

INFLUENCE OF THE USE OF ONLINE
COMMUNICATIONS MEDIA ON PERCEPTIONS OF
TRANSACTIONAL DISTANCE AND STUDENT
SATISFACTION IN A HYBRID EDUCATION
PROGRAM

By

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Abstract: The purpose of this study was to determine the uses of online communications media in an undergraduate hybrid course that yielded the least transactional distance perceived by students and the highest student satisfaction with distance education. The study was based on student responses to the Distance Education Learning Environment Survey having seven scales ascribable to the elements of the transactional distance theory and student satisfaction. It was found that using online communications media for purposes to increase opportunities for interactions, with the intent to mitigate high perceptions of transactional distance, was not as important as who the interactions involved. The desired state of low transactional distance was observed for all groups and marginally close p values were observed for personal relevance and instructor support. This study also found restricting communication with the instructor in an online setting yields low to moderate ratings of enjoyment and thus significantly affects student satisfaction with distance education.

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CHAPTER I

INTRODUCTION

Many educational institutions have incorporated some form of distance education in their course offerings. Distance education formats have evolved from simplistic methods such as teaching and learning by correspondence to more complex methods such as virtual meetings, virtual campuses, and online environments that use learning management systems to create virtual classrooms. As distance education evolved, “media other than the written word became common and grew in importance for educating students and the general public (Holmberg, 2005). With the evolution of distance education, have the practices of online instruction improved along with it? A leading theory in distance education is Michael G. Moore’s Transactional Distance Theory (1993), which states the separation of place and time in distance learning creates a psychological gap between the learner and the course. A learner’s separation from the instructor, the content, and other learners, and/or a learner’s disconnection from familiarity with the technological interface used to deliver the course may foster a feeling of remoteness from the course and thus the learning.

Transactional distance can be overcome by increasing the amount of interactions between the learner and the instructor (Moore & Kearsley, 1996). Identifying and using the instructional strategies in online teaching that increase interactions between the learner and instructor can reduce the learner perceived psychological gaps. Moore (1993) suggested six applications for practice in distance education offerings. The first application is to provide information in the form of a presentation. He further advises to

support the learner's motivation; stimulate analysis and criticism; give advice and counsel; arrange practice, application, testing, and evaluation; and arrange for student creation of knowledge. Additionally, Moore has shared that the perception of transactional distance by a learner is shaped by the *dialogue* between the learner and the instructor, the *structure* of the instructional program, and the *autonomy* of the learner. Therefore, instructors should be cognizant to build in as many opportunities as possible to interact with every type of learner.

As technology advances in online teaching, more can be added to Moore's blanket applications for distance education. Having more guidance on how to keep transactional distance low in specific formats of distance education (i.e. correspondence only, hybrid, fully online), is useful to maintaining student interest in learning via distance education. Students' perceived transactional distance and satisfaction with a course influences their decisions to pursue further study in the distance education format. Thus, the health of distance education lies well within students selecting the option to learn in this manner. This study looks at the influence of the use of online communications media and measures student perceptions of transactional distance and student satisfaction.

Statement of the Problem

As the field of distance education evolves, more guidance is needed on how to use online communications media within its distinct formats. Although there are traditional applications that will apply no matter how advanced media becomes, future technologies are expected to increase capabilities for communication. Online teachers need guidance

on how to design online courses that use current and new media in a way that students feel connected and engaged.

Purpose of the Study

The purpose of this study was to determine the uses of online communications media in an undergraduate online course that yielded the least transactional distance perceived by students and the highest student satisfaction with distance education. The study was based on student responses to the Distance Education Learning Environment Survey that is designed to capture their perceptions of the hybrid experience as aligned to elements of the Transactional Distance Theory. The intended outcome of this research was to gauge the effectiveness of current practices in a national hybrid education program, report to managers of that program and the distance education community results that may influence future design of hybrid courses, and support/refute current applications.

Research Hypotheses

Given the formats for distance education are evolving (Holmberg, 2005), technology is advancing, and students are required to take a more active role in their learning, one can expect that the methods used in distance education will change more before or if they ever standardize. One goal of this study is to show that courses with many opportunities for communication are more comfortable for and most appealing to the students taking them. Because there was little guidance on how to design the courses in this study, it was expected that there would be notable differences among the courses in the transactional distance perceived by students and in their satisfaction with distance education.

The first null hypothesis (H_0) was, no significant difference will be observed in perceived transactional distance among the groups. The first alternative hypothesis (H_1) was, a significant difference will be observed in perceived transactional distance among the groups. The second null hypothesis (H_0) was no significant difference will be observed in student satisfaction with distance education among the groups. The second alternative hypothesis (H_1) was a significant difference will be observed in student satisfaction with distance education among the groups.

Significance of the Study

This research study is significant to the field of distance education by providing current information on student attitudes toward hybrid courses. It provides insight to which uses of online communications media are likely to have students enjoy their distance education experience; thus increasing their likelihood to pursue future coursework via distance education. Results of this research could influence instructional design of future hybrid courses.

Definition of Terms

Autonomy: The extent to which the learner is responsible for his own learning process.

Dialogue: The degree or number of interactions between students and the instructor, and between students and other students.

Hybrid Distance Education Program: The delivery of content and instruction via online communications media and in a face-to-face setting.

Preservice Educators: College juniors and seniors who are education majors or some other major with education training in their plan of study, and post baccalaureate students who have no classroom teaching experience studying to become teachers.

Structure: How flexible or how rigid the objectives, teaching strategies, and evaluation methods are for the course.

Student Satisfaction: The perception of enjoyment and accomplishment in the learning environment (Sweeney & Ingram, 2001).

Transactional Distance: The psychological gap that occurs when students are separated by distance and time in educational settings and a function of structure and dialogue within a course.

Limitations

The limitations of this study are as follows:

- The number of participants available and willing to participate in the study within the allotted time frame. Although, this involved a national program having ten sites as host locations, not all sites started their courses in the same season. Therefore, the potential for everyone participating in the program to become participants in the study was significantly decreased.
- Geographical limitations. The participants of the study were located in various U.S. states. Collecting all of the surveys in person was financially impossible. Facilitators in the same location as the participants were enlisted to help with the data collection.
- Incentive programs. Some of the sites involved in the study offered monetary stipends to the participants that may have affected positively or negatively a subject's opinion about the overall course they participated in.

In consideration of the limitations of this research, every known caution was employed to ensure the highest possible objectivity to yield the most credible research findings.

CHAPTER II

REVIEW OF LITERATURE

Physical behaviors observed in traditional face-to-face contexts afford the instructor and the learner environmental cues to facilitate communication and a sense of community. Yet learners gravitate toward online learning for its convenience, accessibility, virtual study options, and the alleviation of geographical constraints (Merrills, 2010). A consequence of online learning, however, is a feeling of being removed and isolated from other learners and instructors (Cavanaugh & Cavanaugh, 2008). Another consequence is a student's satisfaction with distance education. Below is a review of selected literature on transactional distance and student satisfaction with distance education.

Transactional Distance

Moore's Transactional Distance Theory states that the learner feels a psychological displacement from the instructor, content, and other learners due to the separation in physical distance and in time posed by the distance learning context (Moore & Kearsley, 1996). The perceived transactional distance is influenced by the amount of dialogue happening in a course, the rigidity of the structure of a course, and the degree of student autonomy required for a course. The perception of transactional distance can also be influenced by interactions among learners, between the learner and content, and/or between the learner and the online learning interface (Chen, 2001a; Chen, 2001b).

