

THE EFFECTS OF PERSONALITY TYPE ON WEB-BASED DISTANCE LEARNING*

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ABSTRACT

Web-based distance learning is a relatively new approach in higher education which is gaining in popularity. Because a Web-based classroom is so different than a traditional face-to-face classroom, the variables that influence success or satisfaction with such a course may be different than those in a face-to-face course. We investigated whether student performance and satisfaction in an asynchronous, Web-based distance learning course differed based on personality factors (as measured by the Myers Briggs Type Indicator). Twenty-nine students taking an introductory psychology course participated in the study. Results indicate that personality preference has little relationship with student performance, but several dimensions of personality did influence satisfaction.

INTRODUCTION

University and college administrators and faculty are constantly striving to enhance the quality of education on their campuses. Today, these same administrators and faculty, faced with mounting pressure to offer courses at a distance, are

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now seeking to find ways to offer courses to their students in a manner that is compatible with their students' ever-changing lifestyles [1, 2]. And colleges and universities are meeting those challenges. The number of distance education courses offered by colleges and universities is growing at a phenomenal rate [3-7].

The majority of research comparing Web-based distance learning with traditional forms of learning report "no significant difference" [8, 9], that distance learners achieve as well as local learners [10], or that Web-based distance learners perform better than students in a similar face-to-face setting [11-14]. In perhaps the most comprehensive review of research comparing the effectiveness of distance learning, the Institute for Higher Education Policy (IHEP) [2] agrees that distance learning courses do indeed compare favorably with classroom-based instruction. However, they are quick to point out that "there is a relative paucity of true, original research dedicated to explaining or predicting phenomena related to distance learning" (p. 2) and that "the overall quality of the original research is questionable and thereby renders many of the findings inconclusive" (p. 3). The report lists several key shortcomings of the research on the effectiveness of distance education, including: lack of control for extraneous variables, failure to use randomly selected subjects, questionable validity and reliability of instruments, and lack of control for feelings and attitudes of students and faculty. In addition, the IHEP report lists several gaps in the research that require further investigation. One of these gaps is that research does not take into account differences among students (e.g., learning or personality styles), an issue that clearly deserves more attention [15, 16]. This study begins to address that gap. Personality traits and cognitive styles may help explain some of the variability among students taking an online course. For instance, it may be that online courses appeal more to the introverted student who walks away from such an experience having a more positive attitude and greater success. Or, it may be that students who prefer a more organized approach perform better with the structure of an online course, where students who prefer to be more open find the structure confining. This study investigates whether students with certain personality preferences perform better and/or report more satisfaction in an asynchronous, Web-based, distance learning class.

LITERATURE REVIEW

One of the most common measures of personality is the Myers Briggs Type Indicator (MBTI) which measures an individual's preference on four dimensions. In his classic book, *Psychological Types*, the Swiss psychiatrist Carl Jung described the systematic ways in which people differ [17]. He provided a model that helps us understand the different ways people perceive information and make judgments. The MBTI was developed in the early 1950s by Katherine Cook Briggs and Isabel Briggs Myers. Since its publication in 1955, the MBTI has been increasingly used in education, counseling, business, government, and

religious communities [18]. Campbell and Davis report that more than 1,100 dissertations, books, and journal articles relevant to the MBTI have been published [19]. The MBTI is currently the most widely used inventory of psychological types in the world [20].

The MBTI measures preferences on four dimensions. Each dimension has two poles which are measured along a continuum. The first dimension measures how and where one gets energy. Extroverts tend to draw energy from the external world of people and things; whereas, introverts describe an attitude in which attention is drawn toward the inner world of ideas. The second dimension measures how a person perceives information. A sensing person tends to focus on observable facts. An intuitive person perceives information based on meanings, relationships, or possibilities—things that typically go beyond the information perceived by the senses. The third dimension refers to how a person makes decisions. Thinkers tend to make decisions based on logical fact; whereas feelers tend to be very attuned to their own feelings and the feelings of others. The last dimension is oriented toward how people order their outer world. Judgers are people who prefer to work in a linear, orderly way. Perceivers would rather live a flexible, spontaneous life. These four dimensions and the two poles of each can be combined to identify 16 different personality types.

