" by which a few students are chosen and most rejected.

Second, it emphasizes the *instructional diagnostic* value of information about characteristics and talents. Identification procedures are linked specifically to programming and instructional decisions. This view holds that the most constructive purposes for "identification" relate to preparation for improved instructional decision-making, not merely for selection. In order to be useful for identification, data should provide useful information that will help us more effectively guide students' learning. This also makes it possible (and important) to use the rich information we can obtain from learning style and interest data, even though these are not usually included in traditional identification approaches in gifted education.

Third, individualized identification draws upon an established conception of the qualitative nature of giftedness and creativity, not merely a quantitative segmentation of the population. If we discuss "the gifted" as a fixed percentage of the population, we learn little about the strengths and talents actually demonstrated by the individuals thus designated. Effective identification should also be closely related to our qualitative or conceptual view of giftedness and the productive behavior associated with it. In addressing abilities, motivations, skills, learning styles and interests, we are establishing a conceptual and operational concept of giftedness, not merely setting up arbitrary criteria for selecting a group of students.

Finally, an individualized approach to identification is responsive to many aspects of information about the learner and his or her needs, and is not spuriously enamoured of the "power of the IQ test score." Most basic textbooks on psychological assessment warn examiners explicitly not to base complex judgments and decisions (such as program placement) on test scores alone, and certainly never on a single test score (e.g., Anastasi, 1968; Kaufman, 1979). Despite the clarity and strength of these admonitions, it has been well-documented that the typical practice in gifted education relies heavily on test scores and specific cut-off points, and, even more dangerously, that many tests are used for purposes and populations for which they were never intended and may well be inappropriate (e.g., Alvino, McDonnell & Richert, 1981; Sternberg, 1982; Yarborough & Johnson, 1983).

Even the most common attempts to give more than lip-service to the concept of "multiple criteria," such as identification "matrix" procedures, are hindered by basic psychometric flaws (e.g., weighting, reliability and scale of measurement concerns; see Feldhusen, Baska & Womble, 1981) or by the lingering perceptions, (however erroneous) that fairness requires administration of a standard set of instruments to all students or that identification is necessarily restricted to the selection and labeling of a single fixed group of students.

Process Development

The second factor contributing to effective independent learning is process development, in which we are concerned with the thinking, reasoning and inquiry tools that are essential for the problem solver.

Meaning for Students

In seeking to become effective independent learners, students must know and be able to use many skills that have been described in a variety of ways: process skills, thinking skills or intellectual tools.

The student must be able to think *creatively*, by which we mean:

Making and communicating meaningful new connections, to help us think of many possibilities; think and experience in varied ways and using different points of view; think of new and unusual possibilities; and to guide us in generating and selecting alternatives (Isaksen & Treffinger, 1985).

The student must also be able to think *critically*, by which we mean:

Analyzing and developing possibilities, to compare and contrast many ideas; to improve and refine promising alternatives; to screen, select and support ideas; to make effective judgments and decisions; to provide a sound foundation for effective action (Treffinger, 1984).

There are many structured or systematic models to describe the problem solving process in general terms (e.g., Dewey, 1933; Gordon & Poze, 1981; Isaksen & Treffinger, 1985; Kepner & Tregoe, 1981) or in the context of a specific academic discipline (e.g., Polya, 1957). These systems build upon the basic creative and critical thinking skills, but also involve integration and management of these skills in more complex applications.

Students must also learn and be able to use the research and inquiry techniques required in investigations of real problems. These include general skills, such as using library resources, conducting reviews of literature, and learning basic procedures of data collection, data analysis and data presentation. Also included, however, are knowledge of the specific methods, instruments and techniques related to inquiry in a certain discipline (e.g., an astronomer must be able to use a telescope, or an engineer must be able to conduct a particular kind of stress or strength of materials analysis).

Programming Concerns

Teachers do not hesitate to teach their students how to take notes, how to study for a test, how to use mnemonic devices or memory aids to review knowledge or other "process technology" for the knowledge and comprehension levels of learning. By the same token, learning the appropriate "technology" for higher level processes is also important. Students cannot be expected to be able to engage in independent creative and critical thinking, problem solving or development and sharing of products with real audiences without some prior instruction in the methods and techniques helpful for those purposes (i.e., the relevant "process technology"). If we expect students to learn to solve complex problems and to develop and carry out effective plans of action, we must accept the responsibility to help them acquire the necessary methods and techniques.

It is often asked, *"Should process development be undertaken as a specific, separate instructional activity in itself, or should it be undertaken in the context of other, more traditional 'content' activities?"* Such a question imposes unnecessarily a "forced-choice" view of the challenge. Process development can be considered at three different levels (Treffinger, 1980, 1984). In the first level, which emphasizes training in specific creative and critical thinking techniques, connections with traditional content areas are very easy to make and can readily be accomplished at all grade levels. Some general practice with the techniques alone, without concern for specific content applications, can be useful for introducing and practicing the techniques. It is usually desirable, however, to practice the basic creative and critical thinking skills with examples from the content areas. At the second level, which involves learning and practicing more complex systems (creative problem solving methods, for example), content applications can be made easily through the use of games, simulations and role playing activities. In the third level, dealing with real problems and challenges, it is necessary to address problems for which the students actually have ownership and intend to carry out their solutions. By its very definition, this level transcends "learning about" predetermined content. It is thus important to remember that, if fostering effective independent learning based on students' strengths and talents is a major goal of our instructional program, process development is an important consideration *in its own right*, not merely to the extent that such processes can be used to support instruction about traditional content topics.

Content Competence

The third component which contributes to effective independent learning is content competence. Outstanding contributions in any area of endeavor necessarily involve content. People who are creative, productive, problem-solvers and knowledge-able and involved at a high level in the content of a particular discipline, or in the crossovers and linkages among several disciplines; it is not possible to be creative in a vacuum.

Meaning for Students

Students who seek to become effective independent learners are often able, within the areas of their particular strengths and talents, to learn quickly and easily, to be highly curious and interested in a variety of topics and to pursue learning about new concepts and topics eagerly on their own. They are often very proficient at dealing with complex or advanced material, and commonly can deal with abstractions and generalizations readily. They often prefer to be able to organize and structure their own learning, and to experiment with new possibilities and methods. They can easily learn through presentations in different media or formats, and are not dependent upon a single "channel" or perceptual mode. They may be significantly advanced in their knowledge of their own areas of greatest interest, in comparison with other students of their own age or even with their teachers. They may wish to devote a large part of their time and energies to the topics which interest them, to the exclusion of other topics to which teachers or parents seek to direct them. They may also seem to lack knowledge, make errors or behave uncooperatively when they are bored with instruction dealing with topics they have already mastered. It is possible, however, that some of their "knowledge" of a particular topic may be superficial or glib, which can lead to the risk of significant gaps of understanding. In such cases, however, the missing pieces can usually be mastered quickly and easily without need for the extended, repetitious drill and practice commonly associated with learning at the knowledge and comprehension levels.

Programming Concerns

The importance of content competence does not mean that effective independent learning must be deferred until one has mastered *all* the knowledge and information considered relevant to that area. It does reaffirm that discoveries, inventive breakthroughs and new solutions to problems do not arise from ignorance, despite oft-told myths of dramatic serendipitous contributions. In many such cases, it is often overlooked that the person making the discovery was in fact quite knowledgeable and well-trained in the area being investigated, even though serendipity or good fortune played a role in a specific sequence of events. Intellectual competence, disciplined study and extensive knowledge of one's field cannot and should not be ignored or underestimated in the pursuit of effective independent learning; there are few (if any) "shortcuts" in critical and creative inquiry.

The educational challenge is to recognize the student's entering level of knowledge and skill, prescribe effectively so gaps at the basic levels can be closed efficiently, create opportunities for learning activities consonant with the learner's aptitude and style, and provide an effective foundation for the student to progress towards independent investigations. In short, teachers must be concerned with making knowledge acquisition and comprehension effective *and* efficient, and at the same time providing opportunities for students to become involved in more complex topics (using higher level thinking processes) and independent investigation. Effective content instruction does not involve a steady diet of drill and practice with the admonition, *"Someday you will be able to use all this in solving real problems."* It is not easy to accomplish this task, especially with large classes and limited resources, but it is possible. Information about student learning styles and interests, as noted above, can be useful to teachers in varying instructional activities and assignments. The increasing presence of the microcomputer in classrooms can also be a powerful tool to enable teachers to diagnose, prescribe and monitor more efficiently the performance of students at varying levels, and may be able to be combined effectively with mastery learning models or individualized unit planning procedures (e.g., Treffinger, Hohn & Feldhusen, 1979).

It is also important that, along with pressures to insure a common "core" of experiences and resources that will assure educational *equity* for all students, we do not reduce or eliminate the necessary advanced study opportunities, courses and resources that are needed to promote *excellence* among our most talented students in all disciplines (Ambach, 1984; Bruch, 1984; Feldhusen & Hoover, 1984; Maker & Schiever, 1984).

Management and Environment

The last component which contributes to effective independent learning involves the establishment and management of a productive learning environment. This component has traditionally received less attention than any of the others, although it is a very important concern for both the students and the program.

Meaning for Students

From the individual's viewpoint, the nature of the learning environment and the tasks of management and documentation or record-keeping can be extremely important. Creative productivity can be facilitated by some environmental conditions and events and inhibited by others (Feldhusen & Treffinger, 1985; Torrance, 1962, 1965; Torrance & Myers, 1970; MacKinnon, 1978). For example, it has often been shown that tolerance of complexity and disorder, unconditional acceptance and positive regard for the individual, support for unusual ideas, freedom from arbitrary external evaluation, and time for incubation are among the environmental conditions which can facilitate creative behavior. For the student, then, management and environment begins with a concern for finding an environment or climate in which effective, independent learning will not only be *tolerated,* but will actually be *encouraged* or facilitated. In addition, it involves awareness of the "blocks" or obstacles that can inhibit creative inquiry, and knowledge of ways to remove or circumvent them (Isaksen & Treffinger, 1985).

Next, the student must address the task of managing independent learning: learn how to set reasonable but challenging goals, identify needed resources, gather and use those resources, develop a worthwhile product or outcome and communicate the results to others (Gross, 1982; Treffinger & Barton, 1979). The student must also be concerned with effective time management for independent investigations, because resource and energy limitations, project requirements and deadlines are unavoidable challenges for all independent problem solvers. Record-keeping and documentation of one's activities and products are a necessary part of the management component, and must be addressed.

Programming Concerns

For the school, the challenge in this component derives from the difficulty that many teachers and parents experience in deferring judgment. It is common for adults to evaluate and judge the child's work too often and too soon. Promoting effective independent learning involves creating a learning environment that encourages curiosity, experimentation, exploration and divergent thinking; an atmosphere in which students can generate many possibilities without fear that every idea (and the person thinking of the idea) will be judged swiftly and summarily. It involves creating and maintaining an environment in which new questions are valued as much as old answers, in which there is excitement and the possibility of discovering something new and unusual each day.

An environment for effective independent learning also involves the need to recognize that students do not necessarily know how to manage and direct their own learning, but that they are capable of learning to do so. There are many factors that make this recognition difficult. It often seems faster or easier for adults at home or in school to say, *"Here, let me do it. . . ."* or, *"Just do it this way. . . ."* Management of many children at different levels within a classroom can seem easier to the teacher if all of them are working on the same task at the same time, despite the teacher's recognition that one task does not meet the needs of every student equally well. And some adults merely say, *"This child is just too young to make such important decisions for himself (or herself)."*

Students need opportunities to learn *gradually* to become self-directed learners. Working with the teacher, students can learn how to set goals, identify resources, develop projects and learning activities, make decisions and evaluate ideas, and create and share products. They can learn to share their products with other students and with outside audiences as well. They can learn to keep records of their progress and to document their own efforts and outcomes (Treffinger & Barton, 1979).

Need for New Approaches

In 1982, the writer (as Editor of the ***Gifted Child Quarterly***) assembled a special issue on the theme, "Demythologizing Gifted Education" (Volume 26, Number 1). In this issue, 15 "myths" of gifted education were addressed by 14 authors; the purpose of the issue was:

. . . (W)e will be concerned with more than identifying these myths; we will also attempt to practice "demythologizing." Mythology involves writing about myths, explaining, and classifying them; demythologizing suggests writing that helps us reverse or free ourselves from those myths (1982, p. 3).

Concerned that gifted education had developed too many "easy answers" for the difficult questions of identification and programming, each of us attempted to examine critically one of the "mechanical" responses that might need a fresh perspective or even a complete redefinition. These myths were classified in three general areas; several possible implications were identified:

We should be making efforts to expand our search for . . . unique characteristics . . . that can be related to instructional planning, not merely selection of students. We should be placing greater emphasis upon identification as a qualitative process. . . . We must move towards using identification data to provide a basis for multiple and varied instructional plans. . . . Improving identification should be viewed as examining the most appropriate paradigms, not merely choosing the best tests. . . .

The future will see us moving actively to blend or integrate gifted education more effectively with all *components of the school program. There will be increased recognition of the benefits of individualized instruction for many kinds of student strengths and talents. . . . There will be renewed efforts to provide professional development to enhance the "health" of the* total *school program. We will have to deal increasingly with local resources. We will be considerably more concerned with* meeting students' needs *than with sorting or classifying them (1982, pp. 5–6).*

These concerns pointed to the need for the development and implementation (with experimentation) of new models or approaches for identifying and serving gifted and talented students. Despite its widespread popularity and use (Oglesby & Gallagher, 1983), it is not clear that traditional "resource room/pull-out" model approaches can respond effectively to these needs and concerns. The IPPM approach was developed to provide one such alternative model which might be implemented successfully in a practical educational setting.

Relationship Between Gifted Education and the Total School Program

The relationship between gifted education and other components of the school program has often been strained, and sometimes openly hostile. In many school districts, informal reports from gifted education specialists have indicated such stresses: competition between programs, placing undue pressure or unrealistic expectations upon students who participate, overloading students with unnecessary busywork, refusing to nominate students for programs and other similar concerns. However, conversations with administrators and teachers from regular classrooms have also reflected concerns: excessive labelling and creation of separate, isolated groups of students, lack of communication and coordination of program content and activities, disregard for basic skill areas, overemphasis on "fun and games" activities with little purpose or value, constant interruption of other classroom activities, and so on.

Are all these concerns valid? Of course not! But, when the same concerns are expressed time and time again, in one school building after another, they cannot all be simply dismissed as the unfounded biases of individuals who oppose gifted programs or who do not really want to do their job. The writer's conclusion from these observations and experiences has been that there is a significant need for a reexamination of the relationship between gifted education and the rest of the school program. It does not seem too much to assume that all components of the student's school experience should be planned and conducted in ways that work together for his or her benefit!