A closer look at the elements influencing perceived transactional distance begins with the first element, structure. The *structure* of a course regards how flexible or how

rigid the objectives, teaching strategies, and evaluation methods are for the course (Moore, 1993). Structure also includes the extent to which a course can accommodate or respond to a learner's individual needs, and it is determined by the characteristics of the instructor, characteristics of the learner, and the constraints imposed by the institution.

Teaching strategies in this study are classified as being direct instruction, experiential learning, independent study, indirect instruction, or interactive learning. Direct instruction is a teacher-directed method where the teacher stands in front of a classroom and straightforwardly presents the information to teach a specific skill (Howard, 2013). Experiential learning permits a first-hand experience to acquire skills and knowledge outside of the traditional academic classroom setting that includes but is not limited to internships, studies abroad, field trips, field research and service learning projects (Firestone, 2013). Independent study is the expansion of knowledge and skills through a self-guided process (Diamond, 2013). Indirect instruction takes advantage of students' interests and curiosity by seeking a high level of their involvement in observing, investigating, drawing inferences from data, or forming hypotheses to generate alternatives or solve problems (McCambridge, 2015). Finally, interactive instruction uses social interaction and two-way communication between the teacher and student or between students to enhance students' learning (Long-Crowell, 2013).

The level of structure is indicative of the amount of dialogue occurring in the course. *Dialogue*, the second element, is the communicative interaction(s) occurring within the course. It is influenced by environmental factors such as the frequency of the opportunity for communication, the number of learners an instructor must communicate with, and the physical environment in which learners learn or instructors instruct (i.e.

noisy cubicles, quiet homes). Personality traits also affect the interactivity of dialogue (Moore, 1993). Figure 1 shows that when structure is low, more dialogue occurs and when structure is high, less dialogue occurs.

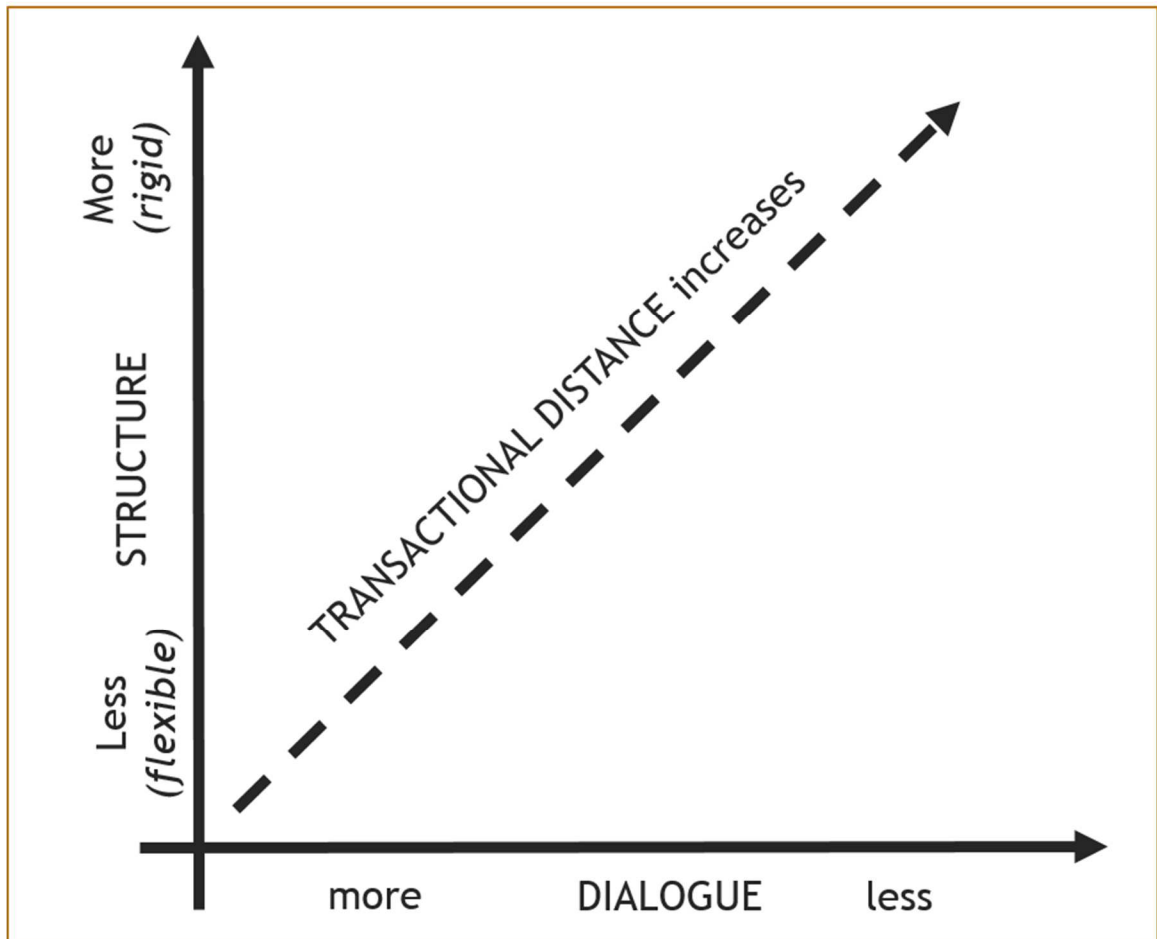


Figure 1. Relationship between Structure and Dialogue (Moore, 2006a)

Student *autonomy* is the third element influencing transactional distance and can be regarded as the extent to which the learner is responsible for his own learning process. A fully autonomous learner is self-directed needing no intermediary between self and the subject matter. In the teaching and learning relationship, it is the learner rather than the instructor who determines the goals, the learning experiences, and the evaluation

decisions of the learning program. To understand how autonomy is related to structure and dialogue, consider Figure 1 turned slightly clockwise as in Figure 2. As the rigidity of the structure increases, and the amount of dialogue decreases, the degree of student autonomy required increases.