There is an abundance of literature evaluating the reliability, validity, and the usefulness of the MBTI [21-30]. Although the MBTI is not without its critics [23, 24, 26, 29], for the most part researchers conclude that the MBTI is a valid and reliable instrument that is useful for a variety of purposes. The MBTI is one of the best researched and most widely accepted of the instruments measuring cognitive style and personality.

While there is an abundance of information related to using the MBTI in counseling, education, career guidance, and teamwork, there is considerably less on how the MBTI is related to distance learning. In fact, a literature search of over 17 electronic indexes focused specifically on the MBTI and distance education yielded only a handful of papers that were relevant [31-33], and of these articles none directly experiment with whether one personality type (as measured by the MBTI) performed better in an online course than another personality type. Ehrman [31] describes various models of learning styles (MBTI being one of them) and speculates on their applicability to distance education practice and theory. Davis and Henry found that those students who had a judging attitude favored a satellite-delivered course; whereas those who had a preference for the perceptive attitude preferred a computer lab over a face-to-face class [32]. A few studies have investigated differences between the sensing-thinking and the intuitive-feeling combined Jungian types [33, 34]. Carey and Kacmar found that sensing-thinking personality types are more satisfied with teleconference communication [34]. Wilson found that sensing-thinking types sent almost twice as many electronic messages and twice as much message content (measured by the number of words) than intuitive-feeling students [33].

This study addresses the question: *Do students in an asynchronous, Web-based, distance learning course systematically differ in their performance or evaluation of the course based on personality factors (as measured by the Myers Briggs Type Indicator)?* A secondary question was whether this study replicates previous findings regarding sensing-thinking types. That is: *Are sensing-thinking personality types more satisfied than intuitive-feeling types with an asynchronous, Web-based, distance-learning course?*

METHOD

Participating

The participants in the study were students taking an Introduction to Psychology (PSY 111) course at a regional campus of a medium-size Midwestern university. There were 29 participants in the study. Sixteen of the students enrolled in the class during the summer of 2001. Thirteen of the students enrolled in the course during the fall of 2001.

Method of Course Delivery

The course was offered both in the summer (six-week course) and in the fall (10-week course). Both sections of the course were designed to be as similar as possible with regard to coverage of material and assignments. Both sections of the course were taught by the same instructor. Both courses used the same textbook [35], and included the same quizzes, projects, and exams. For each section, the course was divided into 13 modules, each representing the major topics in introduction to psychology (e.g., biology underlying behavior, sensation and perception, learning, memory, personality). For each module, students in the online course were required to take an online quiz (available on the textbook's Website) and send their results (via e-mail) to the course instructor, complete a project requiring students to apply the material in the text to an issue or problem and send a 400-word paper (via e-mail) to the course instructor, review a Website suggested by the textbook's Website and send a 300-word summary (via e-mail) to the instructor, and contribute to an online (Blackboard course site specific to the course) discussion board.

Students in both sections of the course met the first night of class (face-to-face) to review the course, engage in preliminary procedures to get started with the online course, and to complete the personality style inventory. They also met face-to-face to take four separate class exams. Outside of these face-to-face meetings, all other interaction was done electronically.

Performance Measures

Students in both the summer and the fall sections of the course completed a number of identical assignments. First, students in both sections completed a

15-item, “open-book” multiple-choice quiz for each module that was available on the textbook’s Website. Second, all students completed a project for each module which required students to apply the course material to a real-world problem (e.g., apply biological principles to explain the differences between men and women) or to think more critically about a theory (e.g., Can the facial-feedback hypothesis be used to explain emotional experience and expression?). All projects required students to write a paper (at least 400 words in length). The papers were graded (on a 100-point scale) using a rubric that took into account the amount of textbook content included, the quality of support for opinions expressed, the quality of the connections made between content and the issue or real-world problem, and mechanics. Third, all students were required to take four exams in a face-to-face setting. Each exam consisted of 30 to 40 multiple-choice questions. Finally, the final course grade constituted another measure of performance. Final grades consisted of performance on exams (50%), performance on module assignments (projects, quizzes, and Website summaries; 40%), and participation in the online discussion board (10%).

Satisfaction Measures

Satisfaction in the course was measured via an end-of-the-course evaluation (using Flashlight’s Current Student Inventory). This inventory included 31 questions measuring various dimensions of satisfaction with the course. Some of the questions were geared toward traditional kinds of assessment—how much the course encouraged students to take responsibility for their own learning, the application of what the students learned to “real world” situations, and whether the assignments were stimulating (1 = low priority to 5 = high priority). Others focused on issues unique to online learning such as whether such a course helped students feel isolated from the instructor or other students (1 = much more likely to 5 = much less likely). Still other questions focused on whether the Internet and the WWW was a help or hindrance to learning the course content (1 = much more likely to 5 = much less likely). Students were also asked to report if they would recommend the course to others and if they would recommend the instructor to others (1 = strongly disagree to 5 = strongly agree). Finally, students were asked how satisfied they were with the course overall (1 = very dissatisfied to 5 = very satisfied). Student satisfaction was also measured via focus groups; however, those running the focus groups were not aware of the personality types of individual participants; and therefore it was impossible to assess the influence of the personality factors in those discussions.

RESULTS

Performance

A total of 29 students participated in the study. Sixteen of these students completed the class during the summer of 2001 and 13 students completed the

course in the fall of 2001. Because both courses were taught by the same instructor, used the same textbook, Website, exercises, and exams, the data for the two courses were combined for this analysis.

Student performance in the course was measured in numerous ways. We investigated whether students performed differently for each of the four dimensions of the MBTI by comparing means on the following performance variables: final discussion grade, final project grade, quiz average, final portfolio grade, exam average, and final grade. Table 1 reports the means of each performance variable separated by personality type. The items that are italicized and bolded are items with the most discrepancy between the means. The majority of items do not show a substantial difference in performance based on personality type. Noteworthy exceptions are that introverts performed better than extraverts on quizzes and thinkers also scored better on quizzes than feelers. With regard to the discussion score, extraverts scored higher than introverts and intuiting types scored higher than sensing types.

Satisfaction

Tables 2 through 5 highlight the specific questions where one personality type did score substantially different than the other type. For instance, Table 2 highlights the questions which extraverts scored substantially different than introverts; Table 3 indicates the questions where sensors scored substantially different than intuitors; Table 4 identifies the questions where thinkers scored substantially different than feeler; and Table 5 identified differences between judgers and perceivers.

Table 1. Performance Differences

Dimension	<i>N</i>	Discussion score	Project total	Quiz average	Portfolio total	Exam average	Final grade
Extravert	20	86	80	76	87	78	82
Introvert	9	72	80	91	87	72	78
Sensing	17	79	79	80	86	74	79
Intuiting	12	85	81	81	88	79	83
Thinking	11	73	77	88	85	77	79
Feeling	18	86	82	75	88	76	81
Judging	15	82	78	78	85	74	79
Perceiving	14	80	82	83	88	79	82

Table 2. Extravert/Introvert Differences in Assessment

Question	Extraverts	Introverts
Since the course began how frequently have you applied what you are learning in this course to other courses? (1 = three or more times, 2 = one or two times, 3 = none at all)	1.7 (.79)	2.3 (.52)
How high a priority was enabling students to work through materials on their own? (1 = low priority, 5 = high priority)	3.5 (1.4)	4.5 (.76)
I look forward to working on assignments for this course. (1 = AS to 5 = SD)	2.2 (.60)	1.6 (.52)
It is difficult to relate to the other students in this class. (1 = SA to 5 = SD)	2.6 (.67)	3.1 (.35)
How likely are you to enjoy studying for this course? (1 = much more likely to 5 = much less likely)	2.5 (.53)	2.0 (.53)

Table 2 indicates that extraverts felt they were applying what they learned more often than introverts. Introverts felt that working through course materials at their own pace was a high priority in this course and they reported that they enjoyed working on assignments and studying for the course more so than their extravert counterparts. Extraverts found it more difficult to relate to other students in the class.

