

Overcoming Barriers to Learning in Distance Education: The Effects of Personality Type and Course Perceptions on Student Performance

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Abstract

Agricultural institutions represent a unique opportunity with respect to developing a better understanding of the factors that influence distance learners' performance and success. This study is the first step in a multi-phased research effort aimed at conducting analysis over time of compiled secondary data from an agricultural distance education program based at the University of Florida. For this first, pilot stage of the project, secondary data was collected from a graduate level agricultural distance education course delivered via interactive videoconferencing network to both on-site and off-site students. The study was conducted in an attempt to explore how demographic, personality and course perception factors might be related to distance learners' perceptions and performance outcomes, as well as determine whether there were any significant differences in performance and perceptions for on and off campus students.

Results of the study indicated that personality type, as well as perceptions of the instructional techniques used, did affect performance of distance learners. On the other hand, age was the only demographic factor that showed strong correlations with performance and course perceptions. Results of correlational analysis involving the Myers-Briggs personality type scale, which was administered to students in the course during the semester in which it ran, indicated that trait based preferences did correlate with course perceptions, which in turn showed strong association with performance indicators. These findings provided support for the idea that a personality inventory, combined with a set of tested perceptual/attitudinal indices, might well serve as the foundation for a useful assessment tool that could be used to track student progress and potentially indicate the likelihood for success in a given course environment.

Introduction

The traditional university classroom, until recently one of the few places where face-to-face communication was seen as the desired norm, has been undergoing rapid transformation due to the impact of distance education based communication technologies such as compressed video and the Internet. Indeed, corporate management consultants such as Peter Drucker have gone so far as to predict the demise of the traditional university classroom, calling it "inefficient and overpriced" as compared to distance education delivery methods (Bray, 1999). It's undeniable that for many students, particularly adult learners, the opportunity to take a technology based distance education course may be very attractive, even essential to obtaining a degree and achieving professional success. But it's also true that adult distance learners may be very different, from the standpoint of experience, personality and perceptions, than traditional

university students. Studies show that most distance learners tend to be adults looking to return to school after an absence or to obtain a credential useful in furthering their careers. Increasing numbers of distance learners are also elderly, minority, disabled and/or English-as-a-second-language students. Studies of distance education student demographics (National Center for Education Statistics, 1998) indicate that a majority (approximately 75%) of adult distance learners are female, are older than traditional students, and live more than 51 miles from the originating campus (Thompson, 1997). In addition, they may have family and work responsibilities that cause them to learn differently, perform differently, and have different perceptions and expectations about the courses they take than traditional students (Sheets, 1992).

Agricultural institutions represent a unique opportunity with respect to developing a better understanding of the factors that influence distance learners' performance and success. As one of the tenets of their mission to provide "life-long learning," land-grant universities and many other agricultural institutions have developed extensive infrastructures to facilitate distance education delivery of courses to a diverse community of learners in geographically varied urban and rural areas (Miller, 1999). Most of these programs involve technological delivery of distance education coursework in a variety of majors at both the graduate and undergraduate levels utilizing teleconferencing, videotape and the Internet. In fact, a study by the National Center for Education Statistics (1998) lists agriculture within the top ten disciplines in terms of development of distance education at the post-secondary institutional level.

Purposes of the Study

A recent article in the Chronicle of Higher Education reported that, although no national data currently exists on distance education student persistence rates, administrators and instructors consistently report course-completion rates of 10 to 20 percentage points below that of traditional students (Carr, 2000). Along these same lines, little research has been devoted to exploring other than demographic factors that might be related to student performance (Cookson, 1989). The research that has been done has concentrated largely on demographic correlates (gender, age, occupation, work experience, and marital status) of student success. Few studies have addressed other factors, such as personality type and perceptions, that may be relevant in terms of influencing student performance and success. This study is the first step in a multi-phased research effort aimed at conducting analysis over time of compiled secondary data from an agricultural distance education program that has been in existence since 1998.

The goal of this analysis is to develop an assessment instrument that can be used to better evaluate students' likelihood of success as they come into the program, as well as track their progress and perceptions of their experiences as they move through the program. For this first, pilot stage of the project, secondary data was collected from one recent and fairly representative graduate level agricultural distance education course delivered via interactive videoconferencing network. The purposes of this study were to 1) utilize existing secondary data to explore those factors that might be related to distance learners' perceptions and performance outcomes; 2) from this analysis, identify and determine the significance of potential factors that might influence students' relative levels of performance.

