

DISSERTATION

STUDENT SATISFACTION AND TYPES OF INTERACTION
IN DISTANCE EDUCATION COURSES

Submitted by

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In partial fulfillment of the requirements

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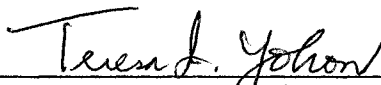
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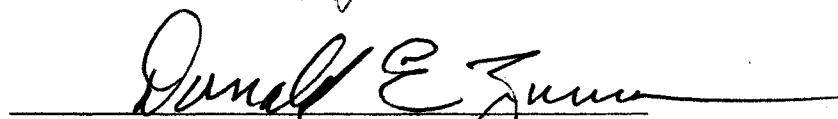
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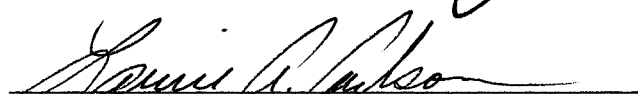
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WE HEREBY RECOMMEND THAT THE DISSERTATION PREPARED UNDER
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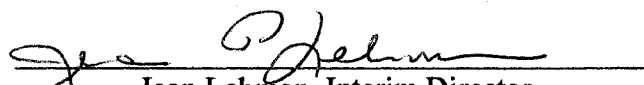
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ABSTRACT OF DISSERTATION
STUDENT SATISFACTION AND TYPES OF INTERACTION
IN DISTANCE EDUCATION COURSES

Technology developments have enabled more collaboration and interaction of learners with instructors, other learners, and the content in distance education courses. A complex array of factors combine to make distance education course experiences varied for students in higher education. This study looked at what types of interaction are most important to student satisfaction in distance education courses. An instrument was developed to evaluate the types of interaction in relation to student satisfaction. The initial instrument items were outlined through a review of the literature and other instruments of instructional evaluation. The framework for the Student Satisfaction and Interaction Questionnaire (SSIQ) was given to a panel of experts, who conducted multiple item reviews and content validation using the Index of Item-Objective Congruence.

The hypothesis for this study was that there would not be any one type of interaction that better predicts student satisfaction in a distance education course. The SSIQ was placed on the World Wide Web and graduate students in a distance Master of Business Administration program were sent e-mails announcing their selection to participate in the survey, along with a URL link to a letter of invitation. After collecting completed survey data from the participants, descriptive statistics such as item

frequencies, means, and standard deviations were calculated. Themes from the comments were analyzed.

Simultaneous multiple regression was conducted to determine the best linear combination of interaction types for predicting overall student satisfaction in distance education courses. The combination of variables (interaction types – learner-content, learner-instructor, learner-learner, and learner-multiple) significantly predicted overall student satisfaction in distance education courses.

The findings suggest that learner-instructor interaction contributed the most to overall student satisfaction in distance education courses, with learner-content interaction also significant to the model. Seventy-two percent of the variance in overall student satisfaction in distance education courses was explained by learner-instructor and learner-content interactions. This is a larger than typical effect in terms of practical significance ($n = 105$). The outcomes were further validated through the qualitative research question where students were asked to rank-order the survey constructs (learner-content, learner-instructor, learner-learner, and learner-multiple interaction types). The research results showed that both learner-content and learner-instructor interaction were the most important types of interaction to the participants in a distance education course. Recommendations for practice and future research needs are discussed.

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“God, grant me the serenity to accept the things I cannot change, courage to change the things I can, and the wisdom to know the difference.” Author Unknown.

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CHAPTER 1 – INTRODUCTION

In this era of technological developments, a significant trend is developing in higher education: the introduction and conversion of traditional face-to-face courses into multimodal and online distance education courses via the World Wide Web (WWW). The distance education platform is mostly asynchronous and therefore, eliminates the constraints of time and location for students. For instance, in an online environment, students can receive instruction at any time, complete assignments, ask the instructor questions, and hold discussions with other students. The combination of these factors allow for increased accessibility of university courses through distance education.

