DISTANCE LEARNING RECEPTIVITY Are They Ready Yet?

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The purpose of this study was to investigate distance learning variables and their possible contributions to successful distance learning receptivity. The variables used in this study included gender, age, computer experience, learning style, and students taking an educational technology (EDTC) course and students taking a statistics (non-EDTC) course. Failing to reject the first 4 null hypotheses indicated that gender, age, computer experience and learning style were not contributing factors in distance learning receptivity. This study revealed that those taking EDTC courses showed higher distance learning receptivity than did non-EDTC students. The results suggest that technology orientation is a necessity in increasing students' distance learning receptivity.

Distance education programs have been rapidly increasing as alternative course delivery systems in the United States (Vafa, 2002). Various types of distance learning programs have proliferated along with the advancement of educational technologies, such as two-way compressed-videoconferencing and as Web-based courses utilizing online delivery system WebCT (2003) or Blackboard (2003). However, are the faculty who deliver the course contents and the students who take distance learning courses really ready to adapt themselves to this new learning environment? Educational researchers have suggested that there was a need for research in order to better understand the student population who were taking distance learning courses (Vafa, 2002). Others have recommended that a comparison of those variables which might impact the effectiveness of distance learning, such as prior knowledge, ability, learning style, media familiarity of the participants, teacher effects, time of task, and instructional methods (Joy & Garcia, 2003).

The purpose of this study was to investigate variables of gender, age, computer experience, learning style, and knowledge of educational technology students and non-educational technology students to determine receptivity of distance learning. The intention was to provide

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useful information for the faculty and students in institutions of higher education to better prepare them in developing an effective distance learning environment.

REVIEW OF RELEVANT RESEARCH

Demographic Characteristics and Prior Computer Experiences

Prior research on distance education has shown that learners might vary based on demographic influences on distance learning receptivity, such as gender (Christensen, Anakwe, & Kessler, 2001). Christensen, Anakwe and Kessler found that there were no correlational or mean differences in responses regarding gender for distance learning receptivity. Gender, not as an associated factor with distance learning receptivity, was further confirmed by Biner and Dean's (1998) and Martens, Valcke, Portierm, Weges, and Poelmans' (1997) studies. However, female students showed significantly higher preference for visual learning tasks than did male students in Halsne and Gatta's study (2003).

Neuhauser (2002) taught the same courses and compared the effectiveness of an asynchronous online course with a traditional face-to-face course using the same instructional materials. In that study, no significant differences were found in test scores, assignments, participation grades, and final grades. There were no significant differences between learning preferences and styles in either the face-to-face group or the online group. Also, significant correlation between final grades and learning types was not found. No significant differences in the student demographics, the media knowledge, and the description of the course were found. The research concluded that the online course was as effective as the face-to-face course.

In Vafa's (2002) study, most online students preferred to learn through their kinesthetic modality in teams of the physical factors. The male students had a higher preference for auditory modality and were less responsible than female students. No statistically significant difference was found for learning styles in different age groups and employment status.

Christensen, Anakwe, and Kessler (2001) found that distance learners' computer background and technology familiarity were positively and significantly related to interactive (e-mail and videoconferencing, for instance) receptivity, but not with noninteractive receptivity (post mail, audiotape, and videotapes). Similarly, Jackson, Chow, and Leitch (1997) found that the distance learners' prior computer-using experience was an important factor in predicting their distance education receptivity.

Learning Styles

Numerous educational researchers on learning styles have noticed that students preferred to a certain learning style, and accommodation to their learning styles could increase their academic performance (Diaz & Cartnal, 1999). Kolb (1984) described learning style as a sharing and interpretation through dialogue with one another as personal experience. Learning styles have been categorized into different ways. For instance, Keirsey and Bates (1984) summarized four learning styles; sensation/perceiving, sensation/judging, intuition/thinking, and intuition/feeling. Sanders and Morrison-Shetlar (2001) divided students into seven learning styles: auditory, visual, kinesthetic, and combinations of these three.

Chen (2000) conducted a survey using a non-western cultural sample. The study revealed that there was no significant relationship between learning styles and attitude toward distance education among adult learners in Taiwan. Childress and Overbaugh (2001) investigated 204 preservice teachers in education computer literacy classes to determine the relationship between learning style and final course grade. No significant relationship was found between learning style and achievement. Their study also showed that varied support mechanisms in the distance

education environment accommodated different learning styles. In Aragon, Johnson and Shaik's (2002) study, learning style was not found as a significant factor in contributing to students' academic success.

Face-to-face instruction should have the same effectiveness as an online course if there was no significant difference in the learners' learning style (Diaz & Cartnal, 2003). Diaz and Cartnal indicated that educators have recognized that students with different learning styles learned better in certain teaching environments than in others. These learning styles varied in distance learning and equivalent on-campus traditional environments. Awareness of student learning styles could facilitate faculty in preparing delivery methods and choosing appropriate technologies. According to Diaz and Cartnal, most research on learning style has focused on the relationship between learning style and student outcomes, such as drop rate, completion rate, and predictors of high risk. They found that online students who were more independent in their learning style tended to be less collaborative and dependent. For on-campus students, those who were collaborative tended to be competitive and participatory in the classroom. The distance learning students showed more preferences for independent learning style than traditional class students. Diaz and Cartnal (2003) found that if the instructor initiated and structured the online activities well ahead of time, the online students performed well in collaborative activities. On-campus students expected rewards from the instructor and were willing to work to meet the instructor's expectation. However, online students seemed to be more motivated by intrinsic motives. In planning distance learning courses, faculty should be aware of their students' learning styles and demographic data and adapt their teaching methods to the preferences of their students. Through distance education training, the relationship between social interaction and satisfaction could become more positive for those who disliked learning alone (Curnow, 2001). Diaz and Cartnal (2003) argued that the research on the area of distance learning and learning style was rare. More research was needed to determine the reasons underlining the differences of learning styles in relationship with students' attitude toward distance learning modalities (Aragon, Johnson & Shaik, 2002).

Prior Experience and Distance Learning Receptivity

Distance learning programs have been increasing in the United States and Internet-based distance education has become mainstream education (Scagnoli, 2001). However, as Scagnoli noted, online learning was, in 2001, still new to most students; therefore, universities needed to create a learning environment to build students' self-confidence. Scagnoli raised the question of whether or not the technological applications should be included in the distance learning program: "Shall the prerequisites to the program include some basic technological skills? To what extent should these skills match the ones that will be used in the program?" (p. 20).

Students' perceptions of academic quality of their courses were strongly associated with approaches to studying in distance learning (Lawless & Richardson, 2002). Maushak, Chen, Martin, Shaw and Unfred (2001) conducted an extensive literature review on distance education research and found consistent results of non-significant differences in academic achievements attributable to the different course delivery methods. Broady-Ortmann's (2002) qualitative study investigated the practicing teachers in their perceptions in taking a distance learning course of German language pedagogy. The study revealed that a successful online course design required new approaches to curriculum design and professional development.

There was lack of research on psychological differences between traditional classroom and distance education training (Curnow, 2001). The effect of students' receptivity toward technology perceptions in distance learning was still at an early stage in research

(Christensen, Anakwe, & Kessler, 2001). Christensen, Anakwe, and Kessler indicated that there was a paucity of literature in determining prior factors influencing distance learning receptivity. They further stated that successful adaptation of distance learning was related to students' individual attitudes and opinions. Future studies were needed to examine which specific types of media learners preferred, such as video and Web-mediated simulations (DeLeon & Killian, 2000). Sanders and Morrison-Shetlar (2001) recommended using a different type of Web-based program or different components to better generalize the students' attitude toward the Web-based instruction. They further suggested that more items be added to their research instrument to better understand what components of Web-based instruction are most beneficial for student learning. Based upon Sanders and Morrison-Shetlar's recommendations (and with permission from Sanders and Morrison-Shetlar), the researcher modified and added more items to the original research instrument. Instead of using WebCT, the online course delivery system Blackboard, which is more popular in the mid-southern area, was used in this study.

The features of this study that differed from previous research were: (a) using longitudinal data collection to include a wider range of subjects, (b) focusing on distance learning preference to detect the distance learning receptivity, (c) comparing two groups of students—students taking an educational technology course (EDTC) and students taking statistics (non-EDTC) in three different locations with combinations of face-to-face, compressed-video, and online course delivery via Blackboard.

This study contained the following five questions:

1. Are there distinguishable differences between male and female students in terms of course delivery preferences?
2. Are there distinguishable differences among different age groups in terms of course delivery preferences?
3. Are there distinguishable differences among different computer experiences in terms of course delivery preferences?
4. Are there distinguishable differences among students with different learning styles in terms of course delivery preferences?
5. Are there distinguishable differences between those who are EDTC students and who are non-EDTC students in terms of course delivery preferences?

Based on these five research questions, five null hypotheses were formulated:

1. There is no statistically significant difference between male and female students in terms of distance learning course preference.
2. There is no statistically significant difference among different age groups in terms of distance learning course preference.
3. There is no statistically significant difference among different computer experience groups in terms of distance learning course preference.
4. There is no statistically significant difference among students' different learning styles in terms of distance learning course preference.
5. There is no statistically significant difference between EDTC students and non-EDTC students in terms of distance learning course preference.

The term *preference* was used here to denote students' distance learning receptivity for this study.

METHODOLOGY OF THE STUDY

Participants

Participants were students from two groups—EDTC students and non-EDTC students. Non-EDTC students were at three different sites using compressed video, Blackboard, and face-to-face lectures. EDTC

students were those taking EDTC657: Advanced Telecommunication and Distance Learning, on the university campus. EDTC students also used Blackboard as an auxiliary medium in their courses. Table 1 shows participants' characteristics in detail.

Instrument

With permission from Sanders and Morrison-Shetlar (2001), the original Web-Based Instruction Attitude Scale was modified, followed by an extensive review from a panel of experts that consisted of a university research methodology professor, educational technology professors, and a distance learning coordinator. The final Instruction Attitude Scale consists of 16 items with a reliability coefficient of 0.77. The lowest possible student preference was 16, and the highest possible score was 64. The Learning Style Profile (Morrison-Shetlar & Franks, 2001) was used to identify students' learning styles. There were 30 items with 10 statements of auditory, 10 of visual and 10 of kinesthetic. Each student checked the statement that applied to her or him. If there was a difference of at least two points between any two learning categories, there was a difference in the preferred learning. If all the categories were over 5 points, then there was no difference in learning preference.

Procedure

Students completed the survey online on a voluntary and longitudinal basis. Data collection began in the spring of 2002 and was completed in the summer of 2003. The online

TABLE 1
Student Characteristics

Variable/Category	*N*	*Percent*
Gender		
Male	16	19.3
Female	67	80.7
Age		
29 or under	23	27.7
30–39	35	42.2
Over 40	25	30.1
Computer experience		
No computer experience	1	1.2
Small amount of computer experience	7	8.4
Moderate amount of computer experience	28	33.7
Large amount of computer experience	47	56.6
Learning Style		
Auditory	3	3.6
Visual	33	39.8
Kinesthetic	6	7.2
Auditory/Visual	7	8.4
Auditory/Kinesthetic	4	4.8
Visual/Kinesthetic	12	14.5
Auditory/Visual/Kinesthetic	18	21.7
Groups		
EDTC Students	48	57.80
Non-EDTC Students	35	42.20

survey was made available through the researcher's Web server. All the data entries were automatically inserted into a computer database for analysis, and the statistical package SPSS (2003) was used to analyzed the data.

RESULTS

The mean preference score was 44.84 with a standard deviation of 6.49. The preference score in this study ranged from 26 to 59, with 55.42% of the respondents having a preference score of 44 or higher. Table 2 shows the details.

The first four null hypotheses were accepted respectively in separate statistical tests. The variables of gender, age, computer experience and learning style distinguishable differences toward distance learning preference were not significant.

The first null hypothesis for this study, H_0: $= \mu_I = \mu_{II,}$ stated that there was no statistically significant difference in mean scores on the distance learning receptivity between male and female groups. An independent *t* analysis confirmed this hypothesis: means = 45.69, 44.64; $t = .577$, $df = 81$, $p > .05$.

The second null hypothesis for this study, H_0: $= \mu_I = \mu_{II} = \mu_{III}$, stated that there were no statistically significant differences in mean scores on the distance learning receptivity among three different age groups (29 years old or less, 30–39 years old, and 40 years old or

TABLE 2
Attitude Scale of Students Responses in Percentages to the Distance Learning Course

Question	*Strongly Agree*	*Agree*	*Disagree*	*Strongly Disagree*
*1. I am uncomfortable answering questions in the compressed video class.	7.2	18.1	44.6	30.1
2. I am confident about completing in-class assignments in compressed video class.	4.8	12.0	45.8	37.3
*3. I am uncomfortable answering questions through the Internet.	9.6	14.5	31.3	44.6
4. I am confident about completing assignments through the Internet.	4.8	10.8	42.2	42.2
5. I enjoy taking quizzes through the Internet.	7.2	26.5	39.8	26.5
*6. I prefer talking to people in person rather than communicating through the Internet.	19.3	47.0	31.3	2.4
7. I would rather post questions through the Internet than ask them during class.	7.2	51.8	30.1	10.8
8. I would rather get class notes from the Web than have them handed out in class.	9.6	38.6	30.1	21.7
*9. I prefer to have the course syllabus handed out to me in class rather than print it from the Web.	14.5	28.9	39.8	16.9
10. I would rather look up my grade on the Internet as opposed to getting them from the professor.	7.2	12.0	48.2	32.5
11. I am comfortable doing course work through the Internet.	3.6	6.0	49.4	41.0
12. I would prefer not to use Distance –Learning instruction for my courses.	3.6	18.1	55.4	22.9
13. I would rather take quizzes through the Internet than on paper in class.	18.1	26.5	36.1	19.3
14. I prefer taking quiz or exam in compressed video class rather than in regular class.	13.3	33.7	36.1	16.9
*15. I prefer talking to people in person rather than communicating through the compressed video.	15.5	38.4	27.4	18.7
16. I am comfortable doing course work through compressed video class.	1.2	18.1	50.6	30.1

*Questions are reverse-coded.

over). A one-way analysis of variance was calculated for distance learning receptivity variable and the result confirmed the null hypothesis: means = 45.60, 44.57, and 44.52, respectively, $F(2, 80) = .218$, $p > .05$.