Literature Review

Literature in the field of distance education is replete with studies to demonstrate the effectiveness of televised instruction in terms of student performance (Chu & Schramm, 1975; Russell, 1992; Whittington, 1987). Whittington (1987) reviewed more than 100 published and unpublished documents on the subject of television's instructional effectiveness and reported television "has no intrinsic effect, for good or ill, on student achievement" (p. 54-55). Russell (1994) cited 44 studies and 21 research summaries from 1954 through 1992, encompassing more than 800 separate studies of instructional levels from elementary through graduate education, that show "no significant difference" in terms of students' grade performance between video-mediated classes and a traditional classroom. Studies over the years have shown that students who have taken technology-delivered courses through various media (computers, videotape, satellite, interactive video) have done as well or better than their counterparts in "traditional" classrooms (Moore & Thompson, 1997). Wright (1998) found that students at remote sites in a video teleconference course actually outperformed the traditional classroom group.

Although not looking specifically at performance, many researchers have used instruments to measure students' attitudes about such topics as the overall distance education experience, technology used, instructional methods, and interaction techniques (Biner, 1993; Diebel, McInnis, & Edge, 1998; Sorensen, 1995). Sorensen (1995) wrote that students' primary complaint was poor reception (video and audio), based on technological constraints. Gray and Miller (1999) found that age appeared to be an attitudinal factor, relating to desired interaction levels in distance education courses distributed by videotape and an interactive video network. Older students placed a higher value on learner-content interaction and learner-interface interaction than did younger students.

Personality type is widely recognized as a determining factor on how people learn (Lawrence, 1997; Myer, McCaulley, Quenk, & Hammer, 1998). Because personality type indicators, such as the Myers-Briggs Type Indicator, are readily available to guidance counselors and professors, the indicator instruments are used to help students identify their personality characteristics. The MBTI is based on four dichotomous preferences: extraversion/introversion, sensing/intuition, thinking/feeling, and judgment/perception. Learners respond differently to educational methods, based on the personality type, especially as the methods relate to the sensing/intuition dichotomy, where sensing types favor collaborative and dependent learning methods and intuitive types prefer holistic and independent methods (Myers, McCaulley, Quenk, & Hammer, 1998). The MBTI has been used to help identify successful high school and at-risk urban community college students (Evans, 2000; Fouts, 2000). Research also has suggested that certain personality types (ISTJ and ISFJ) have a higher graduation rate at universities (Macdaid, Kainz, & McCaulley, 1984). Lynch and Sellers (1996) found that traditional and nontraditional (defined by the authors as 'older age') college students tended to prefer learning environments consistent with their own personality type preferences.

However, there is a lack of research addressing the role of personality as a predictor of achievement in televised courses (Biner, Bink, Huffman, & Dean, 1995). One of the few personality type-based distance education studies used the Sixteen Personality Factor Questionnaire (16PF) to compare final course grades with distance education and traditional education students (Biner, Bink, Huffman, & Dean, 1995). The researchers found that successful

telecourse students were more introverted, self-indulgent, and tended to meet their responsibilities in efficient, expedient manners. They suggested that the personality profile of students enrolling in the distance education course differed markedly from the personality profile of traditional college students. The authors also recommended that a personality-testing program be implemented for students to be enrolled in distance education courses and that interventions be conducted for possible low-performing students.

Methods

This study employed a causal comparative analysis using an ex post facto design. To conduct the study, secondary data in the form of student records, course evaluations and results from a Myers-Briggs personality type inventory that was administered to students in the class during the term in which it ran was collected from a population of 40 students enrolled in the graduate level course. The fall 1999 course was a two-way, audio/video class, distributed to eight sites across the state via an interactive videoconferencing network. The class met once a week in a three-hour lecture/discussion format. The instructor taught from the campus interactive video distance education facility location for each class. Students were able to take the course either in the on-campus interactive video distance education facility or at one of the eight remote videoconferencing sites. (In this program, all students, whether on or off campus, are characterized and think of themselves as distance learners, and instructors communicate and evaluate their students in the same way.)

The first course offered in the Professional Master's Degree program utilized a student evaluation of the interactive videoconference technology and distance course delivery. Specific technology-related items addressed factors including picture quality; sound quality; talkback delay; and confidence in the IVN system. Course delivery and management items included enrollment and registration, instructor responsiveness, receipt of course materials, promptness of a back-up tape (when needed), and interaction between students. A second iteration of this instrument added items drawn from Biner (1993) to develop measures of student attitudes and opinions toward televised courses. These items had been analyzed for content validity in televised courses. This second survey instrument raised some faculty concerns over items pertaining to instructor characteristics. Thus, in the third version of the student evaluation these types of questions were removed or modified to focus only on the use of instructional technology, course management and the instructional technique. This became the instrument used in the fourth course that is the focus of this study.

Instrumentation

To conduct the study, data analysis was used to identify relationships among student demographics (including gender, age, on and off campus status); personality type; perceptions of course characteristics (perceptions of instructional techniques, course management/ coordination and level of social interaction) and the key performance indicators of course grade and grade point average (GPA). The perceptual data was derived from the course evaluation instrument that is currently administered to all students enrolled in the program. The Myers-Briggs Type Indicator (MBTI) was used to indicate students' personality type. The instrument used to

measure students' attitudes and perceptions toward the technology used in the course was based on Biner's (1993) attitudinal instrument for students in televised courses.

Results

To conduct this analysis, student demographics and course grade and GPA were collected from the university student records system, and integrated into a data analysis package along with students' responses to the MBTI inventory and to 20 relevant items from the course evaluation. To insure confidentiality and anonymity, student identification numbers were converted to case numbers, and these were used to match data files. Since only one student in the sample withdrew from the course after the drop/add period ended, after compiling all data, a final n of 39 was achieved. Of that number, 13 of the students included in the sample were male, and 26 were female. The mean age for students in the sample was 33 years ($SD=9.5$). Seventeen students took the class in the campus distance education interactive video facility, while 22 took the class at one of the remote video conferencing sites. With respect to outcome measures of the course itself, the average course grade was a B+ ($SD=2.4$), while the mean GPA was 3.47 ($SD=.90$).

Objective One - Utilize Existing Secondary Data To Explore Those Factors That Might Be Related To Distance Learners' Performance And Course Satisfaction Outcomes.

It was anticipated that results of the study would show significant relationships among student demographics, personality types, perceptions of course characteristics and the performance measures of course grade and GPA. To initiate this analysis, principle component factor analysis using varimax rotation was used as a data reduction technique on students' responses to the 20 relevant items from the course evaluation survey. The resulting three-component solution loaded 15 of the items on three factors, accounting for 77% of the total variance. The items that did not load were the specific technology items (quality of picture; quality of sound, etc.). These items were not included in the analysis. The resulting three principle components were composed of from three to eight perception-oriented statements. The resulting variables were subsequently constructed as indices and coefficient alpha reliability estimates calculated as follows: instructional technique perceptions ($r = .88$); course management/coordination perceptions ($r=.73$) and level of social interaction perceptions ($r=.67$). Table 1 lists the three principle components, the individual items in each component and n , mean and standard deviation for each item.

Table 1.
Principle Components of course evaluation survey.

Item #	Abbreviated Variable Label	<u>n</u>	<u>M</u>	<u>SD</u>
Perceptions of Instructional Technique		31	3.60^a	.86
1	Technology helped in delivery of material	30	3.87	1.01
2	Presentation materials aided understanding	30	3.73	.94
3	Instructional techniques aided understanding	29	3.52	.95
4	Students felt they "belonged"	30	3.53	1.22
5	Technology encouraged class participation	30	3.27	1.23
Perceptions of Levels of Social Interaction		31	4.15	.84
8	Interaction of instructor/students and student/student between sites	30	3.87	1.01
12	Accessibility of instructor outside of class time	25	4.72	.54
13	Ability to interact with students outside class	30	4.23	1.04
Course Management		30	3.85	.62
10	Helpfulness of site coordinator/facilitator	29	3.52	.99
11	Room held free of distractions	31	3.39	.99
14	Promptness which materials were delivered/sent	31	4.10	.94
15	Delivery promptness of backup tape	28	3.40	1.07
16	Availability of academic advising	28	3.86	1.11
17	Class enrollment procedures	15	4.40	.99
18	Registration procedures	26	3.88	.95

^a1 = very poor, 2 = poor, 3 = average, 4 = good, 5 = very good.

Bivariate correlations were subsequently run and a correlation table developed indicating variables with significant correlations. Table 2 displays these results, indicating that for the independent variable gender, significant correlations existed with perceptions of instructional delivery and course management; on and off campus status was significantly correlated with perceptions of instructional techniques and level of social interaction; and age was significantly correlated with course grade and GPA, as well as with the perceptual indices instructional technique, course management and level of social interaction.

Table 2.
Correlations of demographic variables to performance and perceptions.

	Grade	GPA	Instructional tech.	Course management	Interaction
Gender	.00	.09	.41**	.44**	.19
On/off campus	.12	.17	.58***	.31	.50
Age	.47**	.52***	.60***	.47**	.52**

** (p < .05) *** (p < .01)

As for personality type, Table 3 displays the correlation table showing significant correlations by personality type. Results indicated that, for introvert types, perceptions of instructional technique were strongly correlated to course grade and GPA, while for extrovert types, perceptions of instructional technique were strongly correlated, and perceptions of course management and level of social interaction were moderately correlated to course grade and GPA. For intuitive types, perceptions of instructional technique were also strongly correlated to course grade and GPA, and perceptions of course management were moderately correlated. Perceptions of level of social interaction were moderately correlated to course grade, but not to GPA. On the other hand, for sensing types, only perceptions of instructional technique were strongly correlated to course grade and GPA.

For thinking types, as well as for perceiving types, none of the perception indices were correlated to performance, and for thinking types, there seemed to be almost no association at all. For judging types, perceptions of instructional technique were strongly correlated to course grade and GPA, perceptions of course management were moderately correlated and perceptions of level of social interaction were moderately correlated to course grade, but not to GPA.

Table 3.
Correlations of perceptual indices and performance indicators for MTBI personality type Preferences.

Personality Type	Factor	Grade	GPA
Introvert	Instructional Technique	.74**	.74**
	Course Management	.46	.48
	Social Interaction	.37	.42
Extrovert	Instructional Technique	.84***	.73***
	Course Management	.60**	.67**
	Social Interaction	.59**	.52**
Intuitive	Instructional Technique	.85***	.88***
	Course Management	.62**	.67**
	Social Interaction	.66**	.54
Sensing	Instructional Technique	.74**	.76***
	Course Management	.43	.38
	Social Interaction	.31	.42
Thinking	Instructional Technique	.19	.26
	Course Management	.02	.12
	Social Interaction	.04	.08
Feeling	Instructional Technique	.86***	.73**
	Course Management	.72**	.70**
	Social Interaction	.67**	.62**
Judging	Instructional Technique	.89***	.79***
	Course Management	.62**	.68**
	Social Interaction	.59**	.47
Perceiving	Instructional Technique	.56	.41
	Course Management	.24	.04
	Social Interaction	.12	.13

* $p < .05$. *** ($p < .01$).

Objective Two - From This Analysis, Identify And Determine The Significance Of Potential Factors That Might Influence Students' Relative Levels Of Performance

To achieve this objective, two priori hypotheses were developed, based on an assumption that there would be a significant difference in course performance between MBTI personality types, and that personality types would interact with perceptions of instructional technique, course management and level of social interaction. To conduct this analysis, univariate ANOVA was run, using MBTI preference type as between subjects factor and each of the perceptual indices as a covariate. ANOVA results showed a main effect for perceptions of instructional technique, $F(1, 20) = 23.05, p < .02$, and a two-way interaction between extrovert/introvert types and thinking/feeling types $F(1, 20) = 3.88, p < .05$, as well as between extroverts/introverts and judging/perceiving types $F(1, 20) = 5.73, p = .04$. Figs. 1 and 2 show graphs of the means plots for the interaction effects.