Distance education is not a new phenomenon in higher education. Distance education courses (DECs) in higher education in the United States, though, have been expanding rapidly during the last 10 years due to the Internet, newer technologies and delivery formats, changes in academia and legislation, and the success of distance education programs across the world.

In the past, distance education research in higher education has focused on the comparison to the traditional on-campus classroom (Lesh & Ramp, 2000; Russell, 1999; Saba, 2000). In recent years, researchers have moved beyond these comparative studies as they have shown, in general, there is no significant difference in student outcome between the traditional classroom and the distance classroom (Allen & Seaman, 2003; Anglin & Morrison, 2002; Bannan-Ritland, 2002). The focus of research has turned toward distance education courses using the Internet, the World Wide Web and multiple

delivery formats, and exploring the quality of the educational experience for the learner rather than the increase in use of technologies (Bannan-Ritland, 2002; Sherry, 2003). Researchers in distance education are not merely looking at learner achievement or outcome, but are examining learner attributes and perceptions, as well interaction patterns and the level of interactivity associated with these new technological distance education programs and courses (Anderson, 2003).

Technology developments have enabled more collaboration and interaction of learners with instructors, other learners, as well as the content, in distance education courses (Anderson, 2003). The technologies used in higher education distance courses can potentially improve the quality of teaching and learning for the learner and widen access to education by increasing flexibility. As distance education grows and expands, therefore, so does the need to re-examine its fundamental assumptions and perspectives by research and evaluation, especially as it relates to the higher education environment.

A complex array of factors combine to make distance education course experiences varied for students in higher education. The important factors to consider for this research study include the prevalence of distance education courses (DECs) in postsecondary education, delivery formats and the comparison of traditional courses to DECS in higher education, distance learner characteristics, quality indicators and evaluation of DECs, interaction, measurement of student satisfaction in distance education, and survey research and methodologies.

Distance Education Courses in Postsecondary Education

Distance education in postsecondary education has been expanding rapidly in the past 10 years. The National Center for Education Statistics (NCES) found more than half

of all two year and four year degree-granting institutions offered DEC's (Waits & Lewis, 2003). Changes in the infrastructure, capacity, functionality, and cost of information and communications technology have increased access for educational purposes.

The Internet and two-way video technologies were most often used as primary modes of instructional delivery for DEC's by the institutions in the NCES study. The proliferation of DEC's in postsecondary education needs to be considered as most institutions were planning to increase their distance education course and degree program offerings during the next several years. Distance education in higher education appears to be a strategic and integral part of academia for years to come, and therefore, a key research area.

The recommendation for research in distance education has shifted toward learner characteristics and factors appropriate to the learning environment (Berge, 1999; Hassenplug & Harnish, 1998; Hong, 2002; Maushak, Chen, Martin, Shaw, & Unfred, 2001). Therefore, it is important to determine how similar or different present day distance learners are from non-distance learners, so that the distance learner can be better understood and provided for in higher education courses.

Academic excellence and providing exemplary pedagogical experience for the learners should be at the forefront of tasks for those involved in the provision of DEC's in higher education. Unfortunately, the method for quality assurance of DEC's can vary by institution, delivery format, course, and even by individual instructor in higher education (Sherry, 2003).

Although more access and choice are available in distance education programs and degrees, an image that distance education is inferior to traditional face-to-face

education remains (Sherry, 2003). The focus of much of the distance education research has been on the effectiveness of traditional face-to-face courses versus those offered via distance (Russell, 1999). Moore and Kearsley (1996) support the idea of no significant difference between DEC's and traditional classroom courses, though. Therefore, research comparing distance education to traditional face-to-face instruction indicates that teaching and studying at a distance can be as effective as traditional instruction, when the method and technologies used are appropriate to the instructional tasks, there is student-to-student interaction, and when there is timely teacher-to-student feedback (Phipps & Merisotis, 1999; Russell, 1999). The focus of research evaluation should move to the learner in a distance education course.

The research on distance education has expanded over the last decade to focus on indicators of distance education effectiveness or quality such as student perceptions, interactivity and instruction (Anglin & Morrