University Instructors' Perceptions of Factors in Distance Education Transactions

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Abstract

Understanding instructors' perceptions of distance education transactions is becoming increasingly important as the mode of distance learning has become not only accepted, but preferred by many students. A need for more empirical data was evident as anecdotal information still dominates the research literature. The study focused on the faculty of an established distance learning program at a small Midwestern university. Faculty who used technology distance education (TDE) were surveyed. Demographic information and faculty perceptions on course context, students, interpersonal and procedural transactions, learning and teaching transactions, and assessment transactions were gathered. The quantitative analysis found slight differences in perceptions among demographic subgroups and perception categories. Recommendations for future study, including research in both quantitative and qualitative realms, were proffered.

Introduction

Distance education is a very popular and intriguing area in the present realm of education. A simple internet search for online learning courses or programs indicate institutions of higher learning throughout the United States and around the world are providing distance education to serve thousands of students. These new education environments stress demonstration of learning transactions rather than the old gauge of physical presence in a classroom (Munro, 1998; Phipps & Merisotis, 1999). Still, the perceptions about these learning environments may differ between instructor and student. Clarity of distance education transactions is needed so that this area can deliver optimum education opportunities.

Transactional distance theory was first introduced in 1972 at the World Conference of the International Council for Correspondence Education (ICCE) (Moore, 2007). As defined by Moore (2007), "transactions in distance education is the interplay of teachers and learners in environments that have the special characteristic of their being spatially separate from one another" (p. 91). Transaction in a traditional classroom environment was relatively simple. The teacher asked students questions or passed out an examination to gauge understanding and comprehension of course content and procedure.Distance education severed the physical contact between teacher and student, but learning transactions can be used effectively in distance education.

Learning transactions are defined for this research study as the communication conducted between instructor and student, or perhaps between students. Education does not exists unless learning has commenced in some way. Therefore, distance education, while being innovative and trendy, must bow to the perennial issue of learning transactions. More and Kearsley (2005) stated that the nature and extent of distance learning transactions varies according to the subject matter, course design, student maturity, and technology supporting the transactions. However, a complete understanding of the factors that contributed to these learning transactions seems to elude the distance education research community.

Studying the learning transactions used by distance education instructors is a worthy and somewhat neglected field of education research (Berge & Collins, 1995; Hara & Kling, 1999; Osika et.al, 2009). As the field of distance education grows, it is paramount that proper research accompany these programs. For these reasons, understanding the factors affecting distance education transactions was one area that deserved additional and continual research.

Distance education is growing exponentially. To better prepare faculty and students for the future of distance education, researchers need to better understand the various components that comprise a distance education course (Allen & Seaman, 2003). There is a need to clarify academia's understanding of the types of transactions used by university distance education faculty to communicate with and gauge the learning of their students.

Review of the Literature

Distance education proponents have had to surmount many obstacles in the past. There seemed to be a glut of information on distance education and the task of navigating through the many offerings can be daunting. Anecdotal resources for distance education comingled with purposeful empirical studies. Furthermore, the task of divining useful information for the practicing distance educator was needed as technologies advance at a rapid rate.

Examining the research literature, the most prevalent distance education issue was that of traditional versus distance education. These arguments filled research journals (Allen and Seaman, 2003; American Association of University Professors, 1999; Bernard et.al, 2004; Kuriloff, 2001; Means et.al, 2009). Also prevalent in the literature were online "how to" and instructor resource materials (Conrad & Donaldson, 2004; Finkelstein, 2006; Palloff & Pratt, 2005; Palloff & Pratt, 2009). Less attention was given to the issues of specific transactions in distance education (Munro, 1998; Phipps & Merisotis, 1999). This was unfortunate because instructor/student transactions should be given the utmost attention in distance education debates (Berge & Collins, 1995; Hara & Kling, 1999; Osika et.al, 2009). Assessment methods were believed to be a most important aspect of distance education (May, 2000). Moore (2007) included transactional distance theory, but substantial research in distance education transactions was somewhat limited to the area of assessment transactions. Research in other distance education transactions, such as course context, student/teacher communication and course procedures, was needed to increase distance education's credibility and also to expand the existing ranks of reliable distance education research.

Several researchers rightly stressed the role of faculty in distance education (Berge & Collins, 1995; Hara & Kling, 1999; Moore & Thompson, 1997; Wedemeyer, 1973).Technology advancements brought academic institutions many new opportunities and responsibility for instructional quality and control still rested with the faculty. However, pertinent research and literature suggested that higher education had a lot to learn regarding the ways technology could enhance learning, particularly at a distance (Berge & Collins, 1995; Fletcher et.al., 2007; Keegan, 1986; Phipps & Merisotis, 1999; Windschitl Sahl, 2002). As such, distance education research should include study of distance education transactions.Transactions link teacher and student and stimulate learning, so an understanding of transactions is paramount and would contribute to the research realm.

The existing research in distance education failed to articulate the specific factors that influenced student/faculty learning transactions. Research models on this topic were simplistic or flawed. As a remedy, faculty, rather than students, must be the focus of research. Faculty are often the designers, implementers, and assessors of distance education courses and, as a consequence, distance education transactions. Perception categories of instructor course and context, students, interpersonal and procedural transactions, learning and teaching transactions, and assessment transactions were needed to bring clarity to existing research and to provide a framework for future, functional research in distance education.

The overriding research focus was: What were university instructors' perceptions of factors in distance education transactions? The first subquestion was: What differences were found in direct comparisons of the demographic subgroups of subject area taught, extent of instructors' content knowledge, amount of experience with technology distance education, and level of TDE expertise? The second subquestion was What differences in perceptions of demographic subgroups were discernable in direct comparisons of five areas of perception: 1) instructor course and context, 2) students, 3) interpersonal and procedural

transactions, 4) learning and teaching transactions, and 5) assessment transactions?

Methodology

Setting. The research study was conducted at a small Midwestern university (approximately 6500 students) which had a thriving distance education program and extensive course offerings. Technology distance education (TDE) was defined as the use of interactive television (ITV), internet, mixed mode (blended), and fully integrated technology in curriculum courses. Students could obtain both a baccalaureate degree and a graduate degree solely through the distance education program. Additionally, this university's faculty used technology distance education (TDE) to teach students locally, regionally, and globally. All the universitys colleges, schools and departments used TDE. Most instructors at the university used TDE.

Subjects. Faculty in the research study were those who taught ITV (interactive television), internet, mixed mode (blended), and fully integrated technology courses (i.e. TDE). Therefore, face-to-face course instructors who simply taught at a remote location without TDE were not included. Approximately 190 individual faculty taught distance education courses in the spring semester. Of these faculty, 133 used technology as a major component of their distance education courses and were invited to participate in the research study.

Design. A pilot survey was conducted as the research instrument was unique. The pilot survey draft was the result of the literature review; informal discussions with distance education faculty, students, and administrators; and information gleaned from qualitative interviews with TDE faculty pertaining to distance education transactions. The preliminary survey draft was then reviewed by a five person panel. Each member of the panel was experienced with technological distance education. The panel offered suggestions which were revised into the pilot draft of the quantitative survey. A 30 person pilot survey was then conducted using subjects who had experience with distance education technology. From the survey pilot, the researcher calculated a Spearman Brown split-half reliability coefficient ($r = 0.66$) and a Cronbach Alpha reliability coefficient ($r = 0.74$). Different subjects were used for the pilot survey than were used for the final survey. The survey instrument gathered distance education perception information in five distinct categories: 1) instructor course and context, 2) students, 3) interpersonal and procedural transactions, 4) learning and teaching transactions, and 5) assessment transactions. Quantitative surveys were issued to all faculty members of the research study site who taught TDE courses (Table 1.1).

Table 1.1

Survey instrument for the research study

Technology Distance Education (TDE) Survey

This survey is being conducted so that we can learn more about the [name of university] distance education program. Your responses to this survey are appreciated and they will be held in total confidence.

Technology Distance Education (TDE) describes any course that you have taught in which technology (internet, ITV, CD-ROM, videos) is a major component in student/instructor learning transactions. TDE does not include face-to-face distance education courses in which the instructor drives to locations remote from campus to teach students at that site.

A. Demographics

Subject area of expertise: (Mark the one that best fits your background.)

____ Humanities / Education (e.g. art, communication, English, history, interdisciplinary studies, modern language, music, political science, justice studies, psychology, sociology)

____ Allied Health / Nursing. (e.g. health and human performance)

____ Mathematics / Physical Science. (e.g. agriculture, biology, communication disorders, geosciences, technology studies)

____ Business / Computer Science / Leadership. (e.g. management, accounting, information networking and telecommunications)

Level of Education: (Mark the highest degree that you hold.)

____ Doctorate ____ Masters ____ Bachelors

Total number of Technology Distance Education (TDE) courses you have taught at [name of university] and other institutions:

____ TDE courses

Self-estimate of technological expertise: (Check one of the following that best describes your expertise in using technology in TDE courses.)

____ Recognized leader in using technology in TDE classes.

____ Very high level of expertise in using technology in TDE classes.

____ High level of expertise in using technology in TDE classes.

____ Above average level of expertise in using technology in TDE classes.

____ Average level of expertise in using technology in TDE classes.

____ Below average level of expertise in using technology in TDE classes.

Please rate your perceptions of the following survey items by circling the appropriate number for each item. The scale for the numbers is as follows:

5=Strongly agree 4=Agree 3=Undecided 2=Disagree 1=Strongly disagree

B. Instructor: Course and Context

5 4 3 2 1 (1) Technological Distance Education (TDE) requires course organization and delivery which is substantially different from that of face-to-face classroom teaching.

5 4 3 2 1 (2) TDE provides an education equal to or better than the quality provided by traditional, face-to-face education.

5 4 3 2 1 (3) Applications of technology to distance education lightens the workload of the TDE instructor.

5 4 3 2 1 (4) Applications of technology to distance education lightens the workload of the TDE student.

5 4 3 2 1 (5) Students should be able to complete an entire baccalaureate degree through TDE.

5 4 3 2 1 (6) Students should be able to complete an entire graduate degree through TDE.

5 4 3 2 1 (7) The most difficult part of TDE is articulating the meaning of the subject.

5 4 3 2 1 (8) The most difficult part of TDE is learning and using the technology.

5=Strongly agree 4=Agree 3=Undecided 2=Disagree 1=Strongly disagree

C. Students

5 4 3 2 1 (9) The most difficult part of TDE is managing student interactions with the instructor.

5 4 3 2 1 (10) Sometimes students enroll in a TDE class believing that this type of class is easier.

5 4 3 2 1 (11) Older learners (22-30 years of age) do better in TDE classes than students who are younger (18-21 years of age).

5 4 3 2 1 (12) TDE students must be prepared to accept greater responsibility for their learning than students who are taught in conventional, face-to-face classrooms.

5 4 3 2 1 (13) TDE students must be prepared to adapt their learning habits to those required by the TDE learning environment.

5 4 3 2 1 (14) Self-motivation and self-direction are two personal traits of successful TDE students.

5 4 3 2 1 (15) When TDE students feel that they are not in control of their learning they perform poorly in the class.

5 4 3 2 1 (16) Most TDE students enroll in the classes because they have no other options for taking the course.

5 4 3 2 1 (17) Students who enroll in TDE classes have clear expectations for how they will learn.

5 4 3 2 1 (18) Student who continue to take TDE courses are skilled in learning with a technological system.

5=Strongly agree 4=Agree 3=Undecided 2=Disagree 1=Strongly disagree

D. Transactions: Interpersonal and Procedural

5 4 3 2 1 (19) TDE instructors have less control over the teaching-learning environment than instructors in traditional, face-to-face classes.

5 4 3 2 1 (20) Instructor-student interactions are hard to sustain in TDE instructional modes.

5 4 3 2 1 (21) Instructor-student interactions are of better quality in TDE classes than in traditional, face-to-face classes.

5 4 3 2 1 (22) A considerable amount of time must be invested in coaching students how to use the interactive technological features of TDE processes.

5 4 3 2 1 (23) TDE students are reluctant to engage in 'virtual' class discussions.

5 4 3 2 1 (24) In TDE courses, the interactions between students and instructor are much more productive than student-to-student interactions.

5 4 3 2 1 (25) Most TDE students just want to get through the material and not waste time on

interactions with the instructor and other students.

5=Strongly agree 4=Agree 3=Undecided 2=Disagree 1=Strongly disagree

E. Transactions: Learning and Teaching

5 4 3 2 1 (26) Cultural and language differences can sometimes interfere with understandings between the instructor and the students in TDE classes.

5 4 3 2 1 (27) The amount of feedback needed by TDE students is greater than that needed by students in a traditional, face-to-face classroom.

5 4 3 2 1 (28) Learning in TDE must be tightly controlled and supervised by the instructor.

5 4 3 2 1 (29) Development of students' abilities to problem-solve should override all other learning considerations in TDE classes.

5 4 3 2 1 (30) Learning in TDE must be more open-ended with students making their own personal meaning from course objectives, assignments and class information.

5 4 3 2 1 (31) TDE students should be responsible for making up the basic background knowledge they lack for understanding course material.

5 4 3 2 1 (32) Centering the class on the needs of the individual student is the most difficult part of TDE instruction.

5 4 3 2 1 (33) When the TDE teaching-learning process breaks down it is usually due to equipment or software failure.

5 4 3 2 1 (34) When the TDE teaching-learning process breaks down it is usually due to students' inability with the technology.

5 4 3 2 1 (35) When the TDE teaching-learning process breaks down it is usually due to students having inadequate background knowledge for the course.

5 4 3 2 1 (36) When the TDE teaching-learning process breaks down it is usually due to lack of motivation and work ethic on the part of the students.

5=Strongly agree 4=Agree 3=Undecided 2=Disagree 1=Strongly disagree

F. Transactions: Assessment

5 4 3 2 1 (37) When a TDE student performs poorly on assessment tasks, the instructor should provide immediate feedback so that the student can better understand the course material.

5 4 3 2 1 (38) TDE students should be given a preassessment for each major concept or topic they are taught.

5 4 3 2 1 (39) The type of technology used in TDE greatly affects the way course assessments are designed and conducted.

5 4 3 2 1 (40) TDE should provide access to diverse learning opportunities; however, assessments should be objective, standardized and conducted in a completely protected environment.

5 4 3 2 1 (41) In TDE, it is best to measure students' learning through a series of continuous,

smaller magnitude assessments.

5 4 3 2 1 (42) A good assessment of TDE students' knowledge is a continuous set of assessments that measure their knowledge of the basic facts.

5 4 3 2 1 (43) A good assessment of TDE students' knowledge is a continuous set of assessments that measure their ability to interpret the meaning of the basic facts.

5 4 3 2 1 (44) A good assessment of TDE students' knowledge is a continuous set of assessments that measure their ability to apply the basic facts and their interpretation to solving problems.

The final survey was comprised of six sections: demographics, instructor course and context, distance education students, interpersonal and procedural transactions,learning and teaching transactions, and assessment transactions. Demographics were reported as frequencies (number and percent) and placed the respondents in one of four subject areas of expertise. The surveyed instructors were also placed into categories based on their level of education attainment, amount of technological distance education (TDE) experience, and level of TDE expertise. A five point Likert scale was used to quantify survey responses on the perception items. The demographic section of the survey gathered faculty information on subject area of expertise, level of education (e.g. doctorate, masters), total number of TDE courses taught (to gauge experience), and a six-tiered self-estimate of technological expertise (leader to below average).

The scores from perception item questions were reported by frequencies (number and percent), by mean, and by standard deviations for the total score, for subgroup items (instructor course and context, students, interpersonal and procedural transactions, learning and teaching transactions, and assessment transactions) and for individual items. Direct comparisons included: 1) comparison of perceptions among different subject areas, 2) comparison of perceptions between instructors with high levels of subject knowledge and those instructors with low levels of subject knowledge, 3) comparison of perceptions between two levels of technology experience; high and low experience levels, 4) comparison of perceptions between instructor's sophistication in technology use; high and low expertise levels.

These comparisons were subject to three conditions:1) There had to be enough subjects in each subcategory to justify the comparison. 2) Direct comparisons had to be done using the ANOVA formula. The scores compared were the total scores for the five-point Likert scale perception items. Where applicable, subgroup perception scores were compared to total scores. Scores on individual items were not compared among subgroups. 3) Where there were inadequate subgroup numbers, the researcher relied on frequency, mean, and standard deviation scores.

Findings

Survey results. The whole number of total eligible quantitative survey participants was one hundred thirty-three (133). These faculty were interspersed throughout 27 different academic departments. Ninety-five faculty (71%) completed the quantitative survey. For the 95 faculty who completed the quantitative survey, the researcher calculated a Spearman-Brown split-half reliability coefficient ($r = 0.52$) and a Cronbach Alpha reliability coefficient ($r = 0.69$). Frequency and distribution of subjects by total and subgroup factors is listed in Table 1.2.

Table 1.2		
Frequency and distribution of subjects by total and subgroup factors		
Group factor	n	%
Total group	95	100
Subject area		
Humanities and education	55	57.9
Allied health and nursing	11	11.6
Mathematics and physical science	8	8.4
Business, computer science and leadership	21	22.1
Totals	95	100.0
Level of education		
Doctorate	45	47.4
Masters	50	52.6
Totals	95	100.0
Level of TDE experience		
Low experience TDE instructors	56	58.9
High experience TDE instructors	39	41.1
Totals	95	100.0
Level of technological expertise		
Low expertise TDE instructors	39	41.1
High expertise TDE instructors	56	58.9
Totals	95	100.0

Demographics. The survey was comprised of six sections: demographics, instructor course and context, students, interpersonal and procedural transactions, learning and teaching transactions, and assessment transactions. Demographic data separated respondents into groups based on subject area, level of education, high or low TDE teaching experience, and high or low self-estimated technological expertise. A five point Likert scale was used to quantify survey responses on the 44 perception items. Total perception scores were analyzed and compared when appropriate and feasible.

The departments were categorized into the following: humanities/education; allied health/nursing; mathematics/physical science; business/computer science/leadership. Two choices of "level of education" were used by the faculty respondents:doctorate and masters level degrees. TDE experience was ascertained by the number of courses the instructor had taught in TDE modes. Technological expertise was ascertained by a self-assessment question in which the respondent chose their level of technological expertise; from "leader" to "below average" technological expertise.

Subject area. Of the ninety-five respondents, fifty-five (57.9%) taught in the humanities/education subject area. Eleven (11.6%) were categorized allied health/nursing; eight (8.4%) mathematics/physical science and twenty-one (22.1%) business/computer science/leadership.

Level of education. Each respondent fit into one of two education level categories. Forty-five (47.4%) held a doctorate degree and 50 (52.6%) held a masters degree in their subject area.

High or low TDE experience. Survey respondents answered this demographic question with an open response. They were asked to write the number of TDE courses they had taught at all institutions throughout their education instruction career. The range for this number was 37 (between 1 and 38 courses total). After discussions with distance education course designers and facilitators at the institution, the researcher decided to separate the open response into two categories: high and low experience teaching

TDE courses. The separation point was between five and six TDE courses. Via consultation with course designers and facilitators, the rationale for this decision was that after an instructor taught five TDE courses, they were relatively proficient with the procedures and technology necessary to use TDE effectively. Using these criteria, 39 (41.1%) of the survey respondents possessed high TDE experience and 56 (58.9%) had low TDE experience.

High or low technological expertise. This demographic category was used to discern the proficiency of faculty in using technology to conduct their TD courses. The mechanism to gather this information was a self-assessment question in which the respondent chose one of six levels of technology expertise. Those faculty rating themselves as a "leader","very high", "high", or "above average" in expertise were categorized as possessing high technological expertise. Those faculty rating themselves as "average" or "below average" were labeled as possessing low technological expertise. Fifty-six (58.9%) of the respondents possessed high technological expertise while 39 (41.1%) had low technological expertise.

The subgroup demographic factors in the survey population showed a dominance of respondents in the area of humanities/education and low numbers of respondents in the areas of health/nursing and mathematics/physical science. Level of education was quite evenly dispersed amongst those instructors with doctorate and masters degrees. There was moderate imbalance in the subgroups of level of TDE experience and level of technological expertise, but not enough to cause undue concern in the survey results.

Mean and standard deviation scores for each survey item. Table 1.3 shows mean and standard deviation scores for each survey item reported by the total group. A response of "strongly agree" to any perception question yielded a perception score of 5, "agree" a score of 4, "undecided" a score of 3, "disagree" a score of 2, and "strongly disagree" a perception score of 1. The discussion of mean scores for each survey item was separated by the total mean perception score and placed into the categories of high (mean greater than 3.5), centrist (mean of 2.5 to 3.5) and low (mean lesser than 2.5) perception score.

Table 1.3

Mean and standard deviation scores for each survey item reported by the total group

(n = 95 subjects, n = 44 survey items)

5=Strongly agree 4=Agree 3=Undecided 2=Disagree 1=Strongly disagree

Survey category/item .	Mean	s.d.
Instructor: Course and context		
1. TDE is different than face-to-face (F2F)	4.27	0.87
2. TDE is equal or better quality than F2F	2.57	1.04
3. TDE lessens instructor work load	2.06	1.19
4. TDE lessens student work load	2.59	1.15
5. Complete baccalaureate degree through TDE	2.26	1.26
6. Complete graduate degree through TDE	2.31	1.34
7. Difficult to articulate subject meaning in TDE	2.64	0.98
8. Difficult to learn the technology in TDE	2.54	0.98
9. Difficult to manage student interactions	3.61	1.19
Students		
10. Students believe TDE is easier	4.28	0.79
11. Older students do better in TDE	3.66	1.09
12. TDE requires greater student responsibility	4.58	0.65
13. Students must adapt to TDE forms	4.44	0.65
14. Self-motivation/self-direction important	4.62	0.62
15. TDE students feel lack of environ. control	3.15	0.76
16. Lack of options prompts TDE enrollments	2.88	0.97
17. TDE students have clear expectations	2.44	0.82
18. Skill-technological system improved in TDE	3.58	0.82
Transactions: Interpersonal and Procedural		
19. TDE instructors have less control than F2F	3.65	1.18

20. Interactions hard to sustain in TDE	3.61	1.16
21. Interactions better quality in TDE than F2F	2.04	1.01
22. Increased time spent coaching to use TDE	3.27	1.00
23. Student reluctance to discuss in TDE	3.21	1.00
24. Teacher-student interactions better in TDE	2.85	0.98
25. Students avoid interactions in TDE	3.41	1.07
Transactions: Learning and Teaching		
26. Culture-language interferes in TDE	3.47	1.02
27. Need for greater feedback in TDE	3.12	1.09
28. TDE must be controlled and supervised	2.81	1.12
29. Problem-solving most important in TDE	2.65	0.88
30. Open-ended learning most important in TDE	2.95	1.06
31. TDE requires student background knowledge	3.63	0.92
32. Student centered approach difficult in TDE	3.22	1.07
33. Equipment failure impedes TDE learning	2.84	1.02
34. Student inability w/ technology impedes	2.69	0.89
35. Lack of student background impedes	2.96	0.97
36. Lack of motivation/work ethic impedes	3.81	1.01
Transactions: Assessment		
37. Immediate feedback important in TDE	4.13	0.78
38. Preassessment important in TDE	2.62	1.00
39. Technology affects assessments in TDE	3.78	0.84
40. Objective, standard assessments important	2.95	1.15
41. Smaller magnitude assessments important	3.41	0.88
42. Knowledge of basic facts important in TDE	3.22	0.96
43. Interpret meaning of facts important in TDE	3.79	0.74
44. Apply facts to problem solving	4.06	0.74

This group of 95 TDE faculty were clear in their perception that TDE is different than the traditional classroom (Item 1, m = 4.27). They viewed student interactions to be a very difficult part of the process (Item 9, m = 3.61) and that students sometimes feel that TDE is supposed to be easy (Item 10, m = 4.28). The TDE instructors believed that older students may do better in TDE (Item 11, m = 3.66). The respondents were strong in their TDE perceptions that students must assume greater responsibility (Item 12, m = 4.58), that students must adapt their learning habits to the TDE environment (Item 13, m = 4.44), and that student self-motivation and self-direction are necessary traits for TDE learning (Item 14, m = 4.62). Their perceptions reported that students who continue to enroll in TDE courses are skilled with technological systems (Item 18, m = 3.58).The TDE faculty perceived that they have less control over the TDE teaching-learning environment (Item 19, m = 3.65) and they reiterated their concerns about the difficulty of sustaining teacher-student interactions (Item 20, m = 3.61). The instructors tended toward agreement that students should be responsible for making up basic background knowledge that they lack (Item 31, m = 3.63) and they also tended toward belief that lack of student motivation and work ethic can cause the TDE teaching-learning process to break down (Item 36, m = 3.81). At the same time, the TDE faculty perceived that they should provide immediate feedback when students perform poorly on assessments (Item 37, m = 4.13). The type of technology selected for the TDE course was a determiner of the type of assessment used (Item 39, m = 3.78). When given choices of assessment for basic facts, for interpretation, and for problem solving, the faculty gave higher ratings to assessing interpretation (Item 43, m = 3.79) and to assessing problem solving (Item 44, m = 4.06).

The above reporting was done on the basis of higher scores for perception items. Additional insight was found in considering the items which received lower scores. The surveyed TDE faculty did not believe that TDE lightens the instructor's workload (Item 3, m = 2.06). They also did not believe that entire baccalaureate and graduate degrees should be earned through TDE (Items 5 and 6, m = 2.26, 2.31). The TDE faculty perceived that TDE students do not always have clear expectations for TDE learning (Item 17, m = 2.44). Furthermore, these faculty believed that TDE interactions are of inferior quality in comparison to traditional, face-to-face interactions (Item 21, m = 2.04).

A third group of survey items had mean perception scores which fell in the range of 2.5-3.5. The findings were summarized in the following list, however, these scores should be interpreted carefully because of their centrist nature:

Item	Mean	Comments
2	2.57	Responses tended toward disagreement when considering TDE equal to or better than the quality of teaching in the traditional classroom.
4	2.59	Responses tended toward disagreement when considering TDE providing students with a lighter workload.
7	2.64	Responses tended toward disagreement w hen considering the articulation of subject matter as a problem in TDE.
8	2.54	Responses tended toward disagreement when considering the technology itself as a problem in TDE.
15	3.15	Responses tended toward neutral when considering the problem that students may perform poorly when they are not in control of their learning.
16	2.88	Responses tended toward neutral when considering that these students have no other options beyond coursework through TDE.
22	3.27	Responses tended toward agreement on the factor of teaching students interactive features of technology.
23	3.21	Responses tended toward agreement on student reluctance to engage in virtual discussions.
24	2.85	Responses tended toward neutral on the superiority of teacher-student interactions over student-student interactions.
25	3.41	Responses tended toward agreement on students wanting to complete material and not engage in discussion.
26	3.47	Responses tended toward agreement for interferences from culture and language.
27	3.12	Responses tended toward neutral on TDE students needing greater feedback than traditional students.
28	2.81	Responses tended toward neutral on tight control and supervision of the TDE environment.
29	2.65	Responses tended toward disagreement that problem-solving overrides all other considerations
30	2.95	Responses tended toward neutral that TDE should be open-ended.
32	3.22	Responses tended toward neutral that it is most difficult to make TDE student centered.
33	2.84	Responses tended toward neutral on equipment and software failure as significant sources of problems.
34	2.69	Responses tended toward disagreement for students' inability with technology as a source of problems.
35	2.96	Responses tended toward neutral for lack of student background knowledge as a source of problems.
38	2.62	Responses tended toward disagreement that students should be given a preassessment for each concept.
40	2.95	Responses tended toward neutral that assessments should be standard and objective.
41	3.41	Responses tended toward agreement that assessment should be continuous and of smaller magnitude.
42	3.22	Responses tended toward neutral that assessments should be made of basic facts.

Findings for all subjects and survey items. Table 1.4 summarizes findings for all subjects on the 44 survey items. Analysis of the mean and standard deviation scores for each survey item showed high, low and central perceptions among the TDE faculty. In the category of instructor course and context, strong perception scores showed instructors solidly believed that TDE requires more organization and that TDE delivery was substantially different from that of the traditional classroom. TDE instructors felt that TDE increased the workload of the instructor. Therefore, the faculty perceived TDE as an entirely separate realm of education, which placed increased demands on TDE instructors. Transactions between instructors and students in TDE were important, but were not of the quality desired by TDE instructors, nor were these transactions of the same quality as traditional classroom transactions. Considering these limitations of TDE, instructors were skeptical as to whether baccalaureate and/or graduate degrees should be completed solely through TDE.

Table 1.4	
Summary list of findings for all subjects and survey items (n = 95 subjects, n = 44 survey items)	
1.	Instructors' self-estimated level of technical expertise and education levels were not significant variables.
2.	The subject area taught and the amount of experience in TDE show promise for further study.
3.	Instructors perceived TDE as substantially different from traditional classroom education.
4.	Due to technological and transactional limitations of TDE, instructors are wary of exclusively TDE degree programs.
5.	The perceived differences of TDE required increased demands on instructors and students.
6.	The transactions between students and instructors were perceived as being a large concern to TDE instructors.
7.	Further study of technology's effects on instructor-student transactions is warranted.
8.	Students positive characteristics and traits are necessary for successful TDE courses.
9.	Further study of student characteristics as it impacts TDE is needed.
10.	Instructors perceived their use of proper TDE assessments as crucial.
11.	Instructor's choice of and intent in using assessments in TDE show promise for further study.

In the area of students, TDE instructors perceived that students sometimes enroll in TDE believing that a course in that delivery mode will be easier. TDE instructors also believed that TDE students must accept greater responsibility for their learning than students in a traditional classroom, that TDE students must be prepared to adapt their learning habits to the TDE environment, and that self-motivation and self-direction were traits of the successful TDE student. These perceptions showed that the belief among students that TDE is 'easier' needs to be purged. These students also must realize that a course in TDE will require special traits and skills on their behalf.

In the category of interpersonal and procedural transactions, TDE instructors felt strongly that instructor-student interactions were of poorer quality in TDE classes than in traditional classes. Efforts to increase the quality of these interactions should be sought by TDE instructors and technology designers. The category of learning and teaching transactions showed that TDE instructors perceived that a lack of motivation and lack of work ethic on the part of students was often to blame when the TDE teaching-learning process breaks down. This perception placed a burden upon students, once again. However, this item reinforced the TDE instructor perceptions that successful TDE students were responsible, adaptable and self-motivated. Students without such traits impeded the TDE teaching-learning process.

Perceptions of TDE transactions in the category of assessment showed several strong findings. TDE instructors believed that immediate feedback to the student on assessments was essential in TDE. These same instructors believed that the type of technology used in TDE greatly affected the design and implementation of assessments. Finally, TDE instructors believed that good assessments were those that measured a students ability to interpret the meaning of the basic facts and to apply the basic facts in their interpretation to solving problems. Interpretation and problem solving were important to TDE instructors. Ensuring that technology facilitates the desired learning transactions was paramount for current and future TDE programs.

Findings for all subgroup subjects. There were differences in direct comparisons within demographic subgroups as a significance level of 0.02 was found when ANOVA was conducted on the subject area subgroup. The business/computer science/leadership and mathematics/physical science subgroups showed a significant difference when subjected to a Welch t' test. Further analysis of a possible cause for these differences in direct comparisons of categories of perception within demographic subgroups found significance in subject area. In the instructor course and context perception category (0.03) and the category of assessment transactions (0.01) levels of significance were observed. Levels of significance were also found in the level of TDE experience demographic subgroup. In this subgroup, a 0.003 significance level in the category of instructor course and context was observed. A 0.05 significance level was found in the interpersonal and procedural transactions perception category. Analysis of mean, standard deviation, and mean difference scores for individual survey items hinted at the cause for this significant difference among subject subgroups. These possible causes for the significant difference were discussed, but low subgroup respondent numbers and moderate instrument reliability limited any conclusions. These observations of subgroup subjects were briefly summarized in Table 1.5.

Table 1.5	
Summary list of findings for all subgroup subjects (n = 95 subjects, n = 44 survey items)	
1.	The business/computer science/leadership and mathematics/physical science subgroups showed significant differences in their perceptions of TDE transactions.
2.	The high and low TDE experience subgroups showed significant differences.
3.	The mathematics/physical science subgroup had lower overall mean scores on the instructor course and content category perception items.
4.	The mathematics/physical science subgroups had lower overall mean scores on the assessment category perception items.
5.	Mathematics/physical science reported reluctance concerning the availability of entire TDE degrees.
6.	Mathematics/physical science perceived increased workloads in TDE modes.
7.	Mathematics/physical science perceived a reluctance toward preassessment or the assessment of basic facts in TDE.
8.	Further study of the differences between business/computer science/leadership and mathematics/physical science is needed.
9.	Both high and low experience TDE instructors reported concerns about instructor-student interactions; the quality of, ability to sustain, and control of said interactions.
10.	Lack of experience with TDE may explain the low perception scores and general reluctance of instructors with low TDE experience.
11.	Further study of the perception differences between instructors with high and low TDE experiences is suggested.

The quantitative survey on university instructors' perceptions of TDE transactions was helpful, yet further research is highly recommended. The impact of instructor subject area and level of TDE experience on perceptions showed significant differences but further research is needed to ascertain the extent and reason for these differences. Research exclusively targeting these subgroups would be very beneficial to the study of distance education transactions.

Limitations. The following limitations were present in the research study. The research study was a single entity research study. Its research scope was limited to the chosen university and the faculty who taught distance education courses. Only those faculty who taught in technology distance education (TDE) modes participated in the research study. The research findings were generalizable only to college campuses and instructors with similar characteristics.

Discussion

One of the most striking findings from the research was that the education level of the TDE instructor did not make a difference in their perceptions of TDE. Furthermore, the level of expertise with TDE did not make a difference in instructor perceptions. Differences were found among instructor subject area and their level of TDE experience. The research hinted that TDE instructors in the mathematics/physical science and business/computer science/leadership subject areas were significantly different in their perceptions. Also, instructors with low TDE experience were significantly different from instructors with high TDE experience. Future research focusing on instructors in these content areas, and with a great sample size, may provide better explanation for the reason of the statistical difference.

Survey item analysis showed that TDE instructors strongly believed that TDE required more organization and was substantially different from the traditional classroom. Transactions in TDE courses were important, but maintaining these transactions and the quality of the transactions was an area of concern and debate. Due to these difficulties, TDE instructors were reluctant to offer entire baccalaureate and graduate degrees solely through TDE. Students should accept greater responsibility for their TDE education, according to the perceptions of TDE instructors. Specific student traits such as self-motivation, self-direction, and a willingness to work harder on TDE courses were desirable. TDE instructors, unfortunately, expected lower quality instructor-student interactions in TDE classes. Nevertheless, these interaction barriers could be overcome through strong student work ethic and involvement in the TDE environment. In the category of assessment, TDE instructors believed that immediate feedback was important and that the type of technology used in the course affected assessment design and

implementation.TDE instructors believed that good assessments should measure several types of ability in a communicative model: interpretation of basic facts, application of basic facts, and ability to solve problems using these facts.

Other research studies help support the outcomes of the TDE survey. Allen and Seaman (2003) surveyed chief academic officers at online institutions. Overall outcomes from the Allen and Seaman (2003) survey indicate that instructors are more conservative than students and administrators when it comes to their acceptance of online learning. The Allen and Seaman (2003) study did not survey faculty or instructor perceptions of learning transactions, but alignment of chief academic officer's reports of instructor acceptance of online learning modes with the TDE survey is encouraging. Schroeder and Oakley (2005) reported that more and more faculty appreciate the convenience and potential of distance learning and that it is important for institutions to foster opportunities and equipment for faculty to improve faculty satisfaction with online teaching. Additionally, the TDE survey findings align with Moore's (2007) theory of transactional distance.

Recommendations

While valuable research on quantity and acceptance of online learning has been conducted, more research is needed on specific online learning transactions. Future research upon university instructor's perceptions of factors in distance education transactions is greatly encouraged. As such, the existing research can suggest areas in which continuing research is needed and would be appreciated. Specific research in TDE on instructor subject area in general would be warranted. Analysis of variance significant differences between subject area subgroups suggested that there is a marked difference in opinion among mathematics/physical science TDE instructors. Also, higher mean scores hinted that business/computer science/leadership TDE instructors found it more natural and more productive to teach their courses in computer driven TDE environments. The type of and magnitude of assessments was another perceived area of distinction among the mathematics/physical science and business/computer science/leadership subgroups. Considering the findings of significant difference among these subgroups, further research of subject area pertaining to the categories of TDE course and context and TDE assessments may be quite enlightening.

The subgroups of high and low levels of TDE experience are also ripe areas for additional research. It appears that perceptions concerning use of TDE change as instructors continue to use TDE. Therefore, longitudinal research on the long term effects of TDE teaching and course context would be productive. A five year longitudinal study which can analyze the TDE instructors as they advance from the level of low TDE experience to the level of high TDE experience is suggested.

Future quantitative research should be conducted using a refined quantitative survey. A revised survey may produce greater reliability and promote a higher survey completion rate. Future qualitative research should strive to create and implement a TDE transactional hierarchy. A hierarchy would aid TDE instructors in their organization and analysis of TDE transactions. Such a modification would then nicely compliment a refined quantitative survey instrument. A final recommendation would be to properly combine usage of the refined quantitative survey instrument with qualitative research utilizing the TDE transactional hierarchy. Tandem research in quantitative and qualitative methods would produce greatly needed insight into university instructors' perceptions of factors in distance education transactions.

References

Allen, I. E.& Seaman, J.(2003). Sizing the opportunity. The quality and extent of online education in the United States, 2002 and 2003. The Sloan Consortium. Retrieved from http://www.sloanconsortium.org/sites/default/files/sizing_opportunity_2.pdf

American Association of University Professors. (1999). Statement on Distance Education. Retrieved from http://www.ecu-aaup.org/Statement%20on%20Distance%20Education.pdf.

Berge, Z. & Collins, M. (1995). Computer-mediated communication and the online classroom in distance

learning. *Computer-Mediated Communication Magazine* 2(4): Retrieved from http://www.ibiblio.org/cmc/mag/1995/apr/berge.html

Bernard, R. M., Abrami, P. C., Lou, Y., Borokhovski, E., Wade, A., Wozney, L., Wallet, P. A., Fiset, M., & Huang, B. (Autumn, 2004). How does distance education compare with classroom instruction? A meta-analysis of the empirical literature. *Review of Educational Research*, 74(3), 379-439. Retrieved from http://www.jstor.org/stable/3516028

Conrad, R. & Donaldson, J. A. (2004). *Engaging the online learner: Activities and resources for creative instruction.* San Francisco, CA: Jossey-Bass.

Hara, N. & Kling, R. (1999). Students' frustrations with a web-based distance education course. /First Monday: Peer-reviewed journal on the internet/. 4(12). Retrieved from http://firstmonday.org/htbin/cgiwrap/bin/ojs/index.php/fm/article/view/710/0.

Finkelstein, J.(2006). *Learning in real time:Synchronous teaching and learning online.* San Francisco, CA: Jossey-Bass.

Fletcher, J. D., Tobias, S. & Wisher, R. A. (2007). Learning anytime, anywhere: Advanced distributed learning and the changing face of education. *Educational Researcher*, 36(2), 96-102. doi: 10.3102/0013189X07300034

Keegan, D. (1986). *The foundations of distance education*. Beckenham, Kent, UK: Croom Helm.

Kuriloff, P. C.(2001). One size will not fit all. *The Technology Source.* July/August 2001. Retrieved from http://technologysource.org/article/one_size_will_not_fit_all/

Means, B., Toyama, Y., Murphy, R., Bakia, M., Jones, K. (2009). Evaluation of evidence-based practices in online learning: A meta-analysis and review of online learning studies. U.S. Department of Education Office of Planning, Evaluation, and Policy Development. Policy and Program Studies Service.Retrieved from http://www2.ed.gov/rschstat/eval/tech/evidence-based-practices/finalreport.pdf

May, K. (2000). e-Learning: Improving quality through assessment and evaluation. *Eduport, Inc*. Autumn 2000. Retrieved from http://www.eduport.com/community/kiosk/20004/evalprint.htm.

Moore, M. G. (2007). *The handbook of distance education*. (2nd ed). Mahwah, NJ. Lawrence Erlbaum Associates, Inc.

Moore, M. G. & Kearsley G.(2005). *Distance education: A systems view*. Belmont, CA: Thomson Wadsworth.

Moore, M. G. & Thompson, M. M. (1997). The effects of distance learning: Revised edition. *Research Monographs of the American Center for the Study of Distance Education*, Number 15. Pennsylvania State University, University Park, PA.

Munro, J. S.(1998). Presence at a distance: The educator-learner relationship in distance learning. *ACSDE Research Monograph*. American Center for the Study of Distance Education, Pennsylvania State University, University Park, PA.

Osika, E. R., Johnson, R. Y., Buteau, R. (2009). Factors influencing faculty use of technology in online instruction: A case study. *Online Journal of Distance Learning Administration.* 12(1)0. Retrieved from http://www.westga.edu/%7Edistance/ojdla/spring121/osika121.html

Palloff, R. M. & Pratt, K. (2009). *Assessing the online learner: Resources and strategies for faculty.*San Francisco, CA: Jossey-Bass.

Palloff, R. M. & Pratt, K. (2005). *Collaborating online: Learning together in community.*San Francisco, CA: Jossey-Bass.

Phipps, R. & Merisotis, J. (1999). What's the difference? A review of contemporary research on the effectiveness of distance learning in higher education. Retrieved from http://www.ihep.org/Publications/publications-detail.cfm?id=88. Washington, DC: The Institute for Higher Education Policy.

Schroeder, R. E.& Oakley, Burks, II(2005). Adding clicks to bricks: Increasing access to mainstream higher education. In J. Bourne & J.C. Moore (Eds.), *Elements of Quality Online Education: Engaging Communities*. (pp. 101-113). The Sloan Consortium.

Wedemeyer, C (1973). The use of correspondence education for post-secondary education. In A. Kabwasa M. Kaunda (Eds.), *Correspondence education in Africa*London: Routledge and Kegan Paul.

Windschitl, M. & Sahl, K. (Spring, 2002). Tracing teachers' use of technology in a laptop computer school: The interplay of teacher beliefs, social dynamics, and institutional culture. *American Educational Research Journal*. 39(1), 165-205.