There were few differences between those with a sensing preference and those with an intuiting preference. Sensors were more likely to feel isolated from other students and estimated that they spent more time on the Internet and WWW. Intuitors reported they enjoyed studying for this course more so than studying for face-to-face courses.

Although there are many questions which the responses for thinkers are substantially different than feelers, several clear themes emerge. Several questions indicate that feelers felt more isolated from the instructor and other students than those with a thinking orientation. A second group of questions all report that those with the thinking orientation enjoyed the course and would recommend it more so than the feelers. Feelers report spending more time on the course and being less comfortable in discussion.

Table 3. Sensing/Intuiting Differences in Assessment

Question	Sensing	Intuiting
Relative to face-to-face courses, how likely are you to feel isolated from other students? (1 = much more likely to 5 = much less likely)	3.1 (.99)	2 (.76)
Relative to face-to-face classes, how likely are you to enjoy studying for this course? (1 = much more likely to 5 = much less likely)	2.5 (.53)	2.0 (.53)
Estimate the time you spent for all your courses searching the Internet/WWW to access reference materials and/or conduct research.	3-5 hours	1-2 hours

There were very few differences between those with a judging preference and those with perceiving preference. Those with a perceiving orientation found that a higher priority was given for students to take responsibility of their own learning and to apply what they have learned to the real world situations.

Sensing/Thinking vs. Intuitive/Feeling

Because prior literature does indicate that the sensing/thinking types may be more satisfied with online courses, we did compare the means of these two groups of students on the questions related to satisfaction. Although the numbers of students in each category is small, sensing/thinking students ($n = 6$, $M = 1.0$, $SD = .91$) were more likely to recommend the course to others than intuitive/feelers ($n = 6$, $M = 1.67$, $SD = .82$). Sensing/thinking ($M = 4$, $SD = 0$) types were also more satisfied with the course than intuitive feeling ($M = 3$, $SD = 1.3$) students. It is also worth noting that of all the comparisons run in this study, the question showing one of the greatest discrepancies was the comparison between sensing/thinking and intuitive/feelers regarding how likely they were to feel isolated from other students. Intuitive/feeling ($M = 1.6$, $SD = .5$) that they were much more likely to feel isolated from other students than the sensing/thinking students reported ($M = 3.2$, $SD = 1.1$).

DISCUSSION

The MBTI has been used extensively to help educators understand differences in student behavior and student achievement. It has been used to help analyze curricula and develop educational materials. One can use knowledge of type to create classroom activities that will meet the needs of all personality types, and in

Table 4. Thinking/Feeling Differences in Assessment

Question	Thinking	Feeling
How high of a priority is applying what you are learning to real world situations? (1 = low priority, 5 = high priority)	3.5 (.75)	4.2 (.87)
I am more comfortable participating in discussion in this course than I am with other courses (1 = strongly agree to 5 = strongly disagree)	1.4 (.53)	2.3 (.90)
Since the beginning of this term, on average how many hours per week have you spent for this course?	8.1 (4.6)	12.8 (7.1)
Compared to face-to-face classes, how likely are you to feel isolated from the instructor? (1 = much more likely to 4 = much less likely)	3.5 (1.1)	2.3 (1.2)
Compared to face-to-face classes, how likely are you to feel isolated from other students? (1 = much more likely to 4 = much less likely)	3.1 (.90)	2.3 (1.0)
It is difficult to relate to the other students in this class. (1 = strongly agree to 5 = strongly disagree)	3.1 (.35)	2.6 (.67)
I would recommend this course to others. (1 = strongly agree to 5 = strongly disagree)	1.0 (0)	1.6 (.81)
I would recommend that others take a course that uses materials on the Internet/WWW. (1 = strongly agree to 5 = strongly disagree)	1.1 (.35)	1.8 (.98)
Overall I have been (1 = very dissatisfied to 4 = very satisfied) with this course.	3.9 (.35)	2.8 (1.2)

turn create a more effective classroom environment for all students. While Web-based distance learning shares similarities with the traditional face-to-face classroom, it is also very different. Knowledge of how MBTI preferences influence both performance and satisfaction in such classrooms can help educators and administrators create a more effective environment for all.

Introvert/Extravert

Extraversion defines a preference to focus on the outer world of people and things. Some of the characteristics associated with extraversion include: an

Table 5. Judging/Perceiving Differences in Assessment

Question	Judging	Perceiving
How high of a priority was encouraging students to take responsibility for their own learning? (1 = low priority to 5 = high priority)	4.4 (.69)	5 (0)
How high of a priority applying what you are learning to real world situations? (1 = low priority to 5 = high priority)	3.6 (.79)	4.4 (.79)

awareness and reliance on the environment for stimulation and guidance; action oriented; frankness; ease of communication or sociability. Introversion, on the other hand, defines a preference to focus on the inner world of ideas and impressions. Introverts enjoy a thoughtful contemplative detachment and often prefer solitude and privacy. It would seem that introverts would prefer the electronic environment (one that can be done in the solitude of their own house) over the face-to-face environment and, in fact, some of the preference scores indicate just that. Introverts reported that they did enjoy working on assignments and studying for the course (both somewhat solitary activities) more so than their extravert counterparts; however, this is likely to be the case whether or not the course is online.

Because of the introverts' preferred style, it would seem that the electronic nature of communications would cater to the introverts style—that it would allow them to process their thoughts before sharing them and that extraverts would have a more difficult time with the electronic environment; however, the student's assessment did not support this. In fact, with regard to performance, extraverts scored substantially higher on participation than introverts. It may be that whether the conversation be face-to-face or electronic, extraverts are still likely to perform better because they do gain so much from interactions with other people and this is their preferred orientation. Interestingly, although extraverts scored higher in participation, they also report that they found it more difficult to relate to the other students in this class.

When asked whether this class (because of its electronic nature) made them feel more isolated from other students or more isolated from the instructors, both introverts and extraverts report that the feeling of isolation was about the same as in a face-to-face course. Almost all of the students (whether introvert or extravert) reported that they have been very satisfied with the course and they would recommend it to others.

Sensing/Intuitive

Sensing students tend to be realistic and practical. They enjoy owning things and making them work and they prefer memorizing to finding reasons. They learn best from an orderly sequence of details. Sensors tend to be patient and like routine. Intuitors like to attend to whole concepts rather than details, they like problems that require new ways of being solved, and they tend to work in bursts of energy with slack periods in between. Our study indicates few differences between those with a sensing preference and those with an intuiting preference. Sensors were more likely to feel isolated from other students and estimated that they spent more time on the Internet and WWW. They may have spent more time on the Web because searching the Web does require patience, and tends to be routine (especially the specific course Website). Intuitors reported they enjoyed studying for this course more so than studying for face-to-face courses. This may be because there were some projects that did allow for students to exercise their own creativity. All things considered, there were few differences between sensing and intuitive types with respect to performance or satisfaction.

Thinking/Feeling

Although feelers ($M = 13$ hours) report that they have spent more time on the course than thinkers ($M = 8$ hours), thinkers did score higher on quiz scores than feelers. The quizzes included both knowledge and conceptual questions. Given that a thinking orientation is one that tends to base decisions primarily on logic and on objective analysis of cause and effect, one would expect those with a thinking orientation to perform better.

With regard to student satisfaction, there were more differences between thinkers and feelers than any other dimension of the MBTI. Several of the questions relate to how likely the student was to feel isolated from instructors and other students. In all of these questions, feelers felt more isolated and found it harder to relate to other students than feelers. A second set of questions related to how likely students were to recommend the course to other students and how satisfied they were with the course. Again, students who favored a thinking orientation were more likely to recommend the course and were more satisfied with the course. Both of these findings are consistent with MBTI theory.

