On Educating the Gifted

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This article explores current thinking on ways to improve the education of intellectually talented youths. The term "intellectually talented" seems, for several reasons, preferable to the more commonly used expression "gifted." In this article, I consider just those specific developed abilities that make some students especially educable within the broad context of schools. The aggregate of several such abilities can provide a measure of general intellectual ability, usually represented by an age-adjusted score called the IQ. In essentially its present form, the concept of general intelligence dates back to Spearman (1904) and Binet (see Binet & Simon, 1905). Perhaps this construct-validated concept is still operationalized best via a child's carefully ascertained standard-score IQ on the Stanford-Binet Intelligence Scale when he or she is about 7 to 12 years of age. If the educator could have but *one* indication of a youth's intellectual ability, this would probably be the best. Later, I shall question the wisdom of relying heavily on a single such score.

To most knowledgeable adults, a "gifted" child is one whose Stanford-Binet-type IQ is "high." Typically, the minimum criterial score is set at 130, 132, 140, or occasionally 150 or even 180 (e.g., see Hollingworth, 1942). It is usually assumed, often tacitly, that all students with a given IQ such as 140 are equally educable in the usual school subjects. For example, when a high-IQ youth performs poorly in a mathematics class set up for intellectually brilliant students, the teacher is likely to conclude that he or she is not adequately motivated and, therefore, not "working up to capacity." Actually, of course, some students reason mathematically far better than do others of exactly the same chronological and mental age. Using only IQ or MA scores to group pupils homogeneously for instruction in mathematics is foredoomed to be inefficient compared with grouping based on more relevant criteria.

This points up the need for frequent use of tests or other assessments of special abilities that, singly or in combination, provide a more valid basis than the IQ for instruction of youths talented in a given school subject. Which measures prove optimum will depend considerably on the type and pace of instruction in the special class. For the 12 fast-paced mathematics classes conducted thus far by the Study of Mathematically Precocious Youth (SMPY) at Johns Hopkins, a high score on a difficult test of mathematical reasoning ability, augmented by a good score on a test of reading comprehension and vocabulary, has been found to be powerful.

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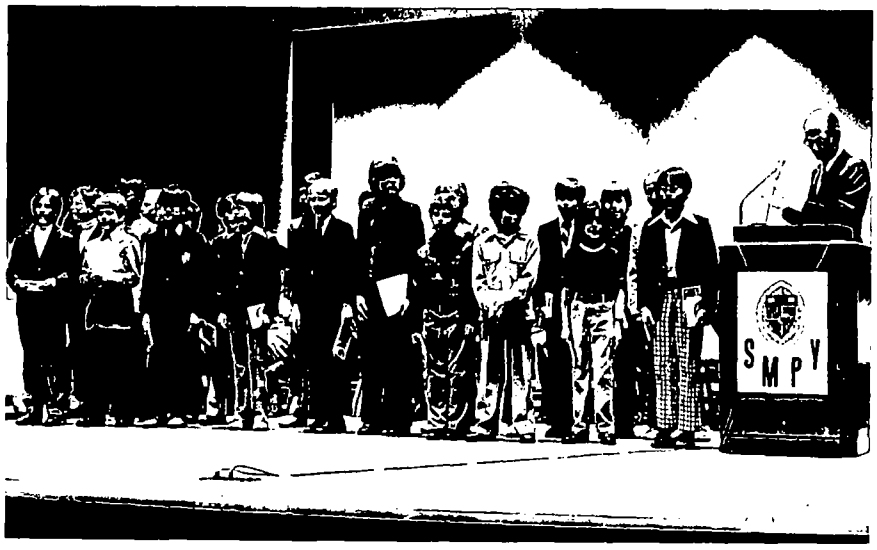

Pictured here are Dr. Julian C. Stanley and SMPY's top 23 Math pupils, chiefly 12-year-olds.

Many 10- to 12-year-olds who are in this category have been able to get certified via standardized achievement tests for more than 600 hours of precalculus mathematics (Algebra I through analytic geometry) in approximately 40 hours of instruction and testing.