The third null hypothesis for this study, H_0: $= \mu_I = \mu_{II} = \mu_{III} = \mu_{IV}$, stated that there were no statistically significant differences in mean scores on the distance learning receptivity among four groups with different computer background (no computer experience, small amount computer experience, moderate computer experience, and large amount computer experience). A one-way analysis of variance was calculated for distance learning receptivity variable and the result confirmed the null hypothesis: means = 40.00, 39.86, 44.50, and 45.89, respectively, $F(3, 79) = 2.08$, $p > .05$.

The fourth null hypothesis for this study, H_0: $= \mu_I = \mu_{II} = \mu_{III} = \mu_{IV} = \mu_V = \mu_{VI} = \mu_{VII}$, stated that the distance learning receptivity means of each learning style variable were equal across seven levels of learning styles. A one-way analysis of variance was calculated for distance learning receptivity variable and the result confirmed the null hypothesis: means = 43.67, 45.79, 46.83, 42.43, 48.25, 44.58, and 43.00, respectively, $F(6, 76) = .81$, $p > .05$.

The fifth null hypothesis for this study stated that there was no statistically significant difference between EDTC and non-EDTC students in terms of distance learning course preference. A one-way analysis of variance of educational technology students and statistics students on the distance learning attitude scales yielded a significant F ratio of 13.69, which indicated that there was a significant difference between the two groups, $p < .001$. Table 3 shows the details.

DISCUSSION AND CONCLUSION

The general positive scores of distance learning on the Instruction Attitude Scale demonstrate that current students benefit from the combination of lecture, online course delivery system, and compressed video. Students took advantage of the online course delivery system, Blackboard, with which students could access the course information and assignments, participate in course discussions, download instructional materials, practice online drills, and take examinations online.

The purpose of this study was to discover which of certain variables contributed to the distance learners' receptivity. This study found no demographic influences on receptivity of distance learning. In this study, gender (female and male students), age (categorized in three groups), computer experience (self-rated computer using experience), and learning style (seven learning styles) were not found to be significant factors in terms of distance learning

TABLE 3
Analysis of Variance for Preference of Distance Learning Courses between EDTC and Non-EDTC students (Descriptive and ANOVA)

		N	*Mean*	*SD*
Non-EDTC Students		35	41.97	7.11
EDTC Students		48	46.94	5.12
Total		83	44.84	6.49
	Sum of Squares	*df*	*Mean Square*	*F*
Between Groups	499.18	1	499.18	13.69***
Within Groups	2953.78	81	36.47	
Total	3452.96	82		

***$p < .001$

receptivity. This finding was consistent with most distance learning research in this area (e.g., Joy & Garcia, 2003). This might be the indication that using a variety of media in distance education milieu could meet the needs of students with diverse backgrounds.

Technology training may not help students develop an interest in distance learning; however, the EDTC students showed significant higher distance learning receptivity than those who were non-EDTC students. This finding supports Broady-Ortmann's assertion (2002) that distance learners should receive training on computers and related hands-on activities. Orientation can be conducted face-to-face or online (Scagnoli, 2001). These orientations were effective in helping distance learners become familiar with the formalities of distance learning, group formation, and technical troubleshooting skills. University faculty, therefore, should be aware of these essential steps and adjust their instructional methods accordingly. This study also supports Rahm and Reed's (1997) claim that if universities are to be competitive as distance learning programs grow, they must adapt and adopt technologies. This study suggests that orientation to distance learning courses for students be prerequisite to initiate any distance learning courses. Distance learning courses were still new and both students and instructors were still trying to adapt themselves to operate successfully in the newly invented learning environment (DeLeon & Killian, 2000). Gradually, instructors and students were being involved in this new arena and developed their knowledge in the virtual environment. The finding of this study shows a significant difference in distance learning delivery system receptivity between educational technology students and non-educational technology students. Therefore, distance learning course design might include technological orientation to minimize problems that students might encounter, providing students complete directions so that students will have a comfortable and successful distance learning experience.

Sarasin (1998) suggested that instructors should be willing to adjust their teaching methods based on their students' backgrounds to improve effectiveness of teaching. Positive learning experiences and online learning success often depend upon the learners' attitudes and prior preparations (Tallman, 2003). The current study supports Christensen, Anakwe, and Kessler's (2001) suggestion that simply setting up a technology-mediated distance learning environment was not sufficient; the distance learners needed to be trained in technological perspectives. Assisting distance learners with necessary technical training is equally important when adding and adopting distance education programs, helping students become familiar with the distance learning environment and helping them feel more comfortable with alternative learning techniques.

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