A person with a thinking orientation tends to give more attention to ideas or things than human relationships. Thinkers find ideas more interesting than people and tend to treat any kind of emotional relationship quite causally. Feelers, on the other hand, are more interested in people, take emotional relationships very seriously, are easily upset by conflicts, and are more personal. They prefer warm personal relationships. A Web-based, asynchronous course, with face-to-face contact occurring only when meeting for tests can be a challenge for those who are more interested in people than things. By their nature, Web-based courses tend to be brief and businesslike. The Web-page itself is impersonal and, although the

conversation on a discussion board may be full of feeling and emotion, there is a clear distinction between meeting classmates online and shaking hands with a smile. Thinkers reported that they were more comfortable participating in the online discussion in this course. The data from this study indicates that feeling types are not as satisfied with an online course or the relationships they make with others.

Judging/Perceiving

Davis and Henry found that those students who had a judging attitude favored a satellite-delivered course, whereas those who had a preference for the perceptive attitude preferred a computer lab over a face-to-face class [32]. A judging type likes to live according to plans, standards, and definite choices. Judging types tend to be orderly, organized, and systematic. Web-based courses (this one in particular) are very orderly, organized, and systematic. There were very clear guidelines, and one would expect the judges to respond favorably to this. However, similar to our findings between sensors and intuitors, there were very few differences between the judging and the perceiving types. With regard to performance, there were no substantial differences on any of the dimensions. With regard to satisfaction, there were only two questions that show differences. Those with a perceiving style felt the course encouraged the student to take responsibility for their own learning and also felt it was a high priority to apply what they were learning to the real world. Based on this study (and care must be taken because of the low numbers of judges ($n = 6$)) it appears the judging/perceiving dimension has little to do with performance or satisfaction of an online course.

Sensing/Thinker vs. Intuitive/Feeler

The theory behind the MBTI suggests that you have two basic ways of finding out (sensing and intuition) and two basic ways of deciding things (thinking or feeling). Intuitive Feeling (NF) people make decisions with personal warmth. Since they prefer intuition, their interest is not in facts but in possibilities. They are the students who enjoy working with the possibilities and are often enthusiastic and insightful. Sensing/Thinking (ST) people are mainly interested in facts that can be collected and verified directly by their senses seeing, hearing, touching. Decisions are made by impersonal analysis and a step-by-step process. Working on the Web and online is fairly impersonal and is also linear. Web pages never “goes off on a tangent” like many professors do and the material is presented in a very organized way. Theory suggests that STs would especially enjoy an online environment. Prior research has shown that STs tend to rate online classes more favorable than NFs. Although our sample size is small, it is interesting that these results were further validated by this study.

CONCLUSION

The purpose of this study was to investigate whether personality factors (as measured by the Myers Briggs Type Indicator) were related to student performance and student satisfaction in an asynchronous, Web-based distance learning course. Students took an online distance learning course in either the summer or the fall of 2001. Student performance was measured via quizzes, exams, projects, and participation in electronic communications. Student satisfaction was measured by a survey administered at the end of the course. Results indicate that while personality preference has little relationship with student performance, several dimensions of personality did influence satisfaction. In particular, the extraverts report having a more difficult time relating to other students in the class even though they scored higher on participation. Students who favored a thinking orientation were more likely to recommend the course and were more satisfied with the course. Feeling students felt more isolated from other instructors and other students. Finally, this study repeated the results of former studies indicating that sensing-thinkers do evaluate a Web-based course more favorably than intuitive-feelers.

One of the interesting findings from this study is that there were so few differences in performance yet there were differences with student satisfaction. Educators and administrators should be concerned about student satisfaction (even when performance is essentially the same) for a number of reasons. First, at this time students still have the option of whether to take courses online or face-to-face. If students are dissatisfied with their online experience, they are not likely to return for more. Second, if further research shows that certain personality types are consistently less satisfied with job-based distance learning, we may be able to use the theory of MBTI to create Web-based course that addresses those areas of less satisfaction. For example, if we learn that extraverted types consistently find it more difficult to relate to other students in the class, the instructor could incorporate a single class session which does involve face-to-face interaction. Third, while student satisfaction does not always affect performance, it clearly affects the dynamics of a classroom. A group of disgruntled students can potentially destroy any positive classroom environment—electronic or face-to-face.

The MBTI is a popular and well researched personality inventory. It has been used in many contexts and much has been written about using the MBTI in the context of education. Much of this can be applied to distance learning; however, distance learning via a Web-based course has some unique characteristics. More research is needed to see what role and how personality dimensions effect learning in a distance environment. This study found that while Extraverts performed better in electronic discussions than Introverts, they also reported that it is more difficult to relate to other students in the course. Future research involving a qualitative component—for instance, a focus group including introverted students and a second including extraverted students participating in a Web-based distance

learning course—could clarify the role that introversion/extroversion plays. Likewise, interviews (via focus groups) could shed some light on the many differences between thinking types and feeling types. Of particular interest is whether feeling type students believe there is anything that can be done in a Web-based course to decrease the feeling of isolation from the instructor and other students.

Additionally, future studies with higher numbers of students could clarify which of the 16 types are more likely to enjoy and learn more from Web-based online course. Because this data comes from two different times, we did not treat this as a sample and therefore did not run statistical tests comparing the means. Further quantitative research on a single larger sample is needed to run statistical tests identifying whether which differences are statistically different. Studies comparing each of the 16 types as well as studies comparing the ways of finding out and ways of deciding things (ST, SF, NT, NF) would be of interest. A study that compares both an online and face-to-face course and has a high enough number of students to compare personality differences in each would be ideal.

REFERENCES

1. R. M. Palloff and K. Pratt, *Building Learning Communities in Cyberspace: Effective Strategies for the Online Classroom*, Jossey-Bass Publishers, San Francisco, 1999.
2. The Institute for Higher Education Policy, *What's the Difference? A Review of Contemporary Research on the Effectiveness of Distance Learning in Higher Education*, Institute for Higher Education Policy, Washington, DC, 1999.
3. J. V. Boettcher, The State of Distance Education in the U.S.: Surprising Realities, *Syllabus Magazine*, pp. 36-40, March 2000.
4. D. E. Hanna, Higher Education in an Era of Digital Competition: Emerging Organizational Methods, *Journal of Asynchronous Learning Networks*, 2, 1998.
5. National Center for Education Statistics, Issue brief: *Distance Education in Higher Education Institutions: Incidence, Audiences, and Plans to Expand*, 1998.
6. D. Rahm and B. J. Reed, Tangled Webs in Public Administration: Organizational Issues in Distance Learning, *Public Administration and Management*, 3, 1998.
7. J. M. Roberts, The Story of Distance Education: A Practitioner's Perspective, *Journal of the American Society for Information Science*, 47, pp. 811-816, 1996.
8. S. M. Johnstone and B. Krauth, Balancing quality and access: Some principles of good practice for the university, *Change*, 28, pp. 38-41, 1996.
9. T. L. Russell, *The No Significant Difference Phenomenon*, Office of Instructional Telecommunications, North Carolina State University, Chapel Hill, North Carolina, 1999.
10. C. Schlosser and M. Anderson, *Distance Education: Review of the Literature*, Association for Educational Communications and Technology, Washington, D.C., 1994.
11. B. Dietz-Uhler, *Evaluation of Introduction to Psychology Online*, unpublished manuscript, Miami University, 1999.

12. W. S. Gaud, Assessing the Impact of Web Courses, *Syllabus Magazine*, pp. 49-50, 1999.
13. S. R. Hiltz, *Teaching in a Virtual Classroom*, International Conference on Computer Assisted Instruction, 1995 (Available: <http://www.njit.edu/njit/Department/CCCC/VC/Papers/Teaching.html>).
14. J. Schutte, *Virtual Teaching in Higher Education: The New Intellectual Superhighway or Just Another Traffic Jam?* 1997 (Available: <http://www.csun.edu/sociology/virexp.htm>).
15. D. W. Brooks, *Web-Teaching: A Guide to Designing Interactive Teaching for the World Wide Web*, Plenum Press, New York, 1997.
16. C. Twigg, The Need for a National Learning Infrastructure, *Educom Review*, 29, 1994.
17. C. Jung, *Psychological Types*, Harcourt, Brace, New York, 1923.
18. M. H. McCaulley, The Myers-Briggs Type Indicator: A Jungian Model for Problem Solving, *New Directions for Teaching and Learning*, 30, pp. 37-53, 1987.
19. D. E. Campbell and C. L. Davis, *Improving Learning by Combining Critical Thinking Skills with Psychological Type*, School of System and Logistics, Air Force Institute of Technology, Wright-Patterson AFB, Ohio. (Eric No. ED 306 250), 1998.
20. S. Hirsh and J. Kummerow, *Life Types*, Warner Communication, New York, 1989.
21. J. Carlson, Affirmative: In Support of Researching the Myers-Briggs Type Indicator, *Journal of Counseling and Development*, 67, pp. 484-486, 1989.
22. M. Carlyn, An Assessment of the Myers-Briggs Type Indicator, *Journal of Personality Assessment*, 41, pp. 461-473, 1977.
23. R. W. Coan, Critique of the Myers-Briggs Type Indicator, in *The Eighth Mental Measurement Yearbook*, O. K. Buros (ed.), Gryphon, Highland Park, New Jersey, pp. 973-975, 1978.
24. A. J. Devito, Review of the Myers-Briggs Type Indicator, in *The Ninth Mental Measurement Yearbook*, J. Mitchell (ed.), Gryphon, Highland Park, New Jersey, pp. 1030-1032, 1985.
25. G. P. Huber, Cognitive Style as a Basis for MIS and DSS Designs: Much Ado About Nothing, *Management Science*, 29, pp. 567-576, 1983.
26. G. E. Mendelsohn, Critique of the Myers-Briggs Type Indicator, in *The Sixth Mental Measurement Yearbook*, O. K. Buros (ed.), Gryphon, Highland Park, New Jersey, pp. 321-322, 1965.
27. I. B. Myers and M. H. McCaulley, *Manual: A Guide to Development and Use of the Myers-Briggs Type Indicator*, Consulting Psychologists Press, Palo Alto, California, 1989.
28. N. D. Sundberg, Critique of the Myers-Briggs Type Indicator, in *The Sixth Mental Measurement Yearbook*, O. K. Buros (ed.), Gryphon, Highland Park, New Jersey, pp. 322-326, 1965.
29. J. S. Wiggins, Critique of the Myers-Briggs Type Indicator, in *The Tenth Mental Measurement Yearbook*, Gryphon, Highland Park, New Jersey, pp. 537-538, 1989.
30. R. Zemke, Second Thoughts about the MBTI, *Training*, 29:4, pp. 43-47, 1992.
31. M. Ehrman, Psychological Factors and Distance Education, *American Journal of Distance Education*, 4:1, pp. 10-24, 1990.
32. M. A. Davis and M. J. Henry, *Cognitive Capacity of Non-Traditional Learners in Two Instructional Settings*, Information and Technology (IR018284), 1997.

33. T. D. Wilson, Human Information Behavior, *Informing Science*, 3:2, pp. 49-56, 2000 (Retrieved October 8, 2003 from <http://209.68.25.5/Articles/Vol3/v3n2p49-56.pdf>).
34. J. M. Carey and C. K. Kacmar, The Impact of Communication Mode and Task Complexity on Small Group Performance and Member Satisfaction, *Computers in Human Behaviour*, 13:1, pp. 23-49, 1997.
35. R. S. Feldman, *Essentials of Understanding Psychology*, McGraw-Hill, New York, 2002.

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