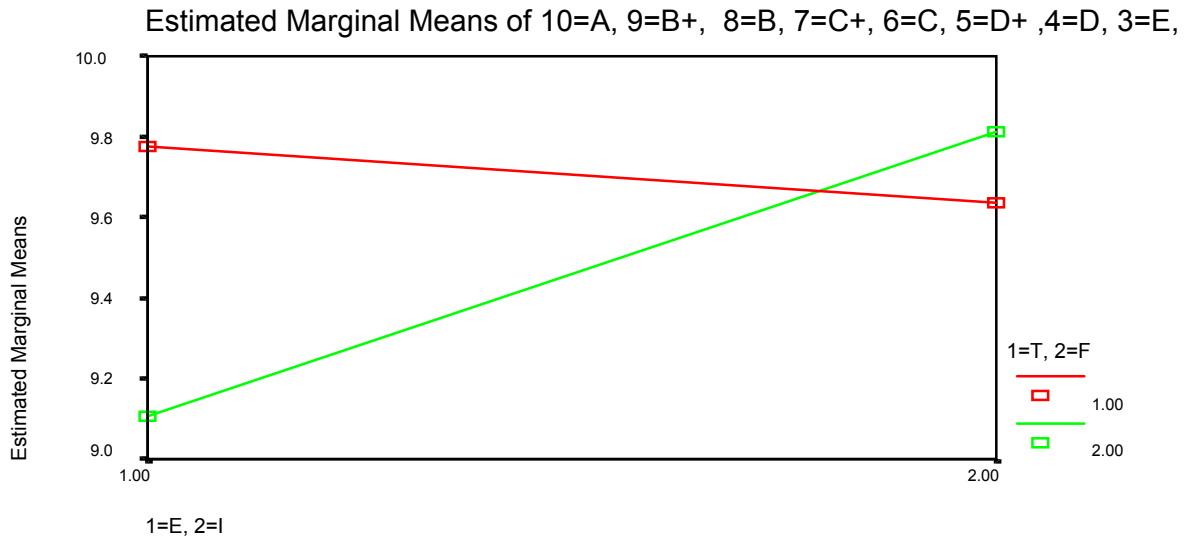


Fig. 1. Differences in Course Performance Between Extrovert/Introvert Types and Thinking/Feeling Types

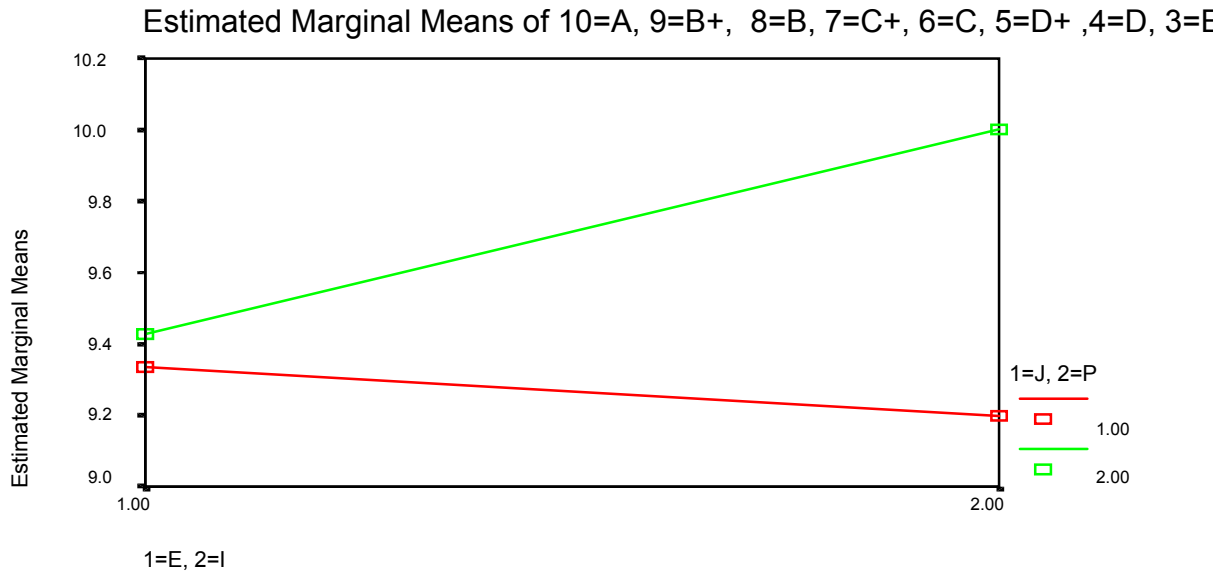


Fig. 2. Differences in Course Performance Between Extrovert/Introvert Types and Judging/Perceiving Types

ANOVA results for the effect of perceptions of course management $F(1, 20) = 3.52, p < .07$, and level or social interaction $F(1, 20) = .40, p, .5$ were not significant.