This, then, is my first point about the state of the art concerning education of the gifted: there seems to be too much emphasis on IQ as the primary homogeneous grouping variable for instruction.

Even more troubling to me, however, are the flight from the use of tests for identifying talented youths and the strong prejudices held by many educators and parents against accelerating these youths academically. These are not new concerns, of course. They are featured prominently in Spaulding's (1975) "review of the state of the art on research on the gifted and talented . . . for the period 1969-74" that was done for the American Psychological Foundation. In fact, the prejudices were obvious in 1921 when Terman began his now classic *Genetic Studies of Genius* (see Gowan, 1977; Terman et al., 1925). The perennial arguments against and for standardized tests are not reviewed here, but probably you, too, are concerned lest certain alleged or real misuses should cause them to become unavailable. I realize poignantly, on the basis of my testing experience since 1938, the great value of standardized tests for *finding* talent (Stanley, 1977-78). We appear to be in danger of losing some of that capacity in the name of the current "truth in testing" legislation.

Accelerating the subject matter and/or school grade progress of intellectually talented youths has a long history of successful outcomes. As far as Daurio (1979) could ascertain in his recent, comprehensive review of the acceleration versus enrichment controversy, not a single substantial *study* has found the educational acceleration of intellectually talented youths harmful. Also, Daurio could locate almost no studies of so-called educational enrichment that found it as effective as acceleration. Apparently, successful subject matter enrichment at one level must lead to acceleration later in order to avoid boring the student and causing him or her to lose interest in the subject. This certainly has been SMPY's finding with many hundreds of youths over a 10-year period. (See Fox [in press]; George, Cohn, & Stanley [1979]; Keating [1976]; Keating & Stanley [1972]; Stanley, Keating, & Fox [1974]; Stanley, George, & Solano [1977, 1978]).

As concluded by Daurio and others contributing to SMPY's most recent book (George, Cohn, & Stanley, 1979), properly conducted acceleration tends to be enriching, and appropriate enrichment is deliberately accelerative. Thus, as the subtitle of the book (Acceleration and Enrichment) indicates, it seems advisable not to contrast acceleration with enrichment as if they were mutually exclusive. Various combinations have produced happy, effective students who completed their baccalaureates 0 to 8 years early.

This leads, naturally, to the concept of a smorgasbord of special educational options that might be sampled freely by intellectually talented youths. Some of these will be primarily enriching, whereas others will be chiefly accelerative. Each intellectually talented youth must have considerable guidance in order to use these options to further his or her own education most effectively.

First, though, the various abilities of the intellectually talented youth must be well known. Some multiability method such as administering the eight Differential Aptitude Tests (DAT) is needed to find those youths who meet a criterion such as scoring in the upper five percent of their age group on the national norms for at least one ability. In a typical school, that will yield far more than five percent of the students tested. The criterial percentage should be set so that false negatives will be minimized. For example, SMPY permits youths of upper-three-percent mathematical aptitude to enter its talent search in order to make fairly certain of screening in for more difficult testing students who reason better mathematically than do 99 percent of their agemates.

After identifying the high scorers on one or more of the eight

tests, it is necessary to administer a much more difficult test of the specific ability or abilities on which the individual excelled. In addition, various self-reports and other information about the student should be secured; these help determine which youths have the ability to forge ahead fast and well in certain subjects or other activities. The titles of the DAT tests suggest ways to relate them to school subjects, but far more research on this is essential: Verbal Reasoning, Numerical Ability, Abstract Reasoning, Mechanical Reasoning, Space Relations, Language Usage, Spelling, and Clerical Speed and Accuracy.

A rather recent development that, as usually applied, seems to me unfortunate is preparation of "teachers of the gifted." Who can be trained to meet all the subject matter needs of youths highly talented in one or more subjects? In mathematics, the situation is especially difficult because most elementary or junior high school teachers simply could not provide or supervise suitable experiences in this subject for highly talented youths.