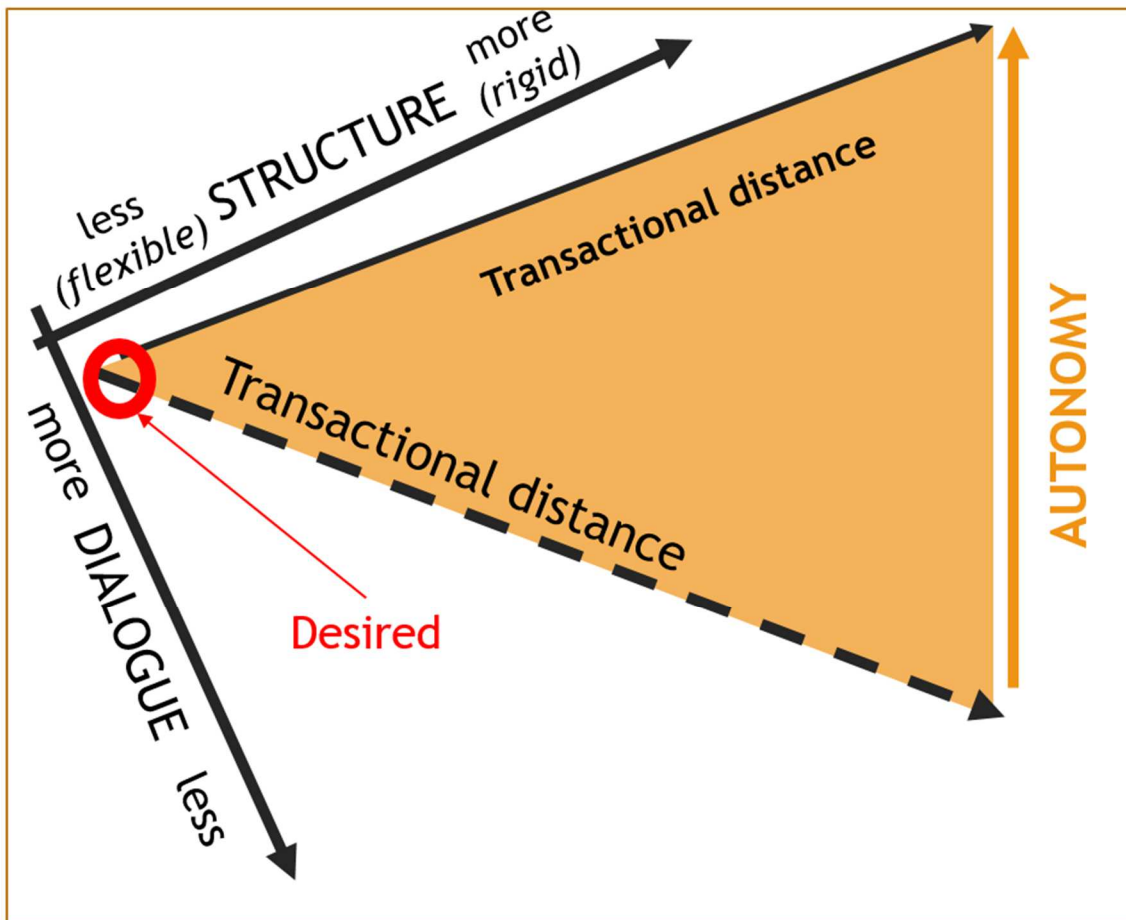


Figure 2. Relationship between Structure, Dialogue, and Autonomy (Moore, 2006b)

The extent to which transactional distance is overcome is based on the degree of opportunity for dialogue and how often dialogue between the teacher and learner occurs. A learner experiencing high transactional distance is likely to be enrolled in a course with

a rigid structure having guidance embedded in the instructional material (Moore & Kearsley, 1996). Highly structured courses permit very little interaction or dialogue between the instructor and the learner, which requires the learner to be more autonomous and responsible. The learner is more likely to depend on the supporting resources of the instruction (i.e., books, texts, websites, etc.) for understanding instead of receiving information from the instructor. Learners are then left to decipher strategies and approaches for study due to the low degree of dialogue with the instructor.

A learner experiencing low transactional distance is usually enrolled in a course where the structure is flexible. Flexible courses have guidance and direction from the instructor that are supportive of the learner. Flexible structures permit the learner to rely on dialogue with the instructor and other learners to receive information. Low transactional distance is the desired state in the online learning context and can be achieved through increased dialogue and feedback (Seok, 2008).

Various studies support Moore's theory, demonstrating that online learning tools used to increase dialogue reduce transactional distance. Wang and Morgan (2008) investigated student perceptions of using instant messaging software for online interactive chapter discussions in a graduate teacher educational technology course and found that it significantly facilitated cooperation among the students, active learning, and prompt feedback with the instructor. Ng (2007) studied the teaching effectiveness and opportunities for interaction using a synchronous E-learning system for online tutoring offered by Open University of Hong Kong and found that student-teacher interaction and student-content interaction were successful through this context, but student-student interaction was low only due to technical difficulties. In a study using the E-learning

context called Elluminate Live, Battin-Little, Passmore, and Schullo (2006) found that students perceived an enhanced learning experience due to the interactive features such as emoticons, hand raising, a shared whiteboard, polling, and application sharing as points of personal engagement. In another study, Cavanaugh and Cavanaugh (2008) examined the visual medium of the interactive geographic map and found that it supports active participation by giving learners control as they visualize the relationships between other course members' locations and themselves.

Conversely, critics suggest that the Transactional Distance Theory needs to be rethought, revisited, and reconsidered based on a previous theory with a similar name, relative groups the theory applies to, and its integration with other theories in practice (Giossos, Koutsouba, Lionarakis & Skavantzios, 2009; Kang & Gyorke, 2008; Murphy & Rodriguez-Manzanares 2008; Sahin, 2008). Despite this criticism, Moore's theory has been suggested to be the central basis for instructional design in online learning contexts and for distance education policy (Benson & Samarawickrema, 2009; Gokool-Ramdoo, 2009). The review of literature indicated that much of the attention related to Moore's Transactional Distance Theory is focused on insufficient social interaction in online learning (McBrien, Jones & Cheng, 2009) and thus, demonstrates support for online learning interfaces that use multiple interactive features for dialogue as an effective way to reduce transactional distance (Battin-Little, Passmore & Schullo, 2006; Cavanaugh & Cavanaugh, 2008; Ng, 2007; Seok 2008; Wang & Morgan, 2008).

Student Satisfaction

Sweeney and Ingram (2001) define student satisfaction as the perception of enjoyment and accomplishment in the learning environment. The body of literature examined in advance of this study reveals that the most efficient model of distance education to support student satisfaction is one in which classroom education is supported by distance education; that is, the hybrid model (Gulten, 2013; Cole et al., 2014). It also reveals several factors that influence student satisfaction. In a study led by Kuo et al. (2013), convenience was the most cited reason for satisfaction and lack of interaction was the most cited reason for dissatisfaction. Chang and Smith (2008) found that learner-instructor interaction, learner-content interaction, learner-learner interactions, and Internet self-efficacy all play a role in a student's satisfaction with distance education.

Learner-instructor interactions influence the range of student satisfaction because they vary from course to course. Students who find it easy to interact with instructors, who approve of instructor actions within online courses, who respect the instructor's level of knowledge, and who are comfortable with the degree of instructor support are usually satisfied with their distance education experience (i.e., Bray et al., 2008; Jackson et al., 2010; Lee, 2014; Harrison et al., 2014). Lee (2014) found that the level of student satisfaction is closely associated with clear guidelines on assignments and rubrics, and constructive feedback from the instructor. While Chang and Smith (2008) found learner-learner interactions to be influential to student satisfaction, other research suggests that learner-learner interactions are not as important as learner-instructor interactions. The opportunity to get to know others in a distance course was undesirable and thought

unnecessary for learning in two studies (Bray et al, 2008; Young, 2011). Only students at the end of their program of study found it interesting to interact socially with others.

Regarding learner-content interaction, the perceived playfulness, usefulness, and effectiveness of multimedia content shapes student attitudes toward distance education (Calli et al., 2013). Students expect their learner-content interactions to provide appropriate information and have quality in the information (Harrison et al., 2014; Machado-Da-Silva, 2014). While learning styles are not predictors of satisfaction (Wu, 2014), they play a role in a student's study skills and ability to engage with the content. The study conducted by Wu (2014) suggested that curriculum can be designed for a single course that leaves students highly satisfied through as much variation as feasible to account for possible learning style differences.

As for Internet self-efficacy, students who found computers easy to use were satisfied with distance education (Bray et al., 2008). Those who had experience with computers and found quality in the learning system and service provided to support it reported high satisfaction with distance education (Erdem Aydin, 2012). Service quality also influenced the intensity with which they used the learning system (Machado-Da-Silva, 2014). Students participating in two Turkish studies found distance education to be a great opportunity that gives them a chance to improve their technical competencies and fills a void for those having difficulties making it to traditional schools (Gurbuz, 2014; Gulsen, 2014; Erdem Aydin, 2012).

Finally, gender, class level, and time spent online per week seemed to have influence on student satisfaction as well (Chang & Smith, 2008). Erdem Aydin (2012) found a

significant difference in the miscommunication, social connection and ease dimensions of online communication between the males and the female students, citing that female students see online environments as openings to communication errors. And, in a study investigating preservice students' class standings and their perceptions of distance education, it was revealed that

Preservice teachers at the beginning stage of their program were significantly more satisfied, overall, with distance courses and programs, than those at the end of their program. Students near the beginning and middle of their program rated grading and timely return of assignments, a sense of accomplishment, and willingness to take additional distance courses, significantly higher than those who were at the end of their program. (Young, 2011, p.138)

In summary, the body of literature shows that interactions within a distance education course are instrumental in overcoming transactional distance and they are strong indicators of student satisfaction with distance education. Recalling that transactional distance can be overcome by increasing the amount of interactions between the learner and the instructor (Moore & Kearsley, 1996) and understanding the role interactions play as indicators of student satisfaction with distance education (Kuo et al., 2013), the following can be summarized. When a course is designed to have a rigid structure requiring high student autonomy and low dialogue, high transactional distance will be observed. When a course is designed to have a flexible structure requiring low student autonomy and high dialogue, low transactional distance will be observed. Dialogue equates to the degree or number of interactions between students and the instructor, and between students and other students. Fewer opportunities for interactions

are expected in courses with high transactional distance. Consequently, when high transactional distance is observed, low student satisfaction will be observed. Conversely, when low transactional distance is observed, high student satisfaction will be observed.

CHAPTER III

METHODOLOGY

This study uses an experimental research design with independent measures where different participants are used in each condition of the independent variable. There were four groups of participants in this study. Each group participated in a hybrid distance education course where the online communications media used in each course varied. The independent variable was the use of online communications media within the courses. The dependent variables were perceived transactional distance and student satisfaction with distance education. Each group of participants were surveyed using the Distance Education Learning Environments Survey upon the completion of the courses. The survey data was analyzed for descriptive statistics. Other statistical procedures included an Analysis of Variance, a Regression Analysis, a Scheffe Test, and an Effect Size calculation.

Population of the Study

All participants of this study were preservice educator participants of a national hybrid education program designed to train preservice educators on curriculum support materials. The national hybrid education program was hosted at ten possible sites across the United States of America. Participants in this study came from four of these sites. Preservice educators in this context are primarily college juniors and seniors who are education majors or some other major with education training in their plan of study. Preservice educators also included post baccalaureate students who had no classroom teaching experience that were studying to become teachers.

Sample of the Population

There were 95 of 125 possible participants that agreed to participate and responded to the survey distributed in this study. Of the 95 participants there were 12 males and 83 females. All of the participants were between the ages of 18 and 25 and all of the students attended a minority serving institution. Due to a confidentiality agreement with the education provider, no additional details about the program participants can be described.

Instrument

The Distance Education Learning Environment Study (DELES) is a 42-item questionnaire designed to measure perceptions of the ideal learning environment (DELES, n.d.). “The development of DELES relied extensively on literature pertaining to high-quality distance education and expert content validation techniques. It treats distance learning as having a distinct social-psychological climate unlike those found in other post-secondary classroom environments (Walker, 2003, p. 62).” After development, it was field tested with 680 distance education students before being validated.

Reliability and Validity

The alpha reliability coefficient for each scale ranges from 0.75 to 0.94 (Walker and Fraser, 2005). Simple correlations between Enjoyment and the DELES scales range from 0.12 to 0.31, with the scale of Personal Relevance having the strongest correlation with Enjoyment when all other scales are mutually controlled (Walker and Fraser, 2005). Figure 3 shows how the seven DELES scales are mapped to the dependent variables of

this study. Structure is aligned to the measure of Personal Relevance, Authentic Learning, and Active Learning built into the course. Dialogue is aligned to the measure of Instructor Support, and Student Interaction and Collaboration. Autonomy is measured by the student autonomy scale and student satisfaction is aligned to the Enjoyment scale.

DEPENDENT VARIABLE 1			DEPENDENT
PERCEIVED TRANSACTIONAL DISTANCE			VARIABLE 2
STRUCTURE	DIALOGUE	AUTONOMY	STUDENT SATISFACTION
<ul style="list-style-type: none"> • Authentic Learning • Active Learning • Personal Relevance 	<ul style="list-style-type: none"> • Instructor Support • Student Interaction and Collaboration 	<ul style="list-style-type: none"> • Student Autonomy 	<ul style="list-style-type: none"> • Enjoyment • Personal Relevance

Figure 3. Alignment of DELES Scales to the Dependent Variables

Scoring Procedures

The DELES has 34 items allocated to six scales: (1) Instructor Support, (2) Student Interaction and Collaboration, (3) Personal Relevance, (4) Authentic Learning, (5) Active Learning, and (6) Student Autonomy. An additional scale of Enjoyment is included to explore associations between the psychosocial learning environment and student affective traits. DELES item values for all scales were set at (a) never = 1, (b) seldom = 2, (c) sometimes = 3, (d) often = 4, and (e) always = 5.

Procedures

Informed consent from each participant was obtained prior to their completion of the Distance Education Learning Environments Survey (DELES) Instrument. This was

done by having a facilitator read aloud the Participant Information sheet bearing details about this study to the potential participants participating in the program. The potential participants were given a copy of the Participant Information sheet for future reference and then completed and Informed Consent Form specifying whether they accepted or declined the invitation to become a subject. Participants acknowledged their voluntary participation in the study by selecting “I wish to participate in the research described above and have read this consent form” and by signing the Informed Consent Form. At that time, the DELES was distributed to them in paper form and completed by the participants. Facilitators at each site collected the completed Informed Consent Forms and DELES Instruments and shipped them to the researcher.

Treatment

Figure 4 shows the differences in use of online communications media among the groups. It describes the type of online communications media used, the purpose for its use, and the degree of opportunities for interactions in each course relative to one another.

	Type of Online Communications Media Used	Purpose(s)	Degree of Opportunities for Interactions Relative to other Groups
Group A	<ul style="list-style-type: none"> • Desire2Learn: a learning management system • Blackboard: videoconferencing software • Email 	<ul style="list-style-type: none"> • Build an online community • Disseminate logistical information • Download content • Establish a 	High

		community of practice <ul style="list-style-type: none"> • Hosting two-way live instructor and student presentations • Log discussions • Submit completed forms 	
Group B	<ul style="list-style-type: none"> • Wiggio: free software for creating private online communities • Facebook: A Social Media Platform • Live Binder: free software for creating an online repository • Email 	<ul style="list-style-type: none"> • Build an online community • Disseminate logistical information • Download content • Log discussions 	High
Group C	<ul style="list-style-type: none"> • Online Repository • Email 	<ul style="list-style-type: none"> • Disseminate logistical information • Download content • Upload content 	Medium
Group D	<ul style="list-style-type: none"> • Email 	<ul style="list-style-type: none"> • Disseminate Logistical Information 	Low

Figure 4. Variations in Use of Online Communications Media among Groups

The purposes for using online communications media was to build an online community, to establish a community of practice, to host two way live online synchronous meetings for student and instructor led presentations, to disseminate logistical information, to log discussions, to submit completed forms, and to upload or download content. Group A had the most opportunities for interaction because

participants had a private online environment to submit information, receive information, have synchronous online meetings, and interact with the instructor and peers. Group B had a similar online community as Group A, but without the online synchronous meetings. Group C had fewer opportunities for interaction than Group A and Group B; in that participants in Group C were required to upload and download content using an online repository and receive logistical information via email. Group D had the least opportunity for interaction as email was the only type of communications media used for interaction and the interactions were mostly unidirectional from the instructor to the participants. Therefore, the number of opportunities for interaction descended in the following order: Group A, Group B, Group C, and Group D. Greater detail for variation among the groups follows.

Group A. There were 29 participants in Group A. These participants did not receive a stipend for participating in the program. The five educational objectives for Group A were to (1) demonstrate the integration of science, technology, engineering and mathematics (STEM) using targeted education resources; (2) provide content-based training to enhance knowledge, skills and strategies for teaching STEM; (3) provide opportunities for authentic teaching experiences; (4) demonstrate instruction in the hybrid fashion; and (5) have participants develop a portfolio useful for marketing their acquired skills.