The IPPM approach does not begin with the assumption that the identification process will lead to the designation of a single, fixed group of gifted students. Also, it does not assume that services to gifted students will be provided only by one person, in one place, or at one fixed time each day or week. It does not take the popular "resource room/pull-out" prototype as a given. This has caused some people to assume, quite incorrectly, that IPPM therefore advocates that all services to gifted students can and should be provided by the regular classroom teacher in his or her own classroom. Indeed, at one session of a large conference, the writer was accused from the floor of "putting all of us in gifted education out of work." To attempt to put aside such misunderstandings, let us attempt to clarify the relationship between gifted education and other parts of the school program, as viewed in the IPPM approach.

Gifted programs should not spend time conducting, for a small group of pupils in a separate setting, activities which should be offered to nearly all pupils in a regular classroom setting. Unfortunately, many of the most common, popular activities of countless gifted programs seem to fall in this category: basic critical thinking tools, divergent or creative thinking activities, library and reference skills, computer literacy activities, higher level cognitive skills (e.g., Bloom, 1956), problem solving methods and a wide variety of Type I Enrichment activities (Renzulli, 1977). Many gifted specialists find that their time and energies are almost completely absorbed by such activities—activities they know *should* be conducted in an effective regular classroom for the benefit of many children. I have been accused of being unrealistic about this, because many people believe that these activities, however desirable for the regular classroom, are not occurring there. My response is twofold: first, conducting such activities in the resource room setting will not make the regular classroom (in which the student still is likely to spend a majority of his or her school time) any more effective; second, the proper business of gifted education is *not* to be involved with "remediating" the deficiencies of the regular program. What *can* be done in the regular classroom *should* be done there.

This does not mean, of course, that all the needs of all the pupils can be met adequately by a single teacher in the regular classroom setting. Even in the best of all possible worlds, the regular program and the classroom teacher will need the assistance and support of specialists with training and experience in gifted education. Effective, independent learning requires resources and services that extend beyond those it is reasonable to expect can be provided by the classroom teacher alone. The IPPM approach does not suggest, then, that services in the regular classroom should take the place of gifted education; instead, it emphasizes the importance of an effective blend of services through the regular program and gifted programming.

Translating Theory Into Practice

How does the IPPM approach attempt to translate a commitment to effective, independent learning based on students' strengths and talents into a practical framework which can be used in a school setting? There are six important decision areas in the IPPM approach. These are: ***Definition, Characteristics, Screening and Identification, Instructional Planning, Implementation of Services*** and ***Evaluation and Modification of Programming.*** The six decision areas are shown in Figure 2 (using Renzulli's 1978 definition illustratively).

The six components of the IPPM approach involve the following decisions, each of which will be discussed briefly in this section:

Component	*Key Question(s)*
1. Definition	What do we mean by giftedness?
2. Characteristics	What unique characteristics of students are associated with the definition?
3. Screening and Identification	How can the students' characteristics and needs be documented and described?
4. Instructional Planning	What is our plan for responding to the students' needs? (Regular program? What other services are needed? How? From whom? When? Where?)
5. Implementation of Services	How are the planned services carried out and documented?
6. Evaluation and Modifications	How will the success of the program be determined? What changes are needed in plans for students?

Definition

In the example in Figure 2, Renzulli's (1978) definition of giftedness was used as an illustration. Although other definitions might just as easily be used in the IPPM framework, Renzulli's was considered especially appropriate because it reflects a conception of giftedness that is clearly consistent with the goal of promoting effective, independent learning. It was preferred over other common, categorical definitions (such as the 1972 or 1978 USOE definitions) because it avoids ambiguity and overlap among categories, emphasizes basic psychological characteristics which have been described in the literature of creative, productive talent, and is not restrictively bound by *a priori* percentages of incidence. The definition is important in IPPM because it establishes a context through which specific characteristics can be determined and examined.

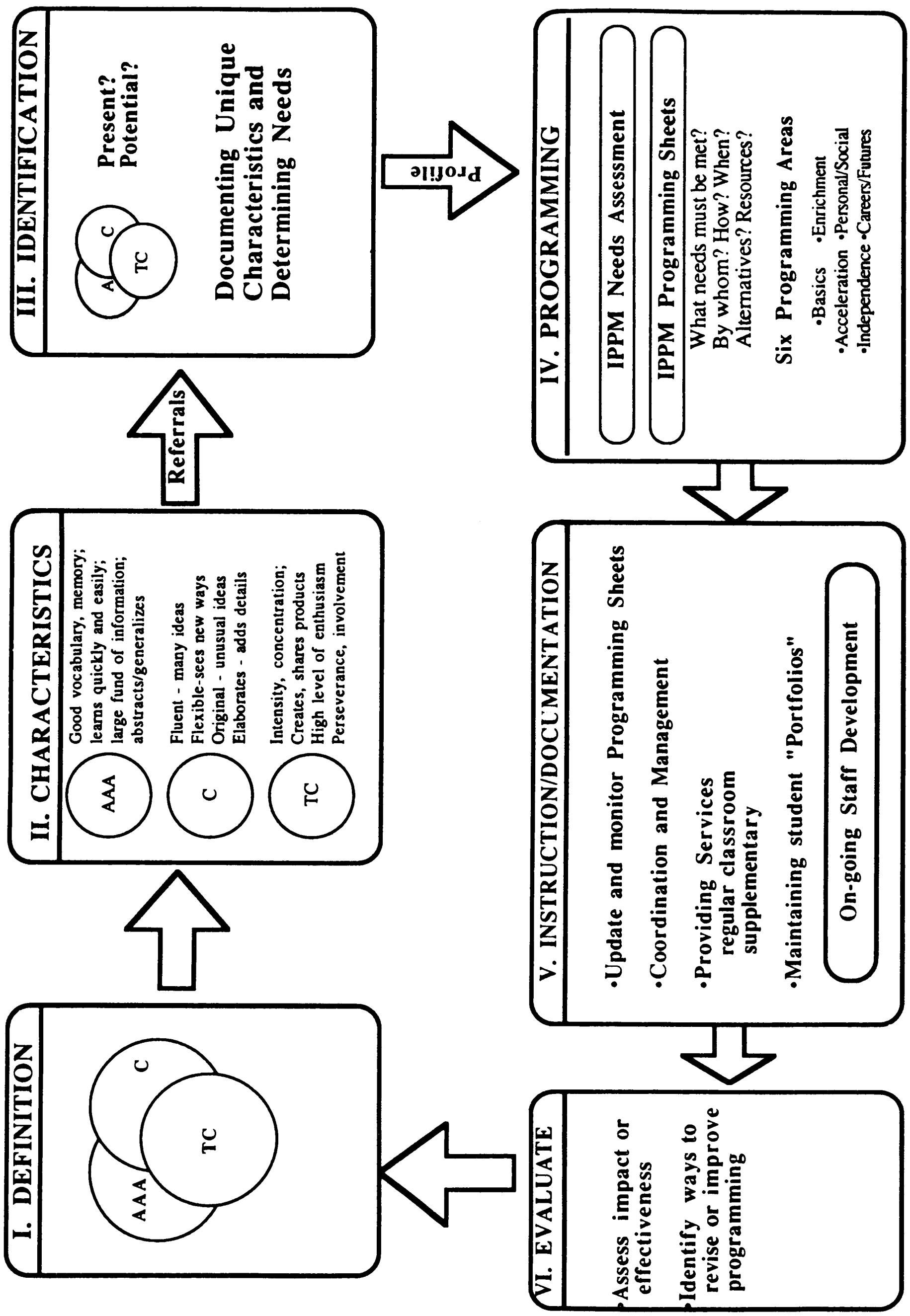

Figure 2. Decision Areas in the IPPM Approach

Characteristics

There is widespread agreement that a number of specific characteristics can be associated with the dimensions of ability, creativity and motivation. When these three clusters are evident, some of the observable characteristics include the following:

Ability	*Creativity*	*Motivation*
Advanced Vocabulary	Questioning, curious	Sets own goals
Good Memory	Fluent, Flexible	Intense involvement
Learns quickly, easily	Original	Prefers own tasks
Large fund of information	Elaborates	High energy level
Generalizes skillfully	Transforms and combines ideas	Does not give up easily when working
Abstracts easily	Sees implications	Completes products
Makes judgments and decisions	Feels free to disagree	Eager for new projects
Perceives similarities and differences	Finds subtle humor and paradoxes	Assumes responsibility

It is important to recognize that these characteristics may be specific to a certain area of talent or interest in any particular student; they are not necessarily "general" characteristics that can be expected to be displayed in every circumstance or in every area of study. (The teacher who reports that a student is not "task committed" because s/he will not do endless drill and practice exercises or worksheets has thus missed the central meaning of the concept.)

It is also important to note that there is abundant research to suggest that the characteristics in each of these three areas are *not* fixed and unchangeable in the person. It is possible to show that significant improvements can be effected through instruction in students' performance in many of the specific characteristics in each of the three areas. This means that giftedness should not be treated as a fixed condition which can unequivocally and permanently be designated present or absent in an individual.

In order to complete the picture of characteristics which should be considered in efforts to foster effective independent learning, it is also important to consider information about the student's specific learning styles or preferences, and the student's specific areas of interest.

Screening and Identification

Having selected a definition to guide our efforts and determined the characteristics associated with that definition, the next step is to consider screening and identification. There is widespread agreement, at least nominally, that there should be a broad-based and wide-ranging screening effort followed by a more comprehensive analysis of the student's characteristics. The IPPM approach differs substantially, however, from many other models with regard to the meaning and purposes of screening and identification.

In many approaches, screening is considered *"searching for candidates"* or *"trying to locate as many students as possible who might be eligible for the gifted program."* The comprehensive evaluation process which follows screening is fundamentally a shake down process by which additional information (presumably more detailed or rigorous) is used to determine whether or not each candidate is actually qualified for inclusion in the program. This step often suggests (and may even require) an individual intelligence test. In at least some cases, the major purpose served by the screening process is merely to identify those students who should be tested individually, since it is not feasible to administer the individual tests to everyone. It is common to use screening criteria as "hurdles" in the sorting process. If the student's group IQ is at least (X), and his or her achievement scores are at least (Y) percentiles, and with the approval or referral of the teacher, the student will be considered for a more comprehensive evaluation (i.e., individual testing).

The presence and use of these hurdles is considered consistent with the well-known admonition to use "multiple criteria" in identification, even though what happens in the subsequent stages of the process may disregard altogether the data gathered during the screening process. In fact, one might argue that the major contribution of the multiple criteria in this setting is *not* to insure that students aren't overlooked, but rather to find an explainable way to exclude the majority of students from being considered for special services or programming. Finally, there is the actual identification step, at which point the student is declared eligible or not eligible for participation in the gifted program (often accompanied with fanfare or sympathy and formal placement notifications). The student becomes an "identified gifted student." This is a process that might well be described as the "sift down" approach of identification. Consider a series of sieves, with progressively smaller holes, through which the students are sorted until only the few remain who pass through all the sieves. One group, for one program, and with the use of quasi-objective methods, impressive numerical scores can be created to demonstrate exactly why one student is admitted and others are refused.

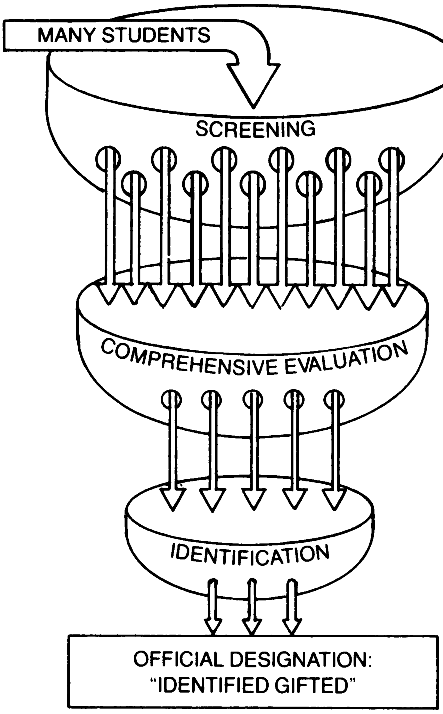

Figure 3. The "Sift-Down" Identification Model

In the IPPM approach, there are different questions and different kinds of answers. We do not begin by considering "candidates" for the gifted program, as if we were concerned with membership applications for a new private club. Instead, our initial question is, *"Are there some students who, by virtue of their strengths and talents, require some unique assistance from us to insure that their needs are being met?"*

Screening recognizes the fact that various students with unique needs may come to our attention in a variety of different ways. We want to be certain that we are alert to these varied ways of recognizing students' strengths and talents, and we want to attempt to minimize the possibility of overlooking any unusual needs among our students. Figure 4 summarizes several possible sources that might provide input as part of screening, including: teacher referrals, test scores, class performance data, school records, parent input, peer information, self-report data and product samples (including portfolios and recognitions of accomplishments). In IPPM, any *one* of these sources of information would cause us to say, *"Let's look more closely at this student's characteristics and needs. Perhaps there are some responses that we should consider to match the student's educational program more effectively with his/her strengths and talents."*

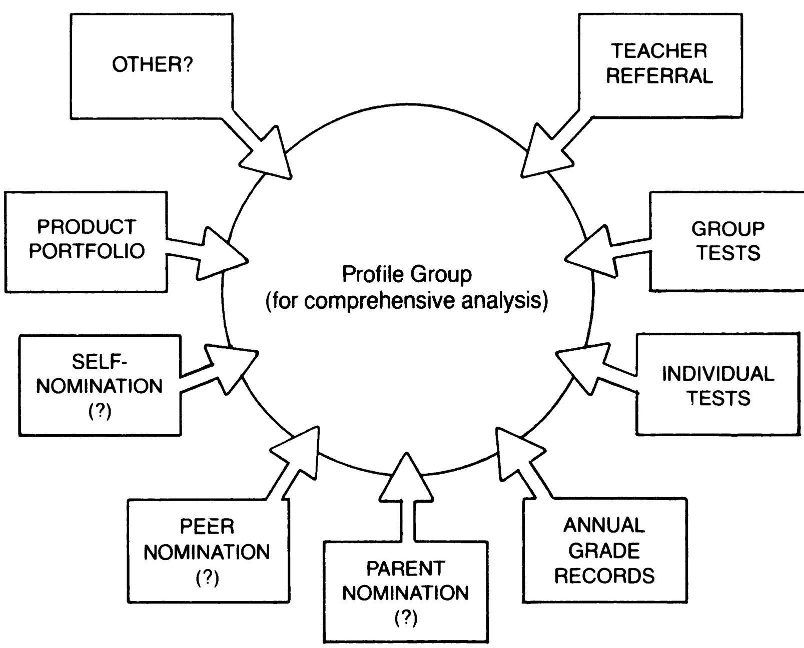

Figure 4. Sources of Data for Screening

The screening process is important because it represents our deliberate, on-going effort to recognize and respond as effectively as possible to the strengths and needs of as many students as necessary. It is not designed to weed out students, to eliminate all but a certain fixed percentage or to sort out the "truly gifted" from less able pretenders. It is predicated on the assumption (perhaps idealistic, but we hope not unfounded) that educators aspire in all their efforts to find and nurture talents. It is a continuous process (since talents might be recognized in students at any time) rather than a fixed annual event.