Discussion

Willis (1992) is one of many researchers who have observed that, in the distance setting, learning is a dynamic process, the success of which is a function of the communication and interaction that takes place between instructor and learners. Looked at in the context of performance, it is quite possible that perceptions of the level and quality of the social interaction present in a distance education course, as well as of the instructional techniques used, might influence not only attitudes but also performance of distance learners. The results of this study provided support for this argument.

The results of the correlational and ANOVA analysis involving the MBTI personality type scales also proved to be interesting. Trait-based preferences did appear, in some cases, to generate course perceptions that showed strong association with performance indicators, providing support for the idea that a personality inventory like the MBTI, combined with a set of tested perceptual/attitudinal indices, might well serve as the foundation for a useful assessment tool that can be used to track student progress and potentially indicate the likelihood for success in a given course environment. Institutions such as Texas Tech University and Texas A&M University are currently exploring the possibilities of developing such an inventory for use in their distance education programs.

Interestingly, of the demographic variables that were studied, only age showed strong correlations with both performance indicators and course perceptions. This could be related to on/off campus status, since the off site students tended to be older by about 10 years than the on site students. Given the small sample size, further segmentation of demographic variables was not feasible, but would certainly be warranted in a larger sample. In addition to sample size, one

of the chief limitations of the current pilot study was that it was based on analysis of a single course, thus limiting generalizability to other course environments. One of the objectives of subsequent research will be to look at differences with respect to other courses, as well as in computer course environments. Computer anxiety and learning styles have been researched (Stegall, Newman & Raven, 1999; Stegall, Raven & Newman, 1999) but no consensus was reached if there was a relationship between learning style and relieving perceptions of computer anxiety.

Implications and Recommendations

One of the key findings of this study has to deal with the implication that performance outcomes for distance education students are closely related to perceptions that may be a function of a constellation of factors. Prior experience, pre-existing attitudes and beliefs all may play a role in determining whether a student will be successful, and /or able to deal successfully with the reality of a distance education experience. Further, innate traits, such as personality, obviously affect the level of perceptions a student may generate about his or her experience, as well as affect the student's ability to cope with life circumstances that may or may not be conducive to the learning experience. When confronted with lemons, some make lemonade, as they say, but not all of us come equally equipped, in terms of our cognitive and affective orientation, to do so. Based on the results of this study, it could be argued that personality and perception are key determinants of the successful distance learning experience.

In terms of agricultural distance education, these findings may indicate a need to look at the distance education course advisement/evaluation process more closely. As agricultural distance education programs expand and grow, it seems to be time to adopt a more research-based approach to the assessment process. Implementation of instruments that can assess student potential for success as they come into a distance education program, and that can be used as a self-diagnostic tool by students to ascertain whether a particular program or course experience is right for them seem to be timely, and may represent a more efficient way of helping students establish a "fit" with their distance education program.

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Overcoming Barriers to Learning in Distance Education: The Effects of Personality Type and Course Perceptions on Student Performance

A Critique

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Contributions and Significance of Research

The results of this study adds some to the body of knowledge surrounding the use of personality types and course perceptions. Studying student personality types and their perceptions in relation to distance education course barriers is interesting and adds to extensive research already completed. The study points out the limited availability of national data on persistence rates for distance education students. Universities offering distance education programs and courses know that completion rates of distance education students are lower than those on campus students. These completion rate types of studies, actually reports, are published each term by those universities offering courses via distance education or distance delivery.

Procedural Considerations

The study was well designed and conducted in meeting the researcher objectives. It was evident from examining the related literature that an adequate theoretical base has been developed. The statistical methods identified in the study were appropriate for this causal comparative analysis study.

Questions for Consideration

What is different with this study and many other studies conducted using personality type indicators? What does this study really tell us about barriers to distance education? Could not your results be said of every student not just distance education students? Is not personality type a key determinant in the success of every student that attends a university?