The Group A course used online communications media before, during, and after the face-to-face workshops to disseminate logistical information, establish an online community, establish a community of practice, provide training, provide content, submit completed forms, and foster discussions. The course had 10.5 hours of synchronous

online meetings via the Desire2Learn (D2L) Learning Management System. Four meetings occurred in the four weeks prior to participants' face-to-face workshops. A fifth and sixth meeting occurred during the face-to-face workshops and the seventh meeting occurred after the workshops ended. Each online synchronous meeting was 1.5 hours in length. The D2L online community was the only endorsed place where all participants could interact with the instructor, each other, and the content of the course.

Face-to-face workshops for Group A occurred in one of two separate one-week sessions in Houston, TX where half of the participants attended each week. During the workshops, participants were taken on unique behind the scenes tours of various facilities. They heard presentations from subject matter experts and conducted hands-on activities led by education specialists. They had assignments to work on their electronic portfolio in the evenings and they had an authentic teaching experience where each participant taught a lesson that was videotaped for future review and use. By the end of the face-to-face workshops, participants produced a comprehensive electronic portfolio qualified to support a professional profile, academic studies, and/or an increase in marketability for positions in teaching STEM subject areas.

The course for Group A employed four types of teaching strategies: interactive, indirect, experiential learning, and independent study. The interactive instructional strategies included role-playing, peer partner learning, discussion, cooperative learning groups, jigsaw and think, pair, share. Some indirect instructional strategies used were inquiry, reflective discussion, concept mapping, and problem solving. Independent study strategies included learning logs (e-portfolio) and homework while experiential learning strategies included field trips (tours), conducting experiments, and model building.

Evaluation of participants' acquisition of knowledge was conducted using both formative and summative assessments. Formative assessments included a pre and post-test on content information, written reflections, checks-for-understanding, polls, in-class activities, homework and a deliverable (i.e. a 5-E lesson plan). Summative assessments included an electronic portfolio and a presentation where participants had to teach a lesson to an audience.

Group B. There were 21 participants in Group B. These participants received a \$600 stipend for their participation. The twelve educational objectives for Group B were to: (1) teach participants targeted content, (2) explore new technologies that lead to new discoveries, (3) practice 21st century learning skills, (4) participate in hands-on activities, (5) apply the effective use of instructional technology, (6) utilize professional collaboration tools, (7) interact with engineers and scientists, (8) investigate targeted resources, (9) align lessons to local and state standards, (10) apply modeling and simulation as instructional tools for science and math, (11) use STEM notebooks for formative assessment, and (12) utilize reflective practices to personalize learning.

The Group B course used online communications media before, during, and after the face-to-face workshops to disseminate logistical information, establish an online community, establish a community of practice, provide content, and foster discussions. It began with participation in an online environment called Wiggio from <http://wiggio.com>. Wiggio was used for asynchronous field discussions, exchange of links to videos, articles and education resources, and exchange of logistical information. Other online platforms like Facebook and LiveBinder were used for similar purposes.

Face-to-face workshops for Group B occurred in a single two week session in Hampton, VA. Activities during these workshops included facilities tours, hands-on lessons, and hearing presentations from subject matter experts. During the face-to-face workshops only, the course for Group B employed four types of teaching strategies; interactive, indirect, experiential learning, and independent study. The interactive instructional strategies included constructive criticism, role playing and problem solving. Direct instructional strategies used were lecture and structured overview. Some indirect instructional strategies used were inquiry, reflective discussion, and concept mapping. Independent study strategies included journals, homework, and learning centers while experiential learning strategies included field trips, experiments, games, simulations, and model building.

Formative and summative evaluation methods were used for Group B. Formative assessments included a pre and post-test on content information, written reflections, checks-for-understanding, polls, and class deliverables. Summative assessments included a design project and an optional portfolio.

Group C. There were 34 participants in Group C. These participants received a \$500 stipend and a Certificate of Completion. The five educational objectives for Group C were (1) to expose participants to problem based learning and STEM enrichment activities, (2) to interface with scientists, engineers and education specialists, (3) to tour facilities, (4) to incorporate cutting-edge research into STEM-integrated lesson plans for grades K-8 students, and (5) to program Lego MindStorms Robots and to develop problem based lessons.

The Group C course used online communications media before, during, and after the face-to-face workshops to disseminate logistical information and provide content. A repository on a single website was created for participants to upload and download content. While using the website, there was only interaction between the participants and the content, and there were no interactions between the participants and the instructor.

Face-to-face workshops for Group C occurred in six total, though non-consecutive days. The first day was an all-day orientation. The remaining days occurred three weeks later at two on-site locations near Los Angeles, CA. During the face-to-face workshops only, four types of teaching strategies were employed; direct, indirect, interactive, and experiential learning. Direct instruction was solely in the form of lecture while the indirect instruction focused on inquiry. Interactive strategies included problem solving, cooperative learning groups, and role-playing. Experiential learning strategies used involved field trips and games.

Both formative and summative evaluation methods were used. Formative assessments included a pre and post survey, reflections, and class deliverables. Summative assessments required participants to complete projects and make a presentation.

Group D. There were 11 participants in Group D. These participants received stipends ranging from \$100 to \$600, thirty-five professional development hours and 16 Gifted and Talented (GT) credit hours toward GT certification. The six educational objectives for Group D were (1) to participate in hands-on activities, (2) to meet scientists, (3) to model lessons and engage K-8 students in them, (4) to tour facilities, (5)

to discover connections between scientific concepts and (6) to distribute educational resources.

The Group D course used online communications media before the face-to-face workshops to disseminate logistical information about the face-to-face portion. Dialogue was limited to four emails from the instructor to the participants. The face-to-face workshops occurred in a one-week session in Houston, TX. During the workshops, participants were taken on unique behind the scenes tours of various facilities. They heard presentations from subject matter experts and conducted hands-on activities led by education specialists. They had an authentic teaching experience where each participant taught a lesson at an outreach booth during an open house event.

During the face-to-face workshops only, the following types of teaching strategies were employed; direct, indirect, interactive, and experiential. Direct instruction was solely in the form of lecture while the indirect instruction focused on inquiry and reflective discussion. Interactive strategies included think-pair-share, problem solving, and cooperative learning groups. Experiential learning strategies used role-playing, kinesthetic activities, model building, field trips, and conducting experiments.

Both formative and summative evaluation methods were used. Formative assessments included a pre and post survey, reflections, checks for understanding and polling. Summative assessments required participants to make a presentation on lessons they'd been exposed to.

Analysis of Data

Responses to the DELES were used to determine a measure of central tendency for each group using the values of each scale of the instrument. The measure of central

tendency utilized in this study was the mean. For incomplete records, if less than half of the item values for a scale were omitted, the missing values were replaced with the item mean (Knapp, 1990). If more than half of the item values for a scale were missing, the participant was deleted from that scale. For each group, the sums of the items in all scales were averaged to produce the mean for each scale. Next, an analysis of variance test (ANOVA) was performed for each scale to determine if there were differences among the groups. Then, a regression analysis was performed to determine the strength of the relationship between the independent and dependent variables. For the observed significant differences, the post hoc Scheffe test was run and effect sizes were calculated.

CHAPTER IV

RESULTS

A one-way analysis of variance (ANOVA) was conducted to evaluate the relation between each group and their responses to the seven scales of the Distance Education Learning Environment Survey (DELES) instrument, for a total of seven ANOVAs. The independent variable was the online communications media used within the courses completed by each group. The dependent variables, perceived transactional distance and student satisfaction with distance education, were indicated by responses to the seven DELES scales; Student Autonomy, Authentic Learning, Active Learning, Instructor Support, Student Interaction and Collaboration, Personal Relevance, and Enjoyment.

Table 1 is a summary of the means and standard deviations for uses of online communications media by the seven scales of the DELES. Responses to the items on the first six scales averaged. Participants reported affirmatively by selecting “often” or “always” about the practices in each course involving Student Autonomy, Authentic Learning, Active Learning, Instructor Support, Student Interaction and Collaboration, and Personal Relevance. However, the Enjoyment scale had means ranging from 2.50 to 3.64 indicating that on average, participants reported they “seldom” or “sometimes” enjoyed the practices of each course.

Table 1

Descriptive Statistics for Group Responses to the DELES

DELES Scales	Group A (n=29)		Group B (n=21)		Group C (n=34)		Group D (n=11)	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Student Autonomy	4.40	0.48	4.50	0.44	4.34	0.53	4.26	0.53
Authentic Learning	4.52	0.49	4.76	0.38	4.43	0.61	4.51	0.41
Active Learning	4.24	0.60	4.34	0.60	4.10	0.51	4.22	0.57
Instructor Support	4.47	0.51	4.77	0.42	4.72	0.41	4.59	0.31
Student Interaction & Collaboration	4.54	0.69	4.71	0.39	4.56	0.51	4.60	0.44
Personal Relevance	4.39	0.66	4.56	0.53	4.30	0.50	4.36	0.51
Enjoyment	3.63	0.92	3.54	0.99	2.50	0.80	3.64	0.81

Tables 2 through 8 show the results of the one-way ANOVAs for online communications media by each scale of the DELES. The significant p value used in this study was <0.05 ; equivalent to 95% or higher certainty of differences among the groups. There were no statistically significant differences between group means for six of the seven scales; Student Autonomy ($F(3,91) = 0.69, p = 0.55$), Authentic Learning ($F(3,82)$

= 1.77, $p = 0.15$), Active Learning ($F(3,83) = 0.41$, $p = 0.74$), Instructional Support ($F(3,91) = 2.47$, $p = 0.06$), Student Interaction and Collaboration ($F(3,91) = 0.43$, $p = 0.72$), and Personal Relevance ($F(3,83) = 2.35$, $p = 0.07$).

Table 2

ANOVA for Uses of Online Communications Media by Student Autonomy Scale

ANOVA	Sum of Squares	<i>d. f.</i>	Mean Square	<i>F</i>	<i>P</i>
Between groups	0.51	3	0.17	2.71	0.55
Within groups	22.67	91	0.24		
Total	23.18	94			

Table 3

ANOVA for Uses of Online Communications Media by Authentic Learning Scale

ANOVA	Sum of Squares	<i>d. f.</i>	Mean Square	<i>F</i>	<i>P</i>
Between groups	1.38	3	0.46	2.72	0.15
Within groups	21.35	82	0.26		
Total	22.73	85			

Table 4

ANOVA for Uses of Online Communications Media by Active Learning Scale

ANOVA	Sum of Squares	<i>d. f.</i>	Mean Square	<i>F</i>	<i>P</i>
Between groups	0.41	3	0.13	2.72	0.74
Within groups	27.53	83	0.33		
Total	27.95	86			

Table 5

ANOVA for Uses of Online Communications Media by Instructor Support Scale

ANOVA	Sum of Squares	<i>d. f.</i>	Mean Square	<i>F</i>	<i>P</i>
Between groups	1.44	3	0.48	2.71	0.06
Within groups	17.65	91	0.19		
Total	19.09	94			

Table 6

ANOVA for Uses of Online Communications Media by Student Interaction and Collaboration Scale

ANOVA	Sum of Squares	d. f.	Mean Square	F	P
Between groups	0.39	3	0.13	2.71	0.72
Within groups	27.35	91	0.30		
Total	27.74	94			

Table 7

ANOVA for Uses of Online Communications Media by Personal Relevance Scale

ANOVA	Sum of Squares	d. f.	Mean Square	F	P
Between groups	2.24	3	0.74	2.72	0.07
Within groups	26.30	83	0.31		
Total	28.55	86			

Table 8

ANOVA for Uses of Online Communications Media by Enjoyment Scale

ANOVA	Sum of Squares	d. f.	Mean Square	F	P
Between groups	26.51	3	8.83	2.71	<0.001
Within groups	71.71	91	0.78		
Total	98.23	94			

Only the Enjoyment scale showed a significant difference among the groups ($F(3,91) = 11.21, p < 0.001$). Post hoc analyses were conducted to determine where the difference was and how large of a difference it was. The Scheffe post hoc criterion was conducted to determine where the difference among the means was by analyzing multiple pair combinations across the four groups. Using the critical value from the ANOVA test, the decision rule was if $F > 2.71$, reject the null hypothesis. Table 9 shows that all comparisons involving group C have significant values greater than the critical F value. Group C differed from Group A the most ($F=25.64$), followed by Group B ($F=17.80$),

and Group D ($F=13.85$). There were no significant differences among the other group pairings.

Table 9

Scheffe Test of Group Pairings for Use of Online Communications Media by Enjoyment Scale

(I) Group	(J) Group	Mean Difference (I-J)	Std. Error	Sig.
Group A	Group B	0.00	0.78	0.14
	Group C	1.27	0.78	25.64
	Group D	0.00	0.78	0.00
Group B	Group A	0.00	0.78	0.14
	Group C	1.06	0.78	17.80
	Group D	0.01	0.78	0.10
Group C	Group A	1.27	0.78	25.64
	Group B	1.06	0.78	17.80
	Group D	1.30	0.78	13.85
Group D	Group A	0.00	0.78	0.00
	Group B	0.01	0.78	0.10
	Group C	1.30	0.78	13.85

A post hoc analysis for effect sizes was conducted to determine how large the differences among the group means were. Effect sizes are defined as small ($d = .2$), medium ($d = .5$), and large ($d = .8$) (Cohen, 1992). Table 10 shows that all comparisons involving group C have large effect sizes. The effect size for the analysis between Group C and Group D ($d=1.40$) exceeded Cohen's convention for a large effect the most. The effect size between Group C and Group A ($d=1.30$) and the effect size between Group C

and Group B ($d=1.15$) followed in descending order. The effect sizes between the other group pairings were all less than Cohen's convention for a small effect.

Table 10

Effect Sizes of Group Pairings for Uses of Online Communications Media by Enjoyment Scale

Pairings	\bar{X}_1	\bar{X}_2	SD _{pooled}	Cohen's d
Group A vs. Group B	3.63	3.54	0.95	0.10
Group A vs. Group C	3.63	2.50	0.86	1.30
Group A vs. Group D	3.63	3.64	0.87	0.01
Group B vs. Group C	3.54	2.50	0.89	1.15
Group B vs. Group D	3.54	3.64	0.90	0.11
Group C vs. Group D	2.50	3.64	0.81	1.40

A regression analysis was performed to demonstrate how much the dependent variables can be attributed to the independent variable. Using the values calculated in the ANOVAs, the formula for the regression analysis is $R^2 = (SST - SSW)/SST$. That is, the R^2 value is derived from the sum of squares between groups divided by the total sum of squares. Table 11 shows the regression analysis results with R^2 values.

Table 11

Regression Analysis for Uses of Online Communications Media by DELES Scales

DELES SCALES	<i>d. f.</i>	<i>F</i>	R^2
Student Autonomy	3, 91	2.71	0.02
Authentic Learning	3, 82	2.72	0.06
Active Learning	3, 83	2.72	0.01
Instructor Support	3, 91	2.71	0.07

Student Interaction and Collaboration	3, 91	2.71	0.01
Personal Relevance	3, 83	2.72	0.07
Enjoyment	3, 91	2.71	0.26

The strengths of the relationship between the use of online communications media and responses to the first six scales were low, with the use of online communications media accounting for a range of 1% to 7% of the variance. The strength of the relationship between the use of online communications media and responses to the Enjoyment scale was moderate, with the use of online communications media accounting for 26% of the variance.