It is possible that, from the screening information alone, certain instructional responses will be obvious to help the school provide a more stimulating and challenging program for the child. So be it! If a way to improve our services to a student is evident, and is readily within our grasp, what reason could there be for denying it?

Many times, however, it will be necessary for us to consider the data more carefully or in greater detail; this involves comprehensive evaluation of the data (not the child). Comprehensive evaluation is not a sifting down process in this approach. Instead, it addresses the need for serious professional review and analysis of the student's characteristics, in order to determine the most appropriate instructional responses. We do not review each case with the question, *"Should this student be* in *or* out *of our program?"* Instead, we gather as much data as possible regarding the student's abilities, skills, motivation, learning styles and interests. Individual testing may not be necessary. When it is requested, it is to help us obtain a more complete diagnostic assessment of the child's intellectual characteristics, not merely to check for a "qualifying score." With these data in hand (in a summary format described as a *profile,* for which a one-page summary sheet has been developed), the student's characteristics and needs are reviewed by the appropriate staff members, functioning as a "study team" with diagnostic goals, not as a "placement team" with selection responsibilities. This review should include a person with specific training in gifted education, the regular classroom teacher(s), and any other staff members who may be needed for specific purposes or concerns (which may include counselors, school psychologists, specialists in certain subject areas in which the student displays exceptional ability or special education staff for students who may also display handicapped conditions of any kind). The comprehensive review deals with the questions: *"Is there evidence of special needs concerning this child? In what ways might we respond most effectively through our regular program? How should the regular program be modified to be more effective and challenging? What services or options outside or beyond the regular program seem important to provide, and how might these be accomplished?"*

If the essential questions posed in the identification process are designed to identify needs rather than merely to designate or select individuals, it also follows that identification is a flexible, on-going process, rather than a fixed or permanent one time decision. It is not necessary to have a fixed date for all identification to occur. Since effective educators are always concerned with doing everything they can to respond appropriately to students' needs, referrals and comprehensive reviews can occur at any time. If there is documentation of specific needs (strengths and talents) which are not fully addressed by the present instructional program, appropriate plans for program modification can be made. It is necessary to suppose, of course, that "program modification" implies considering a wide range of possible actions or services, not merely deciding whether or not to "place" the student in a particular fixed "program" (i.e., THE gifted program).

A variety of management and record-keeping forms for referrals and for comprehensive review in an IPPM approach have been developed and reported by Colon & Treffinger (1980) and Treffinger (1981, 1986).

Identification, then, *does not involve designating a student, but involves designating responses.* We do not speak of "an identified gifted student," but we do describe needs of students that will lead to certain services or responses. Identification involves creating a realistic and challenging program, suited as well as we are able, to the unique characteristics and needs of the student. It does not lead to a decision that places all qualified students in a single, fixed group so they can participate in a single, fixed program, but instead recognizes that, as the needs associated with giftedness are diverse and varied, our responses must also be flexible and differentiated. In this way, we try to emphasize that identification is a dynamic process, preparing for improved instruction, rather than a static process of labelling or classifying an individual.

Some advocates (particularly parent advocates for individual children, and often parents who perceive their child as ignored and underserved by a school that does not recognize his or her true genius) express concern that such efforts at inclusive identification will take away from the school's ability to provide adequately for those with extraordinarily exceptional ability. This is not true, we believe, since there is in the model a deliberate effort to assess and respond to the unique characteristics of all students demonstrating need for assistance that extends beyond the regular program's capabilities. There is no reason at all for exceptionally capable students (in any area) not to be recognized in this effort, and the model's insistence that programming responses be considered in relation to the student's needs, rather than to a fixed, single program, should hold promise for even more effective responses for such students than might be possible if they were simply placed in a gifted program with a fixed curriculum for all identified students. It is apparently very difficult, however, for some people to understand that the *instructional* implications of a very high IQ score, in itself, are quite limited. In addition, there always seem to be some for whom selection of a student for the "gifted program" is an event of some significance in relation to social status or family prestige. Such intentions and pressures should be very quickly and clearly dismissed as irrelevant to the instructional responsibilities of the school.

In the IPPM approach, identification and programming are necessarily linked very closely. As we consider the programming process in greater detail, then, many of the kinds of questions that will be considered in the identification process should also become clearer.

Planning and Conducting Services

The IPPM approach to program design begins by asking, "*What services should be provided in the regular program?*" It is our position that effective programming for gifted students necessarily considers the role and responsibilities of the regular classroom instructional program, since the student will be very likely to spend some (or most) of his or her time in this setting. Gifted programming should be concerned with the effectiveness of the student's *total* program, not just a small portion of the time during which special activities or services are being provided.

What are the classroom teacher's responsibilities? One answer to this question has been provided by Treffinger (1986, pp. 22–23). This summary can be found in Table 1.

The next question to be considered in program planning is, "*What services or activities that extend beyond the regular program should be considered in light of this student's characteristics and needs?*" IPPM does *not* assume that the entire responsibility of providing for the student's unique or unusual learning needs can or should fall upon an individual classroom teacher (or, in departmentalized settings, on a group of classroom teachers). Students of outstanding talent or potential in any area are very likely to display characteristics, and concomitant needs for challenging services, which extend beyond the capabilities of the classroom teacher. In IPPM, however, our response is not merely to collect a single group of "designated gifted" students into a fixed program that is presumed to be satisfactory to meet all their needs. Rather, IPPM challenges us to consider the *most appropriate decisions* for the student (Colon &

Table 1
Classroom Teacher's Responsibilities—Regular Program

1. Make deliberate efforts to "spot" unique characteristics and talents.
2. Don't settle for poor assumptions.
3. Provide for multiple groupings and varied ways to learn.
4. Create time and opportunities for studies based on student interests.
5. Include questions and activities to develop higher level thinking skills and establish expectations for creative production.
6. Provide for exploratory activities.
7. Nurture intellectual skills or "tools".
8. Promote gradual development of self-directed learning skills.
9. Use community resources and mentors.
10. Listen to students.
11. Facilitate sharing of student work.
12. Know when and how to get assistance.

Treffinger, 1980). In any school district, there will be many different ways of providing services to meet the needs of various students. Rather than examining several program models or prototypes to select *one* to adopt for our program, IPPM calls upon us to consider using a variety of different responses or services as necessary and appropriate to respond to the unique needs of individuals or small groups of learners. We do not assume that there will be *an* enrichment program, or *an* acceleration program, etc. Instead we begin by asking, *"What are* all *the options and alternatives that might be available to various students in this school district or community?"* Then, instead of asking, *"Is this student in or out of our program?"* it will be possible for us to ask, *"Given this student's characteristics and needs, what choices from among our many options seem to be most appropriate and promising?"* It is neither necessary nor appropriate to assume that there must be one gifted program in a school system through which all gifted students will be served in an identical manner.

Some of the many options and alternatives which might be available for students in any school have been described in Table 2. These alternatives include programs sponsored and conducted by the school, as well as options offered by other groups. They include activities which might take place during school hours, or at several times after school.

Providing for students' needs which derive from the strengths and talents we describe as giftedness is not, however, a matter of an endless array of individual programs, each of which is totally unlike any of the others. Given our knowledge of the characteristics associated with abilities, skills, motivations, learning styles and interests, and our focus upon effective, independent learning, it is possible for us to outline some general areas of concern which can be used to guide our planning.

There are six general areas of educational programming with which we must be concerned in planning programming to foster effective independent learning: individualized basic instruction; effective acceleration; appropriate enrichment; independent, self-directed learning skills; personal growth and social development; and career orientation with a futuristic perspective. In each of these six areas, there are many provisions which can be made quite effectively in the regular classroom (e.g., Treffinger, 1982).

Table 2
Varied Options and Services to Meet Students' Needs

	School-Sponsored & Conducted	Parent/Community Sponsored & Conducted	External Agencies
In-School—Regular Program	Renzulli-Type I, II Enrichment Advanced Placement Advanced courses/seminars Elective courses Centers/Individualization Cluster Groups Varied teaching activities Special projects/assignments "Test-out" options Acceleration within a grade level or subject area Multiple Talent Teaching or Talents Unlimited	Type I, II Enrichment Tutoring Parent volunteer/aides Library/Media Center Programs	CLEP Program ETV Programs Junior Great Books Correspondence Study
In-School— Supplement or Alternative Programs on School Time	Resource Room Consulting/Visiting Teacher "Pull-out" services Full-time separate classes Special G/T Classes Acceleration of grades, subjects Early graduation thru increased course loads Early admission	Mentor-taught Seminars Guest speakers Additional Type I, II Enrichment Private Lessons Library/Media Center Programs	Fast-paced courses (Johns Hopkins) Radical acceleration Junior Great Books Enrollment in "off-level" courses. Credit internship programs (parallel Voc. Ed.?) Exchanges—year or semester abroad, etc.
After School (Out of School or After School Hours)	Clubs, interest groups Hobby groups Competition activities Newspaper, yearbook, etc. Student Government	Enrichment courses Modules-minicourses Community visits—field trips, etc. Public Library or Museum Visits, Membership	Scouts Other Youth groups (YM, YW) Religious groups Junior Achievement Executive Internships Community agency programs Museum, Zoo Programs Jobs, internships
Saturday Programs	Sports Saturday Seminars set up by Gifted Coordinator	Hobbies, clubs, etc. Field trips, visitations Parent or community-sponsored enrichment courses/programs	University-based special courses (e.g., Purdue's Super Saturday) "College for Kids" Special courses at galleries, museum, etc. Jobs, internships
Summer Programs	Summer School advanced courses or extra courses towards early graduation	Trips, Vacations Parent or Community-sponsored Enrichment Activities Camps	Camps Summer courses at Colleges Gifted Students' Institutes Governor's Schools Special projects by civic or religious groups. Exchanges

Other ways to expand, extend or enhance learning opportunities for students involve other settings or resources. In each of these six programming areas, our responsibility will be to raise two major questions: (1) How can the regular classroom program respond most constructively to the student's needs? and (2) What options and services should be considered which extend beyond the regular classroom?

Let us examine briefly the meaning of each of the six general programming concerns.

Individualizing Basic Instruction

Unique characteristics, learning styles and interests cannot be turned on or off like a water tap. It is important to recognize that, even in learning basic instructional concepts (from which gifted students are not exempt!), the student's characteristics influence how they learn and hence how they should be taught. Concern for individualizing basics thus involves recognizing and responding to learning styles and interests, adjusting the content and the rate and pace of instruction according to the student's needs, and providing opportunities for students to use a variety of "higher level" thinking skills during instruction in content areas. Our concern for individualizing basic instruction includes many provisions that should be addressed within the regular program.

Effective Acceleration

Students who display outstanding ability or talent in any area need access to teachers, mentors and materials for advanced learning opportunities. If they have not already mastered the standard, age-in-grade curriculum in an area in which they excel, they are probably able to do so very efficiently. "Compacting" the regular curriculum (Renzulli, Smith & Reis, 1982) can also provide time for advanced or accelerative learning opportunities. Students with exceptional ability, skills and motivation in a certain area need to be able to escape the boredom and repetition that may accompany long periods of classroom drill on topics they have already mastered. Through the use of intensive mentoring experiences (Noller & Frey, 1983; Torrance, 1984) or any of a number of accelerative strategies (e.g., Stanley, 1979, 1980), content instruction can be more stimulating and challenging.

Appropriate Enrichment

Another important goal of programming for gifted and talented students is to enrich students' learning experience. Unfortunately, enrichment is a term that has been widely misused, and as Stanley (1979) has reminded us, has frequently been used to describe a variety of useless, mindless or irrelevant "busy-work" activities sometimes employed by teachers who do not know what else to do with able students. Viewed more positively and appropriately, however, enrichment is an important concern which is closely related to the goal of promoting effective independent learning. Renzulli (1977) emphasized, for example, the need to provide students with opportunities to explore a wide variety of topics outside the regular curriculum, to develop the process and investigative skills necessary to pursue independent inquiry, and to pursue individual or small group investigations of real problems. Many of these forms of enrichment are not unreasonable to expect in an excellent regular school program, although their attainment may require the support and assistance of specially trained personnel to work with classroom teachers.

Independent, Self-Directed Learning Skills

Even though our goal may be to foster effective, independent learning, and students may exhibit high *potential* for the attainment of this goal, we cannot assume that they will necessarily possess the *skills* that are needed to manage and direct their own learning effectively. Students need systematic instruction in such areas as setting and defining goals, locating and using appropriate resources, defining appropriate learning activities, creating and evaluating products and locating and communicating with appropriate outlets and audiences. Treffinger and Barton (1979) have described procedures for gradually helping students to learn to be self-directed learners.

Personal Growth and Social Development

The affective or socio-emotional needs of students should not be overlooked. To become effective independent learners, students must be able to develop a healthy perspective about their own talents and limitations and those of others, a positive self-image, positive regard for the processes of growth, learning and inquiry, and commitment to a set of moral and ethical values to guide their lives.

Career Exploration With a Futuristic Perspective

Effective independent learners may also need assistance in becoming aware of career perspectives, sources of information, and methods of dealing with rapid change and the uncertainty of the future. They may need help in assessing or constructing alternatives consistent with their strengths and talents. Such assistance should address questions that are considerably more complex than choosing one's major, planning what college to attend, completing scholarship applications or making a tentative choice of some presently-known employment category.

Programming and Instructional Services

In the IPPM approach, identification data are used to guide program planners in developing a constructive program design for the student, considering each of the six general programming areas (in addition to any specific or unusual needs or areas of interest, of course). In each of these areas, the planners attempt to determine the services or activities that will be most necessary and appropriate to meet the student's needs, both in the regular classroom and in any other contexts or settings that may be available or may be able to be created. The major question to be asked is, *"In what ways might we expand, extend or enhance learning opportunities for this student?"* Examples of some specific instructional alternatives for each of the six general programming areas are provided in Table 3.

At the secondary level, examples of activities or services in each of the six programming areas can also be specified; Table 4 provides several illustrative examples for each of the six programming areas.

The services that are actually provided and how they are provided may vary among students or across buildings within a district. Some services that might require the assistance of a specialist in gifted education in one building or in working with a particular teacher in a certain building might be readily conducted by a classroom teacher in another setting without such assistance. The specific interests and skills of individual teachers and their comfort or confidence in conducting certain activities can be expected to vary considerably, and each building within a school district may have a unique character or style. The activities subsumed under the category "gifted programming" can therefore be expected to be as diverse as the students, teachers, administrators and communities involved. This is certainly a contrast with the traditional, ubiquitous "resource room/pull-out" model that has dominated our approach to gifted education. In the IPPM approach instead of a "pull-out" approach, we prefer to

Table 3
Illustrative Activities in Six Programming Areas

	Individualized Basics	Appropriate Enrichment	Effective Acceleration	Independence & Self-Direction	Personal & Social Growth	Careers & Futures
Activities or Services Readily Accomplished in Regular Programs	Emphasis on student strengths/talents Programmed learning tasks — basic skill Flexible strategies (many options) Multiple student groupings Learning Centers or Stations Contracts Teach through Learning Styles Peer Tutoring Higher Level Thinking Processes More than one learning activity occurs at any one time.	Heighten anticipation and curiosity Type I Enrichment (Guests, Films, Trips, Centers, etc.) Type II Enrichment Creative problem solving Olympics of the Mind Inquiry and Research Skill "How To" books and resources Assess student interests Identify and focus problems	"Compacting" or streamlining assignments and tasks Mastery Learning Modify rate and pace of tasks Criterion-referenced skill tests Alternative level resources in room Optional units or assignments Flexible grouping and regrouping of students within/among classrooms	Gradual development of self-management: ● plan own goals ● assess own needs ● conduct own study projects ● develop products ● Evaluate own work Assume responsibilities for record-keeping Preparation of own projects, presenting own work to others Peer Tutoring Independent Study Projects and Contracts	Biographies of creative, gifted, productive people Sharing responsibilities in room Clarifying values Building positive self-image Deferring judgment Working effectively in groups and on committee tasks Experience models of positive self-concept Role-play and socio-drama	Visitors, Guest Speakers, Field Trips Survey of the occupations of families in community Future Problem Solving Program (local level) Simulations and Games Learning Center and optional activities on careers and futures in basic units of study
Areas in Which the Catalyst's Assistance May Be Needed	Develop advanced projects building on basic skills Assistance in accurate, diagnostic assessment Reviewing, locating, developing new materials Cooperative planning time with other staff Classroom design and organization Obtaining and interpreting Learning Style profiles	Type III Enrichment efforts Finding new resources for Type I/II Coordinating and training outside mentors or resources Locate outlets & audiences for student products Advanced Type II skills in specific content areas Scheduling activities	Testing out procedures for some courses Advanced grade placements or double promotions Special advanced courses/sections "Radical" acceleration (cut across several levels) Off-level testing Cross-age tutors Counsel with parents University or Community College offerings	Advanced contracts and management forms Design, implement & evaluate independent projects Experimentation by students Locating and using outside audiences or markets Use of time, space Assistance from Librarian, Media Specialists, Curriculum Specialists K–12 Sequence of independent learning skills	Counseling — deal with special needs and problems Assistance in overcoming fears or doubts Dealing with underachievement Acceptance of the ideas and feelings of others Tolerance for uncertainty and ambiguity	Mentorships Internships Summer or after school program for career exploration Future Problem Solving (area, regional, or national level) Community or School Service or research projects

Table 4
Illustrative Programming Methods and Resources at the Secondary Level

Individualized Basics	Learning Styles Individualized Unit Planning Testing Out/Credit By Examination Mini-Courses Multidisciplinary Studies Academic Competitions Thinking Skills Instruction Courses, Seminars, Workshops
Effective Acceleration	Off-level Testing, Talent Search Advanced Placement, I-B Program Testing Out/Credit By Examination College Courses—dual enrollment Early College Admission MENSA—Other Personal Support Groups Scheduling Assistance ("Ombudsman")
Appropriate Enrichment	Type I—Speakers, Trips, Colloquia Type II—Thinking Skills, CPS Seminars, Electives, Mini-Courses Mentorships, Internships Research Investigations/Independent Study Extra or Co-Curricular Clubs Summer, Evening, Saturday Classes Community Resource or Service Programs Governor's School, Special-Residential Competitions and Bowls
Independence & Self-Direction	Research Seminar/Study Skills Contracts/Independent Study Locating & Using Resources Internships and Mentorship Teaching in program for adults or for younger students Getting involved in outside research projects Community group participation Entering Competition for Talent/Achievements Junior Achievement Programs/FFA, etc. Becoming an expert on some topic!
Personal Growth and Social Development	Leadership Experiences Group dynamics exercises Individual and Group Counseling Valuing—dealing with talents and respecting differences Understanding Learning Styles Competence in social settings—finding "true peers."
Career Perspectives and a Futuristic Orientation	Bibliotherapy—Reading about Models Shadowing experiences Future Problem Solving Courses, Seminars, and Units on Changes, Futures Individual Planning and Goal-setting Experiences & Skills Designing a career

emphasize a "pull-in" philosophy: drawing the student, with the endorsement and cooperation of the teacher, into services and activities designed to provide the most challenging and appropriate educational program that can possibly be devised for him or her. We do not imply in any way that everything that occurs in the student's program must necessarily occur within a single classroom or under the direction of a single teacher. We do maintain that all components of programming should be carefully planned, coordinated among the professional staff members involved, and specifically concerned with a consistent effort to respond directly to the student's unusual characteristics and learning needs. Careful planning and record-keeping are required in order to describe the student's program and to document its effectiveness. Conferences must also be conducted regularly to determine if further modifications of the student's program are needed, in order to revise or extend the original plan. It is not easy to do this, but there is no reason to believe that it will be easy to work with any students who display unusual characteristics or exceptional needs.

Evaluation and Modification

The individualized programming effort should be accompanied by a carefully planned evaluation effort, involving a variety of different sources of data and extending over several years. There should be involvement of the administrative and instructional staff—along with the gifted education specialists and community input—in the evaluation process. The purpose of evaluation on a regular basis is not only to *judge* the program or determine its adequacy, but more importantly, to provide information that will be useful in modifying and strengthening it. Evaluation data can guide the school in determining specific ways to modify or improve any of the components of the programming model.

Keys To Success In Using IPPM

Through a combination of observation, interviews, evaluation projects and action research, it has become clear that there are a number of "keys to success," or considerations which contribute to the likelihood of success in implementing IPPM.

1 **Commitment to the vision.** There is no doubt that one of the most important factors contributing to success in following the IPPM approach is commitment to the vision of flexible, inclusive individualized programming to nurture effective independent learning. The entire framework is built upon assumptions and values about student's strengths and talents which must be recognized and accepted as a challenge by the school, not merely given lip service through empty phrases in "philosophy statements." The school (and to a large extent the supporting community) must be willing to address these values in theory and in action.

2 **There is an explicit Plan of Action.** Effective programming does not fall into place by luck or accident; it is the result of very deliberate, extensive planning. The districts most successful in blending gifted and regular programming have taken from six months to two years of careful efforts to develop plans, not just for an initial year, a single level or one program model, but for gradual development of districtwide programming over *at least* a three to five year period.

3 **The regular program must be healthy.** Gifted programming cannot take the place of all the things that we recognize should be happening in any school but fear may be missing. It cannot successfully bear the sole responsibility of striving for excellence or attaining more responsive and stimulating instruction for all children, even though it will contribute to such goals. We have found that the healthier the regular

program, the easier it is to initiate gifted programming and the more successfully gifted programming can be synthesized with the total program. A healthy regular program seems to be characterized by a high level of activity and support for the six general programming areas (individualization, acceleration, enrichment, self-direction, personal and social development and futuristic career perspectives). In a healthy regular program, administrators and teachers not only express their interest and support of these areas, but any observer can readily detect specific activities that represent them. A healthy regular program is evident, not only in what people say (because no school says to its visitors, *"This is a pretty grim and dismal place"*) but also in what they do. It does not take very long or very detailed observations to recognize healthy, individualized regular programs, as we have been able to observe, for example, in Lawrence or Shawnee Mission, Kansas, or in Williamsville, Orchard Park or Brighton, New York, among others.

4 There is effective Needs Assessment. The role of Needs Assessment in the development of effective programming should not be overlooked, although it is important to insure that the task is properly structured. After a decision to develop gifted programming has been reached (or mandated), it is not really "needs assessment" to ask the staff whether or not they support the concept of gifted education. Nor is it productive to ask staff their preferences for various models, prototypes or procedures when there is no reason to believe that there is a sufficient level of information or understanding to give meaningful evaluations. Polling the staff about their personal opinions concerning enrichment or acceleration, for example, without detailed explanation and in-service training is not likely to provide useful information for program planning or development.

Needs Assessment instruments have been developed to enable the staff of an individual building to survey the extent to which a variety of desirable provisions or activities are presently available to students. The *IPPM Needs Assessment Survey* (Treffinger, 1986) surveys the present level of involvement and support for 36 specific indicators in the six general programming areas. It can be useful in discussing the practical meaning of the programming areas, in determining the areas in which a building's present program is most or least thoroughly developed, in stimulating discussion among staff regarding positive present opportunities and priorities for expansion or development, or as a starting point for in-service activities. This approach to needs assessment can also provide an opportunity to recognize and encourage existing promising practices, which will then foster program "ownership," positive attitudes and support. It can also help identify staff members with particular interest in gifted programming.

5 There must be a core support group. Successful programming requires a nucleus of supportive, actively-involved teachers with whom the "blending" of gifted and regular programming can begin. These core participants can also help to build support and involvement in the program among other staff members.

6 There must be on-going, professionally sound in-service training. Many teachers have never had any assistance or training in fostering effective independent learning or recognizing and responding to the strengths and talents of students. In addition, teachers must contend with large classes and limited resources. Each year seems to bring new mandates to serve many different special populations in the regular classroom, to respond to new curricular imperatives, and to address declining test scores, equality of education and the press for excellence. Small wonder that countless in-service days now include popular programs on stress management and teacher "burn out!" There is often a tendency for teachers to say, *"Dealing with the gifted student is just one more in the parade of special interests and concerns bombarding me from every side!"*

We cannot avoid or dismiss these concerns. First, we must make efforts to insure that "blending" gifted education does not turn out to be only a fancy term for "dumping" the entire responsibility on the individual teacher. This means commitment of resources to support personnel, training and materials. But, equally important, there must be a commitment to a high quality, professionally sound staff development program. Such a program must involve the staff in defining their goals and concerns, provide opportunities for staff input in planning activities and courses, commit "real" time (i.e., time during the school day) to work on staff development projects, encourage teachers to develop projects which will be directly useful and applicable in instruction and evaluate rigorously the outcomes and impact of the projects. A program involving teacher-initiated staff development project proposals has been conducted in Williamsville, New York, and an extensive exemplary individualized staff development program (encompassing many areas in addition to gifted programming) has been developed in the Niagara-Wheatfield Central School District in Sanborn, New York.

7 **Administrative leadership is essential.** To implement an individualized approach to gifted programming, it is essential to have administrative leadership and support, both at the central office and the individual building levels. In districts in which there have been extensive efforts to blend gifted programming with other components of the school program, there has been extensive involvement, commitment and support by central office administrators. Central administrators and often School Board members have been involved in formulating the philosophy and goals for programming, in planning committees and in developing policies and procedures. At the building level, the principal is a critical force in determining the success of programming efforts in his or her building.

8 **The individual building is the critical unit of intervention.** Although there must be districtwide planning and coordination of policies, activities, and resources, the individual building is the most important arena in which programming occurs. The principal and staff of an individual building can work together to create and maintain a favorable climate, to develop and implement a wide range of options and alternatives and to support and promote effective individualized instruction.

9 **Specialized professional services are needed.** There must be a strong, well-trained, well-accepted professional who has responsibility and time to devote to gifted programming. This does not merely mean time to provide direct services to children; we must not be trapped into thinking that the *"gifted program is what the gifted teacher does to a certain set of students in the gifted room each week."* The specialist, who is sometimes referred to as a "catalyst" in the IPPM approach, provides important services to the staff of the school. The catalyst provides assistance in reviewing student identification profiles, analyzing the needs of students, locating appropriate resources for classroom use and arranging for many different kinds of activities and services that extend beyond the regular classroom program. The catalyst works as a "consultant in residence" with the staff, to help them provide for effective independent learning among their students and to help arrange a variety of other learning opportunities for students. The catalyst must have enough time in a building to provide these services and to be viewed as an integral part of the instructional program; it is not a position involving dropping into the school once a week to do a few activities with selected students. Ideally, there might be a full-time catalyst in a building, although when resources do not

make this possible, a part-time catalyst may be able to work closely with an on-going building committee to insure continuity of activities and services to students and teachers.

10 There must be willingness to deal with "squiggliness." In developing an individualized approach to programming, there will be many problems and challenges which will require patience, tolerance of ambiguity and the ability to cope with difficulties and live with change. A well-blended program is not a neat package which can be carefully limited and controlled; it involves the skills, talents and contributions of many people from within and outside the school, and it addresses the needs of many students in a variety of ways. It will not always operate smoothly, especially during the early stages. It will be necessary to make changes and adjustments and to adapt to unusual situations and challenges that will always arise. It will also be necessary to explain the approach patiently to those who expect only to see one group of students, with a single, stereotyped set of characteristics and needs, meeting together in a single room doing their "gifted lessons."

11 Hard work and problem solving skills will be required. It is not easy to achieve a comprehensive school program in which the strengths and talents of students are recognized and nurtured in many different ways. The process of program development is long and sometimes painful. There will be resistance or opposition from unexpected sources and for unanticipated reasons. There will be unevenness of support and participation by staff members for a variety of reasons, many of which are not under your control and which are unrelated to your program. But there will also be benefits and victories with the students and with the staff. These will make the job worth the effort.

Conclusion

A summary of the "basic flow of events" in the IPPM approach is presented in Figure 5. Individualized programming attempts to foster effective independent learning, in response to students' strengths and talents. It provides an opportunity for gifted education to be synthesized productively with other components of the school's educational program. This is not easy to accomplish, but it is possible, and it holds promise for improving instructional services for many students.

I. CHARACTERISTICS

A. Characteristics Associated With Giftedness
- ABILITY (May be in a specific talent area)
- CREATIVITY
- TASK COMMITMENT

B. Specific characteristics related to the developmental nature and needs of adolescence.

II. IDENTIFICATION PROCESS

A. Documenting ability/potential
- May be in specific area!
- Should relate directly to instructional concerns.

B. Data for "Shaping Instruction"
- Learning Styles
- Student Interest Data
- Prior Achievement Data for diagnostics, not placement.

Figure 5. Basic Flow of Events in Individualized Programming

C. BE FLEXIBLE!
Consider tests on advanced content, specific area; NOT "global" IQ scores.
Consider alternate sources!

D. Develop a PROFILE, not a "HIT LIST."
Documenting strengths, talents
Looking for needs.
Searching for possible services that may be needed.

III. PROFILE REVIEW AND ANALYSIS

A. Review by multidisciplinary team members (may be subcommittee)

B. Analyze general data (leads to recommendations for regular program—See IV-A).

C. Consider individualized data (leads to Individualized Programming—See IV-B).
Individualized Data may include "student portfolio"—application or proposal, interview, audition, self-selection statements.

D. Consider possible needs in IV-A *and* IV-B, not just one or the other.

IV-A. REGULAR PROGRAMMING OPTIONS

A. Teachers in core subject areas involved.
Compacting regular courses
Differentiated assignments
"Share Time" dual course enrollment.

B. Alternate Class Placements
Test out of required courses
Honors or AP Classes
Special seminars or electives
Other

C. Alternate Services
Co-enrollment in advanced courses (HS courses for JHS students; college courses for HS students, etc.)
Fast-paced classes or special sections.
Summer Courses (electives or leading to early graduation)

IV-B. INDIVIDUALIZING PROGRAMMING DECISIONS

A. Independent Learning Opportunities
Independent Study
Extra- or co-curricular
Based on student's special talents and interests.

B. Out-of-school services and activities
Internships
Community resources
Mentorships
Individual or Small Group Investigations

V. COUNSELING FUNCTIONS

A. Addressing Career and Future Perspectives
In-class: topics and readings on change, impact, careers
Counselor—individual and small group career counseling.
Mentors, Resource people—help student identify new areas and possibilities.

B. Addressing personal and social development
Counselor—individual and small groups
Teacher and mentors—role models

VI. MANAGEMENT AND DOCUMENTATION

A. Effective advisement by Catalyst/Content area Advisor.

B. Effective record-keeping systems.

C. Developing a "portfolio" of products, accomplishments to supplement grade transcripts.

Figure 5. Basic Flow of Events in Individualized Programming (Continued)

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Discussion Questions

1 What should be the purposes of gifted programming? Why does Treffinger place heavy emphasis on independent, creative learning?

2 What demands does successful implementation of the IPPM model place upon principals? Classroom teachers? Gifted specialists?

3 Suppose you were a parent of a child moving from a school with a traditional "pull out" or resource room program into a school using the IPPM model. What differences might be most difficult for you to understand? What benefits might there be?

4 In what ways is the IPPM model similar to and different from other models in this book? Consider: philosophy and definition; identification processes and procedures; classroom teacher's role; gifted specialist's role, outcomes and pupil evaluation.

5 What kinds of inservice might be most important to provide for teachers in preparation for implementation of IPPM?

6 The IPPM model proposes that effective gifted programming builds upon a "*healthy*" regular program. How can you determine the "*health*" of the regular program?

7 In IPPM, identification data are used to guide instructional planning, rather than to *select* a group of students. How might each of the following kinds of data be useful in instructional planning?

a. IQ test scores or profiles
b. creativity scores
c. teacher ratings
d. Parent ratings
e. Achievement test scores
f. Learning styles data
g. Student interest surveys

8 What might be the easiest components of the IPPM model to implement at the elementary level? at the secondary level? What parts might be most difficult to apply at each level?

9 Considering the IPPM model, argue in favor of or against the statement, "*Gifted programming requires special resources.*"

10 By what criteria might the effectiveness of IPPM in a school setting be evaluated?

Frank E. Williams

XV

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Summary

The Cognitive-Affective Interaction Model for Enriching Gifted Programs

The Williams Cognitive-Affective Interaction Model is based upon many studies of the creative person and process. It is a morphological model, not a taxonomy, since none of the factors nor dimensions imply hierarchy. As a practical diagnostic-prescriptive model for teachers, its dimensions include six basic subjects of a school curriculum, eighteen strategies to be used by a teacher and the curriculum across any of the subject areas to develop and nurture eight pupil processes. Hence, the model provides for 864 possible interactions ($6 \times 18 \times 8 = 864$) between pupils and teacher across content.

The eight pupil processes as educational objectives or outcomes are all divergent in nature. That is, four have been consistently used to identify creative thinking (fluency, flexibility, originality and elaboration) which are cognitive abilities first defined by Guilford by the divergent slab of the structure of intellect. Four more predominently come from studies of the most important temperament and dispositional aspects of a creative person. These are personality factors (curiosity, imagination, risk-taking and complexity) consistently found in psychological research on highly creative individuals and are affective in nature. The eighteen strategies were empirically derived from research on effective classroom practices, narrowed down by factor analysis from a list of twenty-four appearing commonly across educational literature.

The emphasis of the model is that the four cognitive thinking factors and the four affective factors (now known as creative feeling) are most likely to occur when subject content areas are presented by use of one or more strategies. A person does not think nor feel in a vacuum; this happens only as that person interacts with facts or information through some strategy system. Of most importance to educators is that the regular subjects of an on-going curriculum (math, science, social studies, etc.) become only a means toward the end of causing students to think and feel divergently. And causing this to happen comes about by the process of interaction which the model best illustrates. The list of eighteen strategies are possible alternatives a teacher or curriculum specialist can take when striving to develop divergence.

The Cognitive-Affective Interaction Model for Enriching Gifted Programs

Support for creating and funding programs for gifted children appears to be on hold these days in spite of the push for *"excellence in education."* Unlike the *"gifted"* movements that blossomed and then faded in the twenties and sixties, the current spin-off from efforts in the late seventies still persists, marked by concern with developing a broader variety of human abilities and talents.

Guided by the tenet that each child has multiple abilities and that enhancing any one gift affects all the others, the contemporary approach to educating the gifted strives to develop eight broad categories of abilities—all of which overlap. The eight ability areas, which receive varying degrees of emphasis from program to program, are: (1) general intelligence, (2) specific academic aptitudes, (3) leadership, (4) creative and divergent thinking, (5) visual and performing arts, (6) body movement and motor development, (7) affective development and self-concept and (8) career and occupational pursuits. These eight multiple ability areas, which deal with physical, mental and emotional growth, provide educators with an outline for developing total human potential. The cultivation of these areas may enable American educators to put into practice what John Dewey proclaimed important some 60 years ago when he called for *"educating the whole child."*

In order to explain current practices of the multiple ability approach, both for identifying and programming for gifted children, the following diagram is useful:

Cognitive ⟵⟶ Affective

This diagram has been used by the author throughout various gifted projects across the country and is based upon two popular and important domains used predominantly by educators but typically referred to by psychometrists and media specialists in designing tests and curriculum materials for teachers' use in schools. These are the cognitive and affective domains. The cognitive consists of facts, information and subject content related to thinking (head knowledge—mainly left brain processes). The affective domain includes dispositions, temperament, attitudes, values and motivation involving feelings (heart knowledge or right brain processes). Traditionally, the two domains have been viewed by education on a continuum. Piaget, Bloom, Williams and others have stated many times that it is virtually impossible to separate one domain from the other. However, both are shown in this manner portraying degrees between extreme positions from the full cognitive domain to the full affective domain.

The next step in evolving the complete diagram is to consider two conditions upon which tests and curriculum materials have been designed (Guilford, Meeker, Williams, etc.). These are convergence and divergence, shown again on a continuum:

Convergence ⟵⟶ Divergence

Convergence means narrowing down a search model for selection and decision to one single answer according to someone else's criteria. For example, on a multiple choice test item there may be four possible choices, "A, B, C or D." Yet the score card of answers has established "C" as the only correct answer or the only accepted solution by the test maker. If you do not choose "C" you are wrong.

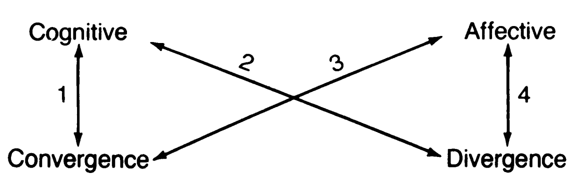
Divergence, on the other hand, allows for selecting and trying a variety of possible solutions based upon your own criteria—not somebody else's. The typical method is to find (brainstorm) a number of probable ways, try them out, combine parts and create a whole new solution. Divergence simply means there isn't *a* way, there are *many* ways. These two conditions have been used by test makers and curriculum designers repeatedly. Students are forced into a *"right answer"* position as convergence either by the test, the book or the teacher. And to produce the *"right answer"* then labels you as more intelligent and/or more successful in school. The divergent, creative individual is in real trouble if told he or she is not allowed to hypothesize, invent, combine or translate in order to produce alternative answers. Exploring possibilities and being flexible is neither rewarded nor accepted. Creative individuals usually find it difficult not to diverge, and convergent systems actually penalize them.

If the two continuums are combined, the diagram appears thusly:

Cognitive ⟵——⟶ Affective

Convergence ⟵——⟶ Divergence

Now if all end points are joined, the diagram yields four possible connections shown here as Figure 1. It is these connections that test and curriculum designers have used to develop educational materials. Thus, Figure 1 can become a classification of presently utilized criteria for selecting and educating gifted children. By referring to the four possible connections and assigning tests and treatment materials, one can grasp the importance of a multiple abilities approach to gifted education. The Williams Model presented and discussed herein emphasizes connection 2, Cognitive Divergence, and connection 4, Affective Divergence, since student behaviors consist of divergent thinking and divergent feeling.



Connection 1 = IQ and academic achievement tests
Cognitive Convergence

Connection 2 = Creativity and divergent thinking tests
Cognitive divergence

Connection 3 = Self-concept, self-esteem scales
Affective Convergence

Connection 4 = Learning readiness, attitude and motivation scales
Affective Divergence

Figure 1. Classification of utilized criteria for selecting and educating gifted children.

Unlike many of the models described in this book, the Williams Model was neither planned nor designed for gifted education. It has however, since its inception, been endorsed and applied by many educational programs for the gifted in American schools. Several of the models presented in this book were more recently introduced in the field of education compared to those which have been adopted by the gifted movement and have existed for years. Some theories and models of learning now purported to be solely for the gifted were, in fact, originally designed for all students. During this latest period of interest in education for the gifted, many once popular learning models have been reviewed to implement new programs. Under pressure to provide differentiated education, directors and teachers of gifted programs have scrambled to adopt and refine "*new*" models that have been around since as long ago as the mid-1950's. They include Bloom's *Taxonomy*, Guilford's *Structure of Intellect*, Piaget's *Stage Theory Model*, Parnes' *Creative Problem Solving and Brainstorming*, Raths' and Hughes' *Higher Thinking Processes*, Simon's *Values Clarification*, Suchman's *Inquiry Training Model*, Taba's *Strategies in Social Studies*, Taylor's *Multiple Talents* and Williams' *Cognitive-Affective Interaction Model*. Most of these models were initially designed as part of theoretical research studies on child growth and development. None was conceived as a learning procedure exclusively for gifted students.

Now that gifted and talented education has provided excellent field tests of these models and practices, it may be timely to let them spread into general education—the broader arena for which they were intended. This proposal to bring methods used with gifted students into all classrooms is in no sense a recommendation to dilute advanced programs. It suggests, rather, that all teaching units can be differentiated so that every child in a classroom can work up to capacity.

Not only would other children benefit from having teaching practices for the gifted in all classrooms, but many gifted children who receive little or no special education because of scarce funds would have their only exposure to these programs. An estimated two and a half million gifted children in American schools today are served by federal grants totaling about $4 million, which amounts to an abysmally meager per capita expenditure. In this sort of money pinch, educating gifted children in a heterogenous classroom is the most sensible of the alternatives. But education in such an integrated classroom cannot be effective if teachers are unprepared. Here again, because the gifted education movement has initiated good teacher training and staff development programs, it may be time for "*gifted*" pedagogy (like "*gifted*" learning models) to get back into the mainstream in all classrooms.

Rationale for the Williams Instruction Model

With the current flurry about excellence in education and returning to basics, there remains an often neglected but important ingredient to learning: that of student motivation. As teachers, we know that education has never been without content or "*the basics*." A well-known principle is that learning does not occur in a vacuum. Students must have many pieces of information in order to learn. A person cannot think or act without something to think or act upon. That something is basic knowledge. Most importantly, acquiring and using basic facts and skills must be accomplished by wanting to learn. This also cannot be accomplished in a vacuum. A strong willingness to learn on the part of the student must exist. Wanting to know and to learn has been called motivation.

I call this motivation to learn *connectedness*. The student who can make the proper connection between a new learning experience and situations already experienced is more likely to be an able learner. Piaget, the famous child psychologist, explained this process in terms of association and assimilation.

No one but the student can understand the full meaning of any basic fact or concept. The real meaning of a current experience must come directly from the student making a connection with his or her past experiences. Such a connection leads beyond rote memorization or irrelevant learning. Thus, the process of turning meaningless learning into meaningful learning must come from the child, not the teacher or the book. The old saying, *"You can lead a horse to water but you can't make him drink,"* is certainly true here. Another rendering appropriate for educators might be, *"You can involve a student in school experiences but you can't make him learn."*

Today's teachers frequently hear about the need for creativity—that is, for children to use the divergent and creative elements of productive thinking. To diverge thoughts so as to produce or create a new idea, response or product, a person draws upon stored knowledge to make new associations. Creative ideas, responses or products result primarily from inferences, implications or applications based on learned information. How can we help children to acquire and store knowledge in such a way that they can draw upon it readily?

Research has confirmed that the ability to think creatively requires breadth and depth of knowledge along with the skills to draw upon that knowledge. The problem for any teacher is how to best help the child acquire this strong content base while at the same time developing the skills of productive-divergent behavior.

Many teachers are ready to be shown how to use a wide variety of instructional techniques and materials for the development of those mental skills which lead classroom students to think creatively. It is now recognized that the divergent mental capacities of children's intellect should be developed to their maximum if education is to more fully meet its total responsibilities. Research studies suggest that there are many kinds of intellectual thinking and learning processes which students can utilize while they are simultaneously acquiring subject matter content. Research on classroom learning also points out the necessity for innovative teachers who can creatively use a wide repertoire of teaching strategies or styles across subject matter content if the full range of student's learning and thinking processes are to be developed completely. The task for teachers, therefore, becomes that of exploring ways to set up and conduct educational experiences in the classroom so that students will be given opportunities to develop, utilize and practice as many of these mental processes as possible while learning a given unit of subject matter.

This chapter presents a model as a plan for achieving the above task. No drastic modifications are needed in curriculum or practice that innovative teachers are not already doing. But through the plan, all teachers at every grade level can discover ways to extend the learning and thinking processes beyond those existing in most classrooms.

The Williams Interaction Model

The Williams Model takes on the perspective of a three-dimensional cube as shown in Figure 2. It is a morphological model, not a taxonomy, since each dimension interacts with the other in no hierarchial fashion. It is intended to portray how subject matter content (Dimension 1) can be arranged or presented through multiple classroom teaching strategies or styles (Dimension 2) in order to produce those various behaviors affecting productive-divergent thinking and feeling (Dimension 3). These three dimensions each contain various subdivisions or categories. Dimension 2 consists of a list of eighteen teaching strategies which teachers can use across the subject matter content of an ongoing school curriculum shown in Dimension 1 for producing eight divergent thinking-feeling processes of students as indicated in Dimension 3. Thus, Dimension 2 lists a variety of eighteen styles which teachers may employ when transmitting knowledge, while Dimension 3 lists eight ways students can be caused to think and feel divergently about such knowledge. Content is presented as an interaction with strategy to produce student processes of divergent thinking and feeling. The model offers educators a complete diagnostic-prescriptive instructional delivery system with teaching strategies across basic content producing specific cognitive-affective student outcomes in the divergent area of creativity. The D formula shown at the top of the model in Figure 2 indicates content interacting with strategy (double arrows) produces pupil process (single arrow).

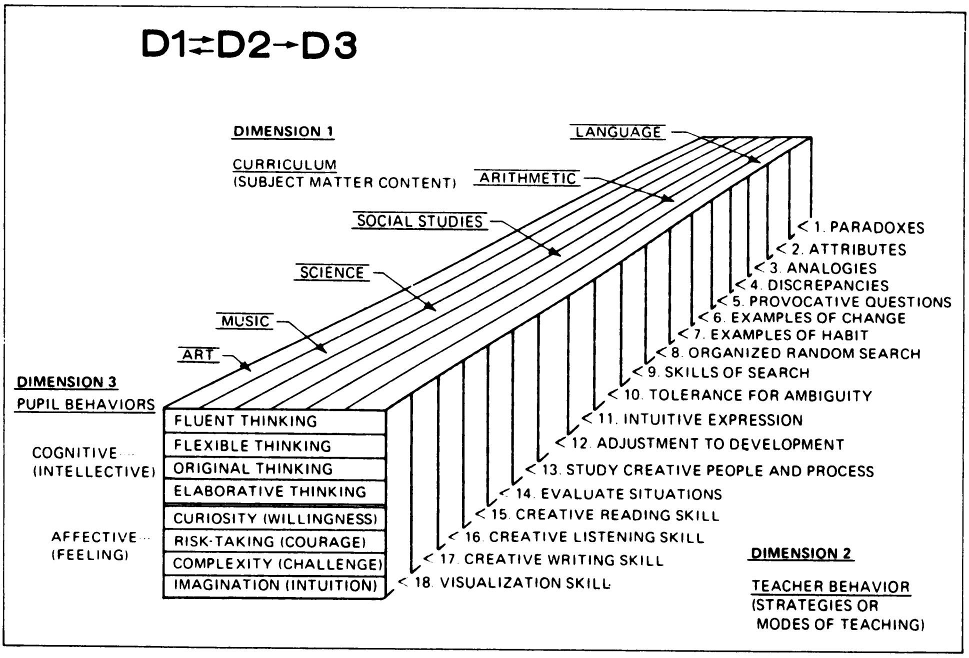


Figure 2. Williams Model—A model for implementing cognitive-affective behaviors in the classroom.

The model provides a working structure for curriculum planning and change as teachers develop or sensitize students to bring all of their general intelligence to bear upon divergent processes, both cognitive and affective. A subsequent discussion of the model and its dimensions follows as an invitation to teachers to accomplish this task directly through subject matter content rather than indirectly or in isolation of the regular school program. The three dimensions are explained here as follows:

Dimension 1 lists the subject areas of a conventional school curriculum with emphasis upon basic content of a K-12 program. Subject matter areas become a means toward an end since students cannot think or feel in a vacuum but must have content to think and feel about.

Dimension 2 lists the strategies which teachers can use across presentation of content as a way to incite the eight thinking-feeling divergent behaviors. All of these strategies have been devised empirically from many studies of how all good teachers behave and operate implicitly in the classroom. As one views these eighteen teaching strategies which can be applied across the subject areas, a vast number of combinations for learning become apparent. They are not new nor unique to this model, but have been utilized by successful teachers for a long time.

Dimension 3 consists of eight processes deduced from theoretical studies of how people think and feel divergently. The four cognitive factors come from the long and extensive research by Guilford and Meeker on the "*Structure of Intellect* (SOI)" related to their factor analysis of the divergent thinking slab for SOI (Meeker, 1974). The four affective factors come from studies of the disposition and temperament of creative people. From among many attributes or traits of highly creative persons, these four occur most prominently in the research literature. All eight processes have been neglected or at least handled randomly in classroom teaching where the development of creativity among students is vital. Dimensions 2 and 3 will now be expanded upon for clearer understanding of their meaning and application.

Dimension 3: Student Behaviors

Cognitive-Intellective

Fluent Thinking *(generation of a quality, flow of thought, number of relevant responses).* Fluency consists of a quantitative measure of the number of questions, responses, ideas, solutions or products an individual generates. The number (sheer count) or flow of relevant responses produced by the student yields the measure of fluency.

Flexible Thinking *(variety of ideas, ability to shift categories, detours in direction of thought).* Flexibility consists of a quantitative measure of the number of different ways the pupil thinks in producing questions, responses, ideas, solutions or products. By counting (sheer number) the detours, categories, changes of approach, shifts or changes in direction of thinking, one can measure flexibility.

Original Thinking *(unusual response, clever ideas, production away from the obvious).* Originality consists of a qualitative measure of unusual, remote, clever or uncommon questions, responses, ideas, solutions or products. The statistical infrequency of questions, responses or ideas produced across the total class by any student or the extent to which the response represents a new approach, mental leap, or departure from the obvious and commonplace occurring within the class or individual pupil yields the measure of originality.

Elaborative Thinking *(embellishing upon an idea, embroider upon a simple idea or response to make it more elegant, stretch or expand upon things or ideas).* Elaboration consists of the production of detailed steps, variety of implications or the ability to embellish or expand upon questions, responses, ideas, solutions or products. It is a quantitative measure which involves adding details and specificity to formerly produced responses or products.

Affective-Temperament

Risk-Taking *(willingness to expose oneself to failure or criticisms, take a guess, function under conditions devoid of structure, defend own ideas).* Risk-taking is the willingness to try difficult things. It is likewise a trait that teachers can observe when high levels of aspiration are sought after and tried out by the student. It involves feeling as well as doing; making guesses as well as taking chances.

Complexity *(the ability to seek many alternatives, see gaps between how things are and how they could be, bring order out of chaos, delve into intricate problems or ideas)*. Preference for complexity exists as an extension of elaboration when the student prefers the richness of embellished questions, responses, ideas, solutions or products. The student who displays a preference and a feeling for "digging in" to complex designs and complicated realms or information can be observed by the teacher as possessing this trait.

Curiosity *(the capacity to be inquisitive and wonder, toy with an idea, be open to puzzling situations, ponder the mystery of things, follow a particular hunch just to see what will happen)*. Curiosity is the capacity of the student to look into things, to feel inquisitive and to be puzzled. It is an observable trait associated with classroom behavior which involves exploratory, inquiry or discovery type activities.

Imagination *(the power to visualize and build mental images, dream about things that have never happened, feel intuitively, reach beyond sensual real boundaries)*. Imagination consists of the freedom to form mental images which in experience have not been actually present to the senses. The student who feels and builds thought models of situations or conceives forms of action symbolically is said to be using imagination.

Dimension 2: Teacher Behaviors (18 Strategies)

No. 1—Paradoxes *(common notion not necessarily true in fact; self-contradictory statement or observation)*. Use paradoxes or teach examples of paradoxical situations. These are tenets contrary to opinion, situation opposed to common notion but true in fact, or inconsistencies between things people hold as true. For example, in social studies, have students think about and explore problems of poverty in the midst of plenty in the world today. Ask students in science to disprove "old wives" tales. This is a technique for sensitizing students to evaluate things and brings out exciting ways for testing and proving.

No. 2—Attributes *(inherent properties; conventional symbols or identities; ascribing qualities)*. Use the technique of attribute listing or pointing out inherent properties. We do this in many areas such as analyzing the use of a word in a sentence (noun, verb, etc.) or the letters in the spelling of a word, or the numbers or units in an arithmetic problem. Develop the skill of analyzing the inherent properties of a thing by mentally taking it apart and thinking about its parts instead of the whole. For example, in an originality exercise, ask for new and unusual uses for commonly known things such as a lead pencil. Then point out how to think in terms of using the inherent properties of its many parts (wood, lead, rubber, metal, etc.).

No. 3—Analogies *(situations of likeness; similarities between things; comparing one thing to another)*. Use analogies or many situations of likeness. Point out new information, facts or principles by looking at similar situations in terms of things students already know. Show how scientific products have been developed out of analogous situations in nature: radar invented from the instinct of reflected sound waves among bats; airplane cargo doors designed like the opening of a clam shell; or the built-in-seam of weakness of the pea pod used in the whole area of packaging. Teachers can use animated pictures and films of animals solving problems of existence, survival and innovation and ask students how their behavior might parallel that of man.

No. 4—Discrepancies *(gaps or limitations in knowledge; missing links in information; what is not known).* Teach by using many examples of deficiencies; that is, ask students to think about what man does not know instead of telling students what man knows. Develop the student's skill for looking at gaps, unknowns or missing elements of information. Allow time for reflective thinking about inconsistencies in knowledge. Point out the difference between problems of fact and problems of logical consistency and how few of the latter kind there are. Use the technique of asking students to list the things that bother people, things people need or things wrong with something. Ask students to search for all possible definitions of a problem as something that is wrong. Allow opportunities for students to write or tell about all the observable things that to them cause puzzlement (in nature, in human nature and in the world of things). Cite examples where our perceptions in the world of conceptualization do not always match the world of reality. Provide a "pigeon loft" in the school or classroom where the students can go to wonder.

No. 5—Provocative Questions *(inquiry to bring forth meaning; incite knowledge exploration; summons to discovering new knowledge).* Use the inquiry training method of asking provocative questions. Point out the difference between factual type questions (How much? How many? What is? Who?) and questions which require depth of comprehension (How would you? In what other ways? What if? How else?). Use many categories of questioning such as those which require translation, interpretation, extrapolation, identification, discovery, synthesis and analysis. Show pictures and films and have students list all of the questions they can ask about the film. Use a check list of question categories such as longer, larger, shorter, smaller, adding, multiplying, taking away, changing, combining and reversing. Allow students to be as sensitive to question asking as they are to answer finding.

No. 6—Examples of Change *(demonstrate the dynamics of things; provide opportunities for making alterations, modifications or substitutions).* Cite the importance for change and use many examples of change. Teach the skill of changing things rather than adjusting to things. Use stories and films depicting change in nature and parallel these to human change.

No. 7—Examples of Habit *(effects of habit-bound thinking; build sensitivity against rigidity in ideas and well-tried ways).* Teach about rigidities, fixations and habit. Show how the lives and functions of men and machines have been influenced by habit-bound thinking. Use examples of principles and techniques, both in the field of arts and of sciences, that have remained unchanged or unimproved because of habit. Such examples in science as jet propulsion, known by the Chinese before the birth of Christ, and innovations in the art of communications could be used.

No. 8—Organized Random Search *(use a familiar structure to go at random to build another structure; an example from which new approaches occur at random).* Design case study approaches around some organized structure of knowledge which can in turn lead to a random search for other knowledge. Organize information to a certain point and then pose the question, "What would you do?" or "What would you have done?" For example, allow the student to identify with some historical situation or personality which provides the organized structure but gives no course of action or solution. Then allow the student to search at random for what could be done to solve the problem. Present unsolved social issues or scientific problems and ask the student to go off into his own "unknown areas of information" to seek solutions. Pose the question of how a field of knowledge as it is now conceived might be fifty or one hundred years from now. Identify an area of subject matter by story, picture or problem and ask the student to generate all of the causes and consequences of that area of knowledge. Use a film which identifies a situation or problem (organized structure) and then stop the film to allow the student to create or design his own information at random to bring the situation to a completion. Upon solving a problem (organized structure), ask the student to think at random about as many problems as he can that the solution might cause (implications).

No. 9—Skills of Search *(search for ways something has been done before—historical search; search for the current status of something—descriptive search; set up an experimental situation and search for what happens—experimental research).* Teach the skills of search as ways in which truths are sought. Teach the processes of the scientific method as well as the basic areas of research. Develop skills in: (1) historical search—how someone else has done it or solved it, (2) descriptive search—such as describing, comparing and contrasting several methods, as well as trial and error search, (3) controlled search through experimental observations—looking for cause and effect, drawing conclusions, analyzing results, identifying causes and consequences and drawing implications.

No. 10—Tolerance for Ambiguity *(provide situations which puzzle, intrigue or challenge thinking; pose open-ended situations which do not force closure).* Build a tolerance for ambiguity by setting purposeful blocks in the learning process. It is well known that students learn when confronted with problem situations. Lead the learning situation up to a definite point and then stop, allowing the student to toy with information, be puzzled, intrigued, involved or challenged. This is a good technique which leads to more self-directed learning.

No. 11—Intuitive Expression *(feeling about things through all senses, skill of expressing emotion, being sensitive to inward hunches or nudges).* Provide many opportunities which allow for intuitive expression. Ask students to write, tell or dramatize their feelings, hunches, intuitions and emotions about something. Use examples across subject matter areas which show how hunches paid off. Use other examples of how innovative people have ended up in trouble and why. Provide many opportunities for the expression of feelings across all the senses (e.g., feel box, color, sounds).

No. 12—Adjustment to Development *(learn from mistakes or failures, develop from rather than adjust to something, develop many options or possibilities).* Use examples of development instead of adjustment. Show how failures, mistakes and accidents have led to the development of worthwhile things (serendipity). Even though our culture is strongly success-oriented, use a reverse process by showing how unsuccessful acts or events have been turned to success. Teach the skill of learning how to learn from mistakes. Mistakes are at least proof of an individual's effort. As an example, use some of the films depicting early unsuccessful attempts of man to fly, and point out how the science of flight profited by such mistakes. Use other examples in science and medicine.

No. 13—Study Creative People and Process *(analyze traits of eminently creative people, study processes which lead to problem solving, invention, incubation and insight).* Study creative individuals in the process under which they create. Analyze the traits and characteristics of eminently creative people through study of biographies and anecdotal data. Study creative people from the standpoint of creating an art out of their own lives—personal creativity. Study the process of creative people interacting with other people—social creativity. Study the process and development of a creative product—productive creativity. Use career films showing creatively successful people on the job. Point out idiosyncrasies of creative people—early life anxieties, conflicts, fears, uncertainties. Emphasize how problems were overcome or how they contributed to a person's own creativity. Show how truly creative behavior comes out of personal and social discomfort, maladjustment, deep concern and a great amount of perserverence.

No. 14—Evaluate Situations *(decide upon possibilities by their consequences and implications, check or verify ideas and guesses against the facts)*. Evaluate solutions and answers in terms of their consequences and implications. Always pose the question, "*What if?*" Provide opportunities for listing things that might happen as a result of. . . . Teach for cause and effect and require the students to extrapolate from information. Allow many opportunities for decision making and the responsibility for choice, especially after a divergent exercise when it is necessary to choose and use.

No. 15—Creative Reading Skill *(develop a mind-set for using information that is read, learn the skill of generating ideas by reading)*. Develop skills in reading creatively. Ask students to state as many ideas as they can which occur to them during their reading rather than to state specifically what it was that they read. Point out the difference between reading as an information acquiring process and reading which leads to idea generation and development. Reading can teach a student about someone else's ideas or information, but it can also stimulate the student to new ideas and information of his own.

No. 16—Creative Listening Skill *(learning the skill of generating ideas by listening, listen for information allowing one thing to lead another)*. Likewise, develop the skill of listening creatively. Listen for information which leads to other things rather than only what was heard. Teach the importance of listening rather than always speaking. Have students listen to sounds, music, talking and then write their perceptions of what was heard.