Instead of teachers of the gifted, it seems to me that coordinators of special experiences for these youths are needed. These coordinators are a special kind of educational guidance counselor seeking resources and flexibility suited individually to each student.

Related to teachers of the gifted is strong emphasis on what I would term "creativity in a vacuum"—that is, creativity essentially divorced from academic subject matter. Such activity, carried along partly by the glamour of the word "creativity," seems to have been derived chiefly from the important work of Guilford (see Michael, 1977) and Torrance (1977). Such approaches often strike me as erring in much the same way that the training of mental "faculties" did many years ago. Even if stable mental factors can be isolated via factor analysis (and Harris & Harris [1971], and Horn & Knapp [1973, 1974] have cast doubt on Guilford's Structure of Intellect model), this does not mean that they can be improved by training, or, even if they can, that this would have beneficial effects for learning school subjects.

Torrance's emphasis on making students "creative" often leads to the teacher's spending considerable time trying to train the presumed trait, creativity. Since two educational activities cannot occupy the same space at the same time, I wonder to what extent the displacement of emphasis on school subjects instruction in favor of such "academically irrelevant enrichment" (Stanley, 1976) (as much creativity training is), has contributed to the present test-score decline. To me it would seem better to handle subject matter, itself, "creatively" rather than to work directly on creativity. Even such activities as "brain-storming" can readily be related to specific subjects. In my opinion, much of the recent emphasis on so-called creativity in our schools is faddish and naive.

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It is at the level of differences *within* individuals across abilities that the most glaring problems become apparent. No single school program for "the gifted" can adequately meet these differential needs. For example, if Susan reasons extremely well mathematically and is eager to move ahead faster and better in *mathematics,* her most pressing intellectual needs will not be met well by even the best imaginable special course in social studies, French conversation, or even computer science or chess. She needs the appropriate level and pace of *mathematics* now, not as a sit-in-the-corner, independent studier but, preferably, with several other students who are also math-able and eager. Perhaps a mathematics course such as college algebra and trigonometry, taken as a part-time student in college or in high school several years ahead of her grade placement, will be excellent for her. Perhaps, instead, she needs a fast-paced math class on Saturday or Sunday afternoons for herself and students like her.

As noted earlier, since June 1972 SMPY has run a dozen such classes. Their chief purpose was to help well-qualified youths learn mathematics from Algebra I through the first year of college calculus as quickly as possible, depending on their abilities and motivation. While doing this, SMPY developed its "diagnostic testing followed by prescriptive instruction" (DT ⧫ PI) method of individualizing the learning of mathematics in a class context (Stanley, 1978). This approach owes much to Glaser's (1977) individually programmed instruction procedures, but little to "[t]he dominant instructional model within special education, Differential Diagnosis - Prescriptive Teaching" (Arter & Jenkins, 1979, p. 517).

In principle, the DT ⧫ PI

method is simple. We find out what the math-able student does *not* yet know about a school subject such as Algebra I and help him or her learn just that. No time is wasted on repetition of what is already known, as must be done in the usual school class where there are many pupils who cannot easily grasp the concepts.

A brief description of how SMPY's fast-paced math classes were conducted last summer might help make the DT ◗ PI model clearer. In SMPY's January 1979 search for youths who reason extremely well mathematically, 3,675 boys and girls of upper-three percent math ability, most of them seventh-graders 11 or 12 years old, participated. Nearly 300 of these from a six-state area met the Scholastic Aptitude Test (SAT) score criteria for being invited to be in a fast-paced precalculus class last summer. Of those, 96 accepted the invitation. All but two of these completed the program.

The students came for 5 hours per day, one day per week, for 8 weeks. This was preceded by a day-long standardized testing to help determine initial placement. Thus, about 32 enrolled for Tuesdays, 32 for Wednesdays, and 32 for Thursdays. To work with the 32 on a given day were three instructors and four teaching assistants, all of them graduates of SMPY's earlier math-facilitation efforts. These teachers ranged in age from a 13-year-old Johns Hopkins' junior to 20-year-old David Meyer, who had recently completed his B.A. and M.A. degrees in mathematics at Johns Hopkins after having been elected to membership in Phi Beta Kappa as a junior.[1] All seven were already experienced instructors and/or tutors.

The 10-12 students who on the basis of the pretesting already knew the most mathematics were put into the "top" section, and David and the 13-year-old junior worked with them on an individualized basis. The next most knowledgeable group of 11 or 12 students received their individualized instruction from another instructor and his teaching assistant, both of whom were especially skilled in working at this level. The group with the least background, who did not even know Algebra I very well, had its-own specially trained instructor and teaching assistant. (The fourth teaching assistant helped where needed). Some shifting among the groups occurred as students forged ahead at considerably different rates. Each student was encouraged to proceed as far as possible along the route from Algebra I through analytic geometry. Five of the 96 went the whole distance, thereby becoming prepared for calculus by the beginning of the eighth grade. In the approximately 35 hours of working time, the typical participant demonstrated mastery of 2 school years of mathematics beyond where he or she had begun.

Results during the fast-paced summer math program of 1978 had been even better, probably mainly because the selection criteria were higher then: only 62 of the 2,800 upper-three-percent youths had qualified. Thirty-three attended, and 12 of them completed all the precalculus subjects well.

While highly successful, SMPY's various procedures occur only because the age-in-grade, Carnegie-unit lockstep of schools, both public and (especially) private, makes such heroic measures essential. If schools were organized differently, SMPY would not have been necessary—nor, indeed, would the present special provisions for most slow learners. In my opinion, age-grading for instruction in academic school subjects has crept insidiously upon us as we have moved from tutorial instruction and the one-room schoolhouse to the current situation. It needs to be reversed. But, of course, that will not be done easily or quickly.

My proposal in the area of mathematics is for a longitudinal teaching team that spans kindergarten through the 12th grade in a school system. Working from a mathematics learning center, the various members of this team would be responsible for meeting all the mathematics needs of all the students in the school system. The buck would stop with them. Every student would be helped to meet clearly stated, rather substantial criteria of mathematical competence. A few students would accomplish these early, perhaps by age 8; a few others would have to work hard until age 18 or so in order to attain the minima. Some students would proceed far beyond the minimum essentials; others would stop with them and devote their efforts thereafter to other subject matter.

Much of the instruction might still be in groups, but not age-graded ones. Attaining levels of achievement instead of A, B, C grades would be stressed. All members of the longitudinal mathematics team would have to be highly competent, but some would specialize in helping slow learners and others in helping fast-moving students.

Obviously, this longitudinal-teaching-teams model could be applied to other subject matter areas such as language arts, social studies, science, and foreign languages. There might also be art, music, drama, physical education, and social and emotional development teams. Attention to individualized differences, both within areas and across areas, would be increased vastly.

I should certainly like to see a sizable public school system pioneer this approach for at least 25 years. Because of problems that one can readily anticipate and many that one cannot, almost certainly this would be extremely difficult. I believe strongly, however, that some such plan is our only hope for the educational future of America's youths. All else will be sorry stop-gaps.

Although increasingly there is

much drum beating for the gifted by various associations, including parent groups, a great deal of it seems poorly focused. Avoidance of subject matter by most of them, especially, dooms their efforts to be ineffectual. They place nearly all their gold and energy on the irrelevant-enrichment bandwagon; in my opinion, far too little of it goes into subject matter emphasis and acceleration. This leaves the typical intellectually talented youth unsatisfied because his specific intellectual hungers are not being met. "Let them eat cake" is as poor advice in this matter as it was in the historical context. We should, and certainly can, do far better than that for the intellectually talented. Intervening strongly on their behalf educationally, rather than mainly researching the status quo, is crucial. The National Academy of Education is uniquely able to promote that.

Note

During the 1979-80 school year, Mr. Meyer is studying mathematics and physics at Cambridge University as a Churchill Scholar.

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