CHAPTER V

DISCUSSION

This study aimed to determine which uses of online communications media within courses provided through a national hybrid distance education program yields the least transactional distance perceived by students and the highest student satisfaction with distance education. It used a quantitative, experimental research design with the ANOVA, post hoc, and Regression statistical analyses to evaluate the relationship between uses of online communications media and participant perceptions of transactional distance, and the relationship between uses of online communications media and student satisfaction with distance education. It was hypothesized that there would be no significant difference among the groups regarding uses of online communications media and perceived transactional distance. As well as, there would be no significant difference among the groups regarding uses of online communications media and student satisfaction with distance education. The samples used in this study were participants of a national hybrid education program designed to train pre-service educators on curriculum support materials. This study surveyed sample groups from four sites across the nation with a total of 95 participants. The DELES instrument was used to measure the elements influencing transactional distance and to capture student satisfaction with distance education.

Conclusions

It was found that the variation in uses of online communications media was not significantly different among group perceptions of transactional distance. All of the groups' courses had comparable educational goals, teaching strategies, and evaluation methods, but the uses of online communications media is where they varied due to a lack of standardization in the program implementation at each of the four sites. Participant responses to scales of the DELES instrument that measured the elements of transactional distance indicated the desired low perception. That is, responses did not indicate there was a great *distance* psychologically from the course, instructor, and other students. Despite the separation in space and time at points during the courses and despite the various uses of online communications media, there were no differences among the groups' perceptions of transactional distance. Specifically, participants in all groups reported means between 4.26 and 4.77 for the following scales; Active Learning, Student Interaction and Collaboration, Student Autonomy, Authentic Learning, Personal Relevance, and Instructor Support. When the ANOVA was conducted for these scales, it was further confirmed that there was no significant difference among the groups at the critical value of $p = 0.05$. However, it should be noted that two scales had p values marginally close to the critical value; Personal Relevance ($p = 0.07$) and Instructor Support ($p = 0.06$). Although insignificant, it means there was notable variation among the groups in these areas of practice.

Further support of insignificance was revealed by the regression analysis that was conducted. The strength of the relationship between uses of online communications media and responses to the first six scales were low, with online communications media

accounting for a range of only 1% to 7% of the variance. Therefore, the null hypothesis, “There is no difference in perceived transactional distance among the groups,” can be retained at the 95% confidence level. The alternative hypothesis, “there is a significant difference in perceived transactional distance among the groups,” can be rejected.

The results of the data analyzed in this study show a significant difference among the groups for student satisfaction with distance education. First, the mean scores for the seventh scale of the DELES, Enjoyment, ranged from 2.50 to 3.64 with standard deviations ranging from 0.80 to 0.99. Specifically, responses from Groups A, B, and D had means between 3.54 and 3.64, while Group C’s responses had a mean of 2.50. In other words, the average participant from Groups A, B, and D selected “sometimes” or “often”, while the average participant from Group C selected “seldom” or “sometimes.” Thus Groups A, B, and D reported moderate to high regards for enjoyment of the course, while Group C reported low to moderate regards for enjoyment of the course.

Secondly, the ANOVA conducted for the Enjoyment scale confirmed a significant difference among the groups at the critical value of $p = 0.05$. Post hoc analyses indicate that Groups A, B, and D differed significantly from Group C in terms of uses of online communications media. The Scheffe Test showed that Group C differed from Group A the most, followed by Group B. Group A and Group B had more opportunities for interaction using online communications media than Group C. The Scheffe Test also showed that Group C differed from Group D, but Group D had fewer opportunities for interaction than Group C. It can be deduced that the low to moderate levels of enjoyment reported by Group C, has to do with how the online communications media was used more than it does with the number of opportunities to interact. Group C used a repository

on a single website with interaction only between the participants and the content instead of interactions between the participants and the instructor.

Further support for the significant difference was revealed during the effect size and regression analyses. The effect size analysis revealed a large effect between Group C and the other groups and a small effect between the other group pairings. The regression analysis revealed that strength of the relationship between uses of online communications media and responses to the Enjoyment scale was moderate, with online communications media accounting for 26% of the variance. It can be deduced that the reason for Group C reporting low to moderate levels of enjoyment was because of the online tasks that restricted some communication with the instructor. Given all of the statistical analyses, the null hypothesis, “there is no difference in student satisfaction with distance education among the groups,” can be rejected at the 95% confidence level. The alternative hypothesis, there is a significant difference in student satisfaction with distance education among the groups, can be retained.

It can also be concluded that implementing a national multi-site hybrid education program that lacks standardized guidance on its implementation, as in this study, does not make a difference to how students perceive transactional distance. The number of interactions in the online portion of a hybrid course is insignificant as well. However, attitudes about distance education are affected by the way online communications media is used within a course. This study found that restricting communication with the instructor in an online setting yields low to moderate ratings of enjoyment and thus significantly affects student satisfaction with distance education.

Recommendations

Subsequent research in the field of distance education should use this study to supplement the body of work investigating student attitudes about hybrid courses and to influence instructional design of future hybrid courses. Although the findings of this study lends future designers of hybrid courses reasoning to disregard standardizing the implementation of them, it also lends advice to the use of online communications media within them. Using online communications media for multiple purposes to increase interactions, with the intent to mitigate high perceptions of transactional distance, was not as important as who the interactions involved. Future designers should alleviate restrictions on communications between the instructor and the student, as opportunities for the instructor and the student to communicate online yield the most appealing and most effective courses for maintaining and/or increasing student satisfaction with distance education.

For the future managers of the national hybrid education program used in this study, it should be noted that this study does not lend information on the quality of the program. One recommendation is to standardize the education goals and implementation of the program for the best comparisons of quality in teaching. Each group experienced a course with goals, teaching strategies, evaluation and communication methods where no transactional distance was reported, but that does not speak to the quality of the experience that each group received. Serious consideration must be given to the impression of distance education that the program is leaving in the minds of participants. A suggestion for further research is to conduct a qualitative study of reasons for the notable differences in satisfaction about distance education from this study. If these

differences are not investigated, it could become a problem for the health of the program's ability to be effective using distance education and it can scar participants' perceptions of what distance education is like. A participant could participate in the current program having received the intended content knowledge while simultaneously feeling adverse to the concept of distance education.

With distance education formats continuing to evolve, researchers should stay fixated on the threat that student satisfaction with distance education is influenced by every online experience. The likelihood of students attending future distance education courses and/or the ultimate, the likelihood of distance education surviving as a delivery mechanism of instruction is dependent on student satisfaction with these experiences in distance education courses.

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APPENDIXES

APPENDIX A

PERMISSION FROM THE CREATOR OF THE DISTANCE EDUCATION LEARNING ENVIRONMENTS SURVEY

Scott L. Walker, ScEdD
397 S. Willow Ave.
New Braunfels, TX 78130
USA
walkstx@gmail.com

DELES Permission Letter


Elicia Fullwood has been granted permission to use the Distance Education Learning Environments Survey (DELES) for the purpose of the proposed doctoral study: Influence of Structure on Perceptions of Transactional Distance and Student Satisfaction in Online Learning Programs through Oklahoma State University with the following usage rights being granted.

One time U.S. rights for e-mail distribution of the Preferred, Actual, and Instructor forms of the DELES.

One time U.S. rights for Web posting of the Preferred, Actual, and Instructor forms of the DELES to be removed from the Web no later than January 1, 2015.

The DELES and its versions and derivatives are copyright protected. When the DELES or a derivative of the DELES is published or presented for non-commercial use you must mention Scott L. Walker as the copyright holder of the instrument in this format:

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Scott L. Walker, ScEdD

June 14, 2014
Date|

APPENDIX B

OKLAHOMA STATE UNIVERSITY INSTITUTIONAL REVIEW BOARD APPROVAL

Oklahoma State University Institutional Review Board

Date: Wednesday, May 28, 2014
IRB Application No ED1489
Proposal Title: Influence of Structure on Perceptions of Transactional Distance and Student Satisfaction in Online Learning Programs
Reviewed and Processed as: Exempt

Status Recommended by Reviewer(s): Approved Protocol Expires: 5/27/2017

Principal Investigator(s):

Dynae Fullwood
2101 NASA Parkway
Houston, TX 77058

Steven Marks
300 Cordell North
Stillwater, OK 74078

The IRB application referenced above has been approved. It is the judgment of the reviewers that the rights and welfare of individuals who may be asked to participate in this study will be respected, and that the research will be conducted in a manner consistent with the IRB requirements as outlined in section 45 CFR 46.

☒ The final versions of any printed recruitment, consent and assent documents bearing the IRB approval stamp are attached to this letter. These are the versions that must be used during the study.

As Principal Investigator, it is your responsibility to do the following:

1. Conduct this study exactly as it has been approved. Any modifications to the research protocol must be submitted with the appropriate signatures for IRB approval. Protocol modifications requiring approval may include changes to the title, PI advisor, funding status or sponsor, subject population composition or size, recruitment, inclusion/exclusion criteria, research site, research procedures and consent/assent process or forms.
2. Submit a request for continuation if the study extends beyond the approval period. This continuation must receive IRB review and approval before the research can continue.
3. Report any adverse events to the IRB Chair promptly. Adverse events are those which are unanticipated and impact the subjects during the course of the research; and
4. Notify the IRB office in writing when your research project is complete.

Please note that approved protocols are subject to monitoring by the IRB and that the IRB office has the authority to inspect research records associated with this protocol at any time. If you have questions about the IRB procedures or need any assistance from the Board, please contact Dawnett Watkins 219 Cordell North (phone: 405-744-5700, dawnett.watkins@okstate.edu).

Sincerely,


Shelia Kennison, Chair
Institutional Review Board

INFORMED CONSENT INFORMATION PAGE

PARTICIPANT INFORMATION OKLAHOMA STATE UNIVERSITY

Title: Influence of Structure on Perceptions of Transactional Distance and Student Satisfaction in Online Learning Programs

Investigators: Dr. Steve Marks and Elicia Dynae Fullwood (Oklahoma State University)

Purpose: The purpose of this study is to describe how student perceptions of transactional distance vary according to differing course designs (structures) offered by NASA that include online activities.

What to Expect: Participation in this study will involve completion of one survey. The survey will ask for information about your participation in the Pre-Service Teacher Institute. You must complete each question before moving on to the next. The survey will take approximately 15 minutes to complete.

Risks: The principle risks associated with this study are those associated with a breach in confidentiality. To minimize these risks your name and contact information will be disassociated from your survey. Your name and contact information will be stored securely in a locked file in the researcher's office.

Benefits: This study is being conducted to gauge the effectiveness of current distance education practices with intent to report to the distance education results that may influence future instructional design for online courses and support/refute recommended best practices.

Compensation: There will be no compensation for participating in this research study.

Your Rights: Your participation in this research study is completely voluntary. There is no penalty for refusal to participate, and you are free to withdraw your consent and participation in this study at any time, without penalty.

Confidentiality: All information about you will be kept confidential and will not be released. Research records will be stored securely and only researchers and individuals responsible for research oversight will have access to the records.

Contacts: You may contact any of the researchers at the following address and phone number, should you desire to discuss your participation in the study and/or request information about the results of the study:

Elicia Dynae Fullwood
Oklahoma State University Doctoral Candidate
NASA Johnson Space Center
External Relations – Office of Education
Educator Professional Development Projects Manager



2101 NASA Parkway, Code AD4, Houston, TX 77058
Phone: 281.244.7426
Email: Elicia.d.fullwood@nasa.gov

Steven K. Marks EdD
NASA Education Projects
TFS/DLN/JSC-SEA/HUNCH
300 Cordell North
Oklahoma State University
Stillwater Oklahoma 74078
Phone: 405.744.8125
Fax: 405.744.7785
Email: steve.marks@okstate.edu



INFORMED CONSENT FORM

NASA Pre-Service Teacher Institute

Researchers Names: Dr. Steve Marks and Elicia Dynae Fullwood

Address: 2101 NASA Parkway, Mail Code AD4

Telephone number: 281-244-7426

Email address: elicia.d.fullwood@nasa.gov

Thank you for agreeing to participate in this research study. This form outlines the purposes of study and provides a description of your involvement and rights as a participant. The purpose of this study is to describe how student perceptions of transactional distance vary according to differing course designs (structures) offered by NASA that include online activities. You are being asked to participate in the study as a result of your participation in the 2014 Pre-Service Teacher Institute.

You are invited to participate in this study by completing the Distance Education Learning Environments Survey.

As participant in this research, you are entitled to know the nature of our research. You are free to decline to participate, and you are free to withdraw from the study at any time. No penalty exists for withdrawing your participation. Feel free to ask any questions at any time about the nature of the research study and the methods we are using. Your suggestions and concerns are important to us. Please contact the researchers at the addresses/email provided above.

Please indicate your willingness to participate in this research process by checking one of the following statements and providing your signature below. The signatures below indicate an acknowledgment of the terms described above.

_____ I wish to participate in the research described above and have read this consent form.

_____ I do not wish to participate in the research described above.

PRINTED NAME

SIGNATURE

DATE



VITA

Elicia Dynae Fullwood
Candidate for the Degree of
Doctor of Education

Thesis: INFLUENCE OF THE USE OF ONLINE COMMUNICATIONS MEDIA ON
PERCEPTIONS OF TRANSACTIONAL DISTANCE AND STUDENT
SATISFACTION IN A HYBRID EDUCATION PROGRAM

Major Field: Applied Educational Studies

Biographical: Born in Baton Rouge, LA, Elicia Dynae Fullwood was the valedictorian of the 1994 Capitol Senior High School Class. In addition to her education described below, she has a Certificate in Online Teaching from Oklahoma State University and a TX School Administration Certification. Dynae is working as the Lead Educator Professional Development Activity Manager at NASA Johnson Space Center in Houston, TX.

Education:

- Completed the requirements for the Doctor of Education in Applied Educational Studies at Oklahoma State University, Stillwater, Oklahoma in May, 2015.
- Completed the requirements for the Master of Education in Education Administration & Secondary Education at University of St. Thomas, Houston, TX, 2002.
- Completed the requirements for the Bachelor of Science in Biology at University of Houston, Houston, TX in 1999.

Experience:

- *Educator Professional Development Activity Manager, November 2013 – present, NASA, Johnson Space Center, Houston, TX*
- *Education Specialist, 2005 – 2013, National Aeronautics and Space Administration*
- *Classroom Teacher, 1999 – 2005, Houston Independent School District, Houston, TX*

Publication:

Piecka, D. C., Ruberg, L., Ruckman, C., & Fullwood, D. (2012). *NasaTalk* as a discovery learning space: Self-discovery learning opportunities. In S. Hai-Jew (Ed.), *Constructing Self-Discovery Learning Spaces Online: Scaffolding and Decision Making Technologies* (pp. 49-71). Hershey, PA: IGI Global.