No. 17—Creative Writing Skill *(learn the skill of communicating ideas in writing, learn the skill of generating ideas through writing)*. Draw attention to shapes, colors, rhythms, textures, sounds and odors. Provide opportunities for students to perceive or visualize themselves in many contexts and then ask them to write about their perceptions in different forms (prose, story, poems, newspaper ad, script, etc.).

No. 18—Visualization Skill *(express ideas in visual forms, illustrate thoughts and feelings, describe experiences through illustrations)*. Provide opportunities for students to perceive or visualize themselves in many contexts. For example, ask the student to perceive himself as a molecule undergoing the process of osmosis or an electron flowing through a solid copper wire. Provide many opportunities for students to find gratification in perceiving with all their senses the world in which they live, and then draw these perceptions in abstract art or form. Visualize your perceptions of nature as seen by an animal or insect.

Sample Lessons Applying the Williams Model

Now that the Williams Model has been presented and discussed in detail, it seems appropriate that lesson examples should show how to use the various dimensions of the model in classroom teaching. The following sample lessons have been extensively field tested in differentiated gifted programs. The lesson format will first be shown, then followed by a discussion of how to do it and what happens. All of these lessons are from the two ***Classroom Ideas Books*** by Frank Williams (1970, 1982, D.O.K. Publishers, East Aurora, New York).

Sample Lesson 1

To Encourage:	Flexible Thinking and Curiosity
Through:	Social Studies
Using Strategies:	Paradox, Attributes

Place the word *"paradox"* on the board and ask students to make guesses as to what they think the word means. Then verify by asking some student to look the word up in the dictionary and read it to the class. Then ask students to brainstorm their ideas about how people are alike. List ideas as they occur and then have the class classify the list into various categories. The number of different categories reflects flexible thinking, with greater numbers indicating more flexibility. Then ask the class to brainstorm another list of how people differ. Classify this list and compare lists and categories. Discuss how people are alike but different. Reinforce abilities to think in different ways about people.

This sixth grade social studies class thought of 36 ideas about how people are alike. Some categories included the way they look, the way they move about, their need for food and water, that they are intelligent, they live in the world, etc. Then their list of how people differ generated only 19 ideas. This was reportedly harder to do. Some categories of differences included their talents and abilities; values; brainpower; feelings and urges; behavior, personality, nationality; and looks. The lists and categories led to a discussion about being curious and flexible in thinking about people. It also got students thinking differently about a common thing, since we are all people.

Sample Lesson 2

To Encourage:	Fluent Thinking and Imagination
Through:	Science, Math and Social Studies (cross discipline)
Using Strategies:	Attributes, Skills of Search

Have the class brainstorm a long list of things that are measurable. Place the word, "measurables," on the chalkboard and record students' ideas as they are spontaneously offered. Tell the students during brainstorming that neither discussion nor criticism is allowed. Emphasis is upon quantity and flow of ideas. After about 20 minutes, when spontaneity ceases, ask the class to brainstorm a list of things that are not measurable. Place the work, *"immeasurables,"* at the head of this list and give the class the same time to list these ideas. Now compare the lists and discuss their differences, not only in number and length but how the words differ. Then ask students to individually select one of the immeasurable things and, using their imaginations, create some way for measuring this thing. Can you imagine how you could measure love, hate, boredom, etc., or one of the immeasurable things that appear on this list?

A ninth grade class was very fluent on the first list. When analyzed, they discovered the list included many math and science measurable things like length of room, time, age, space, distance, energy, area, etc. When analysis of the second list was made, they discovered many *"people"* things like feelings, moods, urges, hunches, emotions, etc.

They then wrestled with the imaginative issue of trying to measure love, hate, etc. Many of them wanted to pursue creating a new measurement system, realizing the old system of measurement may not apply here. This led to individual projects for creating or inventing a new kind of measurement for an inanimate kind of thing. Some students' intuition or curiosity piqued and they wanted to pursue individual research projects.

Sample Lesson 3

To Encourage:	Original Thinking and Curiosity
Through:	Language Arts
Using Strategies:	Organized Random Search, Evaluate Situations and Creative Writing

A Cinquain poem is presented on an overhead projector or chalkboard. The class is told a Cinquain is a 5-line form of poetry starting with one word (noun), with two descriptive words for a second line (adjectives), a third line of three words explaining what the first word does, and a fourth line consists of four words expressing a feeling or mood the first word presents. The fifth line is one single wrap-up (synonym) that ties together the whole meaning of the other four lines. A sample Cinquain is:

Fence
Picketed, Whitewashed
Surrounds a yard
A symbol of security
Barrier

This form of poetry is discussed and the word *barrier* is used as the lead-off word for brainstorming. Ask the class to think of all the different kinds of barriers they can think of. Responses are recorded. After the list has been obtained, students are asked to choose one barrier word from the list and use it in place of the word *fence* in the displayed sample Cinquain. Poems are read to the class. After Cinquain writing, present the Haiku form of poetry by starting:

Let's write a Haiku
Five, seven, five syllables
Try one if you will

Haiku consists of three lines having 5, 7 and 5 syllables. Now have the class create their own Haiku poem from the barrier list.

This seventh grade class wrote Cinquains. When students were asked to read their poems, they were asked the reason for their selected "*barrier*" word that started their Cinquain. One student selected the "*barrier*" word *time*. When asked why he chose this word, he replied, "*Many times I am bored.*" His Cinquain was:

Time
Minutes, Hours
A rigid thing
Too fast, too slow
Frustration

Sample Lesson 4

To Encourage: Curiosity and Complexity

Through: Math Concept

Using Strategies: Attributes, Evaluate Situations, Visualization Skill

The teacher should collect several different kinds of book jackets. From this collection, select six or eight that have differing kinds of topics with intriguing pictures. Present these, one at a time, asking students to compare what is shown in the picture on the jacket to the title and/or subject of the book. In some cases, there will be strong agreement on a scale of one to ten while, in other cases, there will be little or none. Ask students to rate their agreement on a scale from one to ten, one being the least agreement between picture and name of book, ten having the strongest agreement (correlation). Include several differing book jackets from a telephone book, Sears catalog, advertising literature, etc. Have students compare similarities and differences between what is shown on the jacket in pictorial form to what is indicated verbally by the title of the book. Practice the meaning of correlation in this way.

Some of the students, intrigued with the idea of relatedness between pictorial and verbal meaning, started redesigning book jackets which would better represent the real meaning of a book and its title. New jackets were drawn, or old jackets were used on different books. Ads in magazines and newspapers were also correlated as students became curious about the relationship between the picture and the subject of the ad.

Sample Lesson 5

To Encourage: Fluent and Original Thinking, Curiosity

Through: Language Arts and Art

Using Strategies: Organized Random Search, Evaluate Situations and Visualization Skill

From a collection of various different kinds of book jackets obtained from the library, choose some that have interesting and differing pictures. Cover all the print on the jackets, leaving only the picture showing. Separate the class into small groups (4-5 students per group). Give one jacket to each group, asking them to brainstorm all the subjects or topics they think the book might be about. Then have the group choose criteria to judge which topic seems to best fit the picture as the real subject of the book. Select one from the brainstormed list. Now ask each group to originate a clever and creative title for their selected book jacket. Verify by uncovering the title of the book while showing the jacket to the whole class. Do this across each group.

Not discouraged by their covered up book jacket, this group saw a beautiful cloudy sky with angels in purple. They chose the title of the book to be ***Holy Hallelujahs.*** The real title of the book, when the print was uncovered, turned out to be ***Happy Christmas.*** This group liked their title much better and decided to write their own book as they selected time, place and characters for ***Holy Hallelujahs.*** With help from a local author as mentor, they wrote an introduction and table of contents. As these were turned in to the teacher, the book was written as a child's story about heaven. When the book was finished with illustrations, the group became young authors and, with the teacher's help, the book was published.

Sample Lesson 6

To Encourage:	Curiosity and Complexity
Through:	Science
Using Strategies:	Discrepancies, Provocative Questions and Evaluate Situations

Place the word *density* on the chalkboard. Ask students to define the word. Ask someone to look the word up in the dictionary and read the definition; what does it mean? Then perform an interesting experiment with colorless fluids. Before the lesson begins, pour denatured alcohol carefully on top of a half glass of water. Pour down the side of the glass so as not to mix the two fluids. When the experiment begins, pour another glass full of water. Then drop a large ice cube into both glasses. Give the rules for inquiry, telling the class to ask questions about the difference in position of the two ice cubes (on top of the water, in the middle of the glass in the alcohol). Their questions will only be answered by *"yes," "no"* or *"maybe; you need more information."* Students will seek theories by asking questions: the *"maybe"* tells them they must get more information by asking more questions. Questions are to solve the mystery as to the discrepancy in the position of the two ice cubes. Questions will lead to discovering a lighter, less dense fluid floating on top of the water in the one glass. Eventually, someone will guess alcohol. Then ask the class to guess what else might be used in place of alcohol to make the same thing happen. This will lead to the discovery of specific weights of fluids, some heavier, some lighter than water which has a specific weight of 1.

This sixth grade class discovered through inquiry that density is mass per unit volume. They soon guessed that the lighter fluid was on top in one glass which made the ice cube float on the top of the heavier fluid in the bottom half of the glass. They then wondered about the density of solids. So the teacher set up a water displacement experiment having obtained a graduated cylinder, scale and pieces of materials the students brought in. By measuring the amount of water displaced in the cylinder as the solid was placed in it and weighing the material, they determined the density of each solid. They learned wood and ice were lighter than water and that aluminum and gold were much heavier. This then turned into a scientific method experiment and a unit which the class loved. Enrichment strategies of provocative questions, skills of search and evaluating situations were predominantly used by the teacher.

Sample Lesson 7

To Encourage:	Flexible Thinking and Complexity
Through:	Math and Language
Using Strategies:	Examples of Change, Organized Random Search and Evaluate Situations

 The teacher placed the alphabet on the chalkboard, numbering the letters from 1 to 26, A to Z.

The class was involved in finding a one-syllable word, assigning designated numbers for each letter of the word, and using addition and subtraction to get the numbers of the letters to equal 8. For example, the word, *girl*, was given and assigned the numbers 7, 9, 18 and 12 from the spelling of *girl*. Students were asked to come up with as many different number combinations as possible to get the number 8. One number sequence thought of by some student was to subtract 12 from 18, 7 from 9, and then add the two remaining numbers, 6 + 2, to equal 8. Other differing combinations were sought as students worked on addition and subtraction to get 8. Then words from the week's spelling list were used; and by assigning respective numbers and/or using all four of the number combinations to get different numbers, students became intrigued with converting words and letters to numbers and practicing their number combinations.

One group in a class thought of designing a game from this lesson. One syllable words would receive 1 point, two syllable words 2 points and three or more syllable words would receive 3 points. Again, using the week's spelling list and by using only subtraction and multiplication to get 12, students began solving numerical problems and receiving points for the game. They played the game in groups and designed letter-number cards giving the word and numbers rules on one side and the answers on the other side. Students were to think of as many different number combinations as possible to solve the problem. One student completed the word *antidisestablishmentarianism* using addition and subtraction to equal 15. Math improvement soared, spelling improvement was great!

Sample Lesson 8

To Encourage:	Original Thinking and Complexity
Through:	Science and Math
Using Strategies:	Analogies, Skills of Search

The teacher introduced a project on aerodynamics by exploring things in nature that fly, i.e., insects and birds, and then showed a film on hang gliding with a discussion of the flight of man. Airfoil sections and model airplanes were studied. Some students investigated various wing shapes and types, discovering that a relationship must exist between area of lift-producing surface and weight of object being flown. This then led into math computations and ratio. From this, each interested student was to design his or her own hang glider. Knowing their own weight, they were to design a glider wing that would carry them in soaring. Several local college students that were hang gliders came in and discussed their experiences.

A group from this class decided to follow up on a hang glider design of their own. Math and shop teachers assisted the group and the home economics teachers helped them with selecting fabric that could best be used for their hang glider. A study was conducted on the difference between knits and polyesters, learning which to use on a hang glider. Their hang gliders built, this group then displayed them in the community crafts fair. By spring, the group tested their hang gliders with the help of high school students and others who had practice in hang gliding. Learning to this group became applying and doing something productively rather than merely taking in information rarely used for one's own direction.

Discussion of Lesson Examples

It should be obvious from the above examples how the model can be used to enrich lessons for gifted students, particularly in the divergent areas, both cognitive and affective. As the reader finds in the discussion of each lesson, connectedness occurs when students become motivated with the lesson as an interaction between content, strategy and their thinking-feeling processes. This is exactly what the model attempts to do, under diagnostic conditions as planned and carried out by the teacher.

These lesson examples help show that most students in a classroom can, at some time, become more able learners. The diagram on the following page (Figure 3) can more explicitly illustrate this. The teacher, by using strategies across the content curriculum, must supply the enriched experiences. This is really the only place the teacher affects learning as a diagnostic learning manager. The student must then make the connection by using his or her own organizers, which in turn lead to real meaning. As organizers connect through assimilation and/or accommodation (Piaget's terms), the student will derive personal meaning. And real meaning to the student is reflected or expressed by *"Oh! I see now what that means. It makes sense!"*

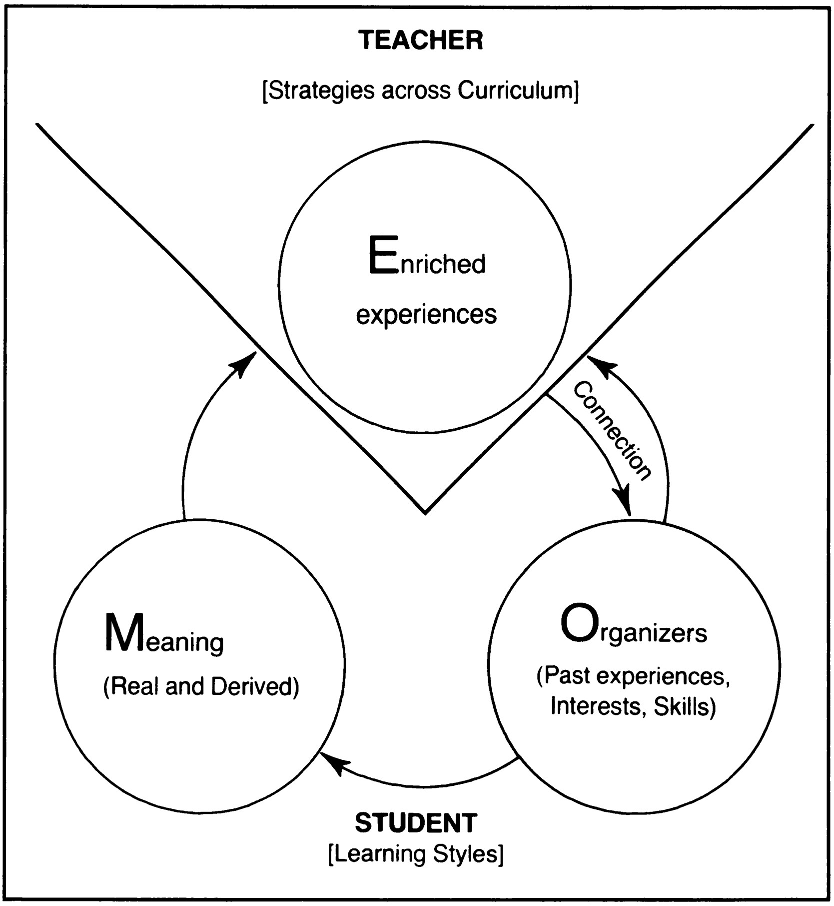


Figure 3. How teachers' curricular strategies influence students' learning styles.

The lock to be opened is individual motivation: joining what has happened in the past to that which is happening now—*connectedness* as I have referred to it. The way this can best be brought about must be through enriched, embellished learning experiences. These experiences are the keys which each student uses in attempting to become a more able learner. Both the quantity and the quality of the learning experiences introduced into a student's life will broaden the degree of connectedness. But the degree of connectedness determines the extent of the student's understanding, resulting from any enriched experience—a recycling loop as Figure 3 shows. The more enriched experiences that are provided, the greater the chance exists that a student will connect. The more connections made by a student, the greater the meaning that can be derived from the new experiences.

Research and Evaluation

Until now, little has been done in devising a satisfactory way to assess a combination of cognitive and affective factors related to creative behavior which can be easily used by classroom teachers. Translating findings from creativity assessment into practical classroom practices by teachers desiring to make conscious efforts to develop student's creative behavior has been practically unheard of until the present gifted movement began in 1975. Of the five general areas of multiple abilities considered legitimate for funding gifted projects, the one area of "creative productive thinking" has until now remained rather barren and neglected in terms of valid assessment and programming procedures. Educators working in gifted programs have been plagued with difficulties in locating curriculum materials and tests when attempting to identify, implement and evaluate projects in the area of creativity. Yet, this is one of the main ability areas strongly advocated by federal, state and district policies governing defensible and differentiated programs for gifted students.

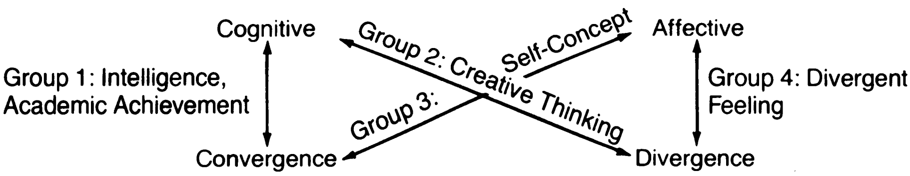
Williams Model provides continuity within a delivery system for coordinating students' creative abilities using strategies teachers can employ for teaching the basic skills and content (Williams, 1979a,b). It is based upon the importance of developing pupil-teacher interactions with the curriculum by dealing specifically with those cognitive and affective behaviors vitally responsible for encouraging and releasing creativity, which have become well known from long-standing research evidence. Now it is possible to purposely program the ongoing curriculum for developing and sustaining those divergent thinking and feeling processes most responsible for the creative process. These can be measured by a combination of cognitive and affective instruments, pre- and posttesting with gain scores computed to show each student's progress. Thus, there now exists a delivery system consisting of definable, developmental and measurable factors purposely aimed at encouraging creativity among students in school classrooms.

Although the model has undergone numerous studies and validation across schools in the United States, Canada, Puerto Rico, Australia and most recently in Central America, the most extensive study is reported here since it involved a greater number of subjects (N = 468) with a variety of programming in four separate gifted projects.

Subjects

Subjects of this study were selected from 468 classroom students, grades 3 through 9, from four large gifted programs where the author had worked as a consultant during the past five years. The four project locations were Anchorage, Alaska (PACT project); Medford, Oregon (Southern Oregon Gifted Project); Great Falls, Montana (PACE project) and Troutdale, Oregon (Reynold's G-T project). All subjects had met certain criteria for being gifted students and had been identified, selected and involved in a gifted program within their respective school districts. These subjects had demonstrated superior performance in either intelligence, academic achievement, creativity and/or in the affective area of self-concept. These were the four ability areas chosen by their respective projects as criteria for identification and selection into a gifted program. In short, these were gifted and creative students with strong feelings of self-worth.

From this large pool of gifted students, four groups were selected by a rank order of highest scores on four respective ability areas as classified by the Williams continuum diagram shown in Figure 4.



Group 1	Cognitive-Convergent Group (N = 77) IQ and academic achievement test scores
Group 2	Cognitive-Divergent Group (N = 59) Creativity test scores (divergent thinking)
Group 3	Affective-Convergent Group (N = 73) Self-concept test scores
Group 4	Affective-Divergent Group (N = 64) Motivational characteristics (divergent feeling)

Figure 4. Williams continuum diagram

Test scores, nominations and rating scales by teachers, parents and peers were used as identification and selection criteria for these four groups. On a variety of tests and scales, selected subjects for the four groups had attained scores averaging 1.2 to 1.7 standard deviations above the mean from published test norms for this grade level group. Classification of the four groups was determined from the nature of the test or scale used and how it is scored. For example, self-concept scales are affective in nature but scored by correct answer keys, hence they yield an affective-convergent classification.

Methods

All four groups of subjects classified, as shown in Figure 4, were administered two test instruments. Both tests had been designed and validated to measure the eight pupil behaviors in Dimension 3 of the Williams Model. These test instruments are:

Divergent Test of Creative Thinking. This test measures the four cognitive-divergent factors from the Williams Model—fluency, flexibility, originality and elaboration yielding these sub scores. This test is a revised form of the earlier figural Torrance Test of Creative Thinking consisting of two drawing exercises, completing a picture using a form and completing a series of pictures using a stimulus figure. Even though these drawing exercises are similar to the earlier Torrance Test of Creative Thinking, a whole new and simplified scoring procedure deriving weighted scores with norms has been devised by Williams based upon thorough analysis of test performance on over two thousand protocols. Both exercises elicit right brain visual perception (classified as divergent figural transformations (DFT) on Guilford's model, except the title score which is left brain oriented and classified as divergent semantic transformation (DST). Hence, the test meets hemisphericity criteria for creativity requiring alternate modes or integrated styles of information processing through synthesis productions.

This modified form of the older Torrance Test of Creative Thinking was validated by a random sample of student subjects from the current study ($N = 67$) by administering both creative thinking tests, the earlier figural form of the Torrance scored by his procedure and this later form scored by a new simplified scoring procedure. High scorers on both tests did differ significantly over low scorers. Both tests yield the same subscores of creative-productive thinking: fluency, flexibility, originality and elaboration as derived from the divergent slab of Guilford's Structure of Intellect Model. However, the new Drawing Test of Creative Thinking can be more easily and quickly scored for use by classroom teachers.

Divergent Feeling Test. This test was originally called "How Do You Really Feel About Yourself Inventory" (HDYRFAY, Williams, F., 1972). The Divergent Feeling Test measures the four affective divergent factors from the Williams Model; namely, curiosity, risk taking, complexity and imagination. This test was initially validated against studies and work of MacKinnon (1968), Cattell (1967) and Barron (1963) and the Torrance Tests of Creative Thinking, both figural and verbal as divergent production exercises. High scoring subjects on all measures of creativity discriminated significantly on the Divergent Feeling Test (HDYRFAY) as compared to low scoring subjects. High performers on the four cognitive-divergent factors of fluency, flexibility, originality and elaboration also scored high on the four affective-divergent factors of curiosity, imagination, risk taking and complexity. Title scores, likewise, correlate high and significantly to verbal comprehension scores on academic achievement tests. This test exercise satisfies integrated brain functioning by requiring left brain verbal analysis to alternate with right brain emotional, affective processing and on structure of intellect it is classified as divergent semantic units (DSU). Both test instruments are now available in a newly designed ***Creativity Assessment Packet*** (*CAP*, 1979b) by Frank Williams, published and distributed by DOK Publishers, Inc. and revised in 1986.

Williams Scale. A third instrument was designed and administered to classroom teachers and parents of the four groups of subjects. This instrument is the Williams Scale, a scale for rating divergent thinking and feeling behaviors of children. It consists of an observational check list of traits and characteristics across each of the eight factors, both cognitive and affective, from Dimension 3 of the Williams Model. For example, it defines *fluent thinking* and lists six characteristics of a fluent thinking person, or defines *curiosity* and lists six characteristics of a curious person. Each characteristic may be checked by three alternative boxes: often, sometimes or seldom. In addition to the 48 characteristic items on the scale, there are four open-ended items asking a parent and a teacher for their expectations of a school program for a gifted child and their expectations of the accomplishments of a gifted child in a school program. The entire Scale yields a weighted score of 100 points and has norms available. This Scale, like the Divergent Test of Creative Thinking and the Divergent Feeling Test, is likewise available in the new Creativity Test Packet as indicated. Hence, the entire packet is a series of test instruments to be used across the Williams model for assessment and evaluation as the model is used for programming (CAP), D.O.K. Publishers, East Aurora, New York.

Results

Table 1 reports means and standard deviations for each group of subjects as shown in Figure 4 on all eight factors measured by the two test instruments administered. It should be noted that subjects in the cognitive-divergent and affective-divergent groups, Groups 2 and 4, attained the highest scores on most measured factors.

Table 1
Means and standard deviations of selected creative thinking and feeling factors across four groups of gifted students

Measured Factor	Group 1 Cognitive-Convergent		Group 2 Cognitive-Divergent		Group 3 Affective-Convergent		Group 4 Affective-Divergent	
	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.
Fluency	8.4	1.6	9.3	1.4	8.7	1.7	9.0	1.3
Flexibility	5.7	2.0	7.1	2.1	5.9	2.2	7.0	1.9
Originality	26.4	2.1	30.3	2.4	27.9	2.6	30.1	2.7
Elaboration	24.3	4.9	27.1	5.2	26.1	4.7	28.8	5.0
Title	2.9	0.9	2.5	1.0	2.4	1.1	2.3	0.8
Curiosity	15.1	1.9	18.8	2.1	16.9	2.3	18.3	2.0
Imagination	14.7	2.1	19.0	2.4	16.8	1.7	18.4	2.2
Complexity	15.0	2.4	15.3	2.1	16.7	2.0	16.2	2.3
Risk-Taking	15.1	2.3	17.9	2.0	16.7	1.7	16.3	2.2

Subjects initially scoring highest on cognitive-divergence by scores on instruments and checklists, Groups 2 and 4, obtained higher scores on all factors of both the creative thinking test and the divergent feeling test except title score on the drawing test. To test the statistical significance of these differences, Chi-Square tests found seven of the nine factor scores for Groups 2 and 4 (cognitive and affective-divergence) to be statistically significant beyond the .05 level of confidence. Flexible and original thinking along with curiosity and imagination yielded the greatest significant gains for Groups 2 and 4 over Groups 1 and 3. The data suggests two confirming facts. First, if you want to choose students who will do well on measures relating to creativity, you assess certain creative thinking and feeling behaviors, not IQ, academic achievement or self-concept. For the latter are convergent abilities, at least the way they are tested, while a majority of abilities necessary for creativity are divergent abilities. This study reveals eight predominantly divergent behaviors highly related to assessing creativity. Second, the importance of linking or connecting cognitive with affective styles of processing information under conditions calling for divergence appears to be generally more effective for eliciting creativity than under convergent, fixed-answer conditions.

In addition to the data shown in Table 1 on results of the two test instruments administered student subjects, correlations were obtained using the Williams Scale administered to parents and teachers of these same subjects. It is important to point out again that the eight factors comprising the Williams Scale, which is a rating checklist to be used by parents and teachers observing student behaviors at home and in school, are the same eight factors measured by the two test instruments reported in Table 1 and developed as student outcomes by use of the Williams Model. By analysis of teacher-parent pairs of Williams Scales for the same student, correlations obtained were .73 for upper grade students, .67 for elementary grade students, with an overall correlation across all pairs of .71, all significant at the .01 level of confidence. Such correlations indicate a significant relationship existed between teachers' rating and parents' rating of the same student on fluent, flexible, original and elaborative thinking along with curiosity, risk taking, complexity and imagination.

The last part of this correlation study asked the question, "Did students as subjects in the study (observed at home eliciting these processes as well as in school) perform the same on tests which measure like processes?" The top five scoring students on the William Scale as ranked by both parents and teachers were compared to the top five scoring students as ranked by their scores on the Creative Thinking Test and on the Divergent Feeling Test. A rank order correlation of .84 was obtained. In summary, data confirm that students who are curious and flexible at home (as observed by parents) are also curious and flexible in school (as observed by teachers) and perform equally well on tasks measuring these two areas.

Conclusions

Using gifted subjects scoring highest by tests, checklists and nomination forms across the cognitive and affective domains under either convergent or divergent conditions, it appears from the study that both cognitive and affective divergers perform better on creative thinking and feeling tasks measuring cognitive and affective divergence. The evidence produced by this study indicates rather clearly that groups of gifted students classified by tasks of cognitive and affective convergence obtain lower scores than do groups of students classified by tasks of cognitive and affective divergence on measures of creative thinking abilities and on personality measures associated with creative behaviors. On measures of creative thinking, cognitive-divergent groups excelled over cognitive-convergent groups on factors of flexibility and originality. On measures of temperament or dispositional factors, affective-divergent groups excelled over affective-convergent groups on measures of curiosity and imagination.

By use of the Williams Model, there now is available a complete delivery system for school classrooms including test instruments, curriculum materials and teaching strategies for teacher's use when interested in developing creative processes within subject content areas of a school program. Although evidence of the study suggests that among exceptional students, both convergent and divergent behaviors are involved in multiple ability giftedness, a style of information processing utilizing both cognitive and affective domains operating under divergent conditions seems to be more favorable for assessing creativity. Additional studies need to be conducted with different populations, especially a replicative study on typical, average students. For if we accept the premise that giftedness is a matter of degree, not kind, perhaps these assessment instruments tested in this study with gifted students could likewise be used for most other students.

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Discussion Questions

1 Why was a three-dimensional cube selected to graphically illustrate this model?

2 How do the eight pupil processes in Dimension 3 relate to other educational or psychological theories?

3 What is the origin of the 18 teaching strategies in Dimension 2? Were only these strategies included in the original research for the model?

4 Based upon past educational research and development findings, how has this model contributed to educational efforts throughout the years of its implementation?

5 As viewed from a classroom perspective, how has this model helped teaching become more effective?

6 Even though the model has been used in many gifted programs in the United States, Canada and Puerto Rico, it was not designed primarily for this purpose. What is the rationale for this model's use in gifted programs?

7 What is the basic purpose or primary objective for classroom implementation of this teaching model? What has it offered educators that other models have not?

8 Considering the vast implications of the model (asking teachers and/or curriculum specialists to implement 864 possible interactions—18 strategies × 6 content areas × 8 pupil processes), how can this model be applied in any grade, at any school, by any teacher?

9 Where should further work on the model be concentrated for those who may want to extend its use in current educational programs?

10 How could this model be used in conjunction with any of the other models in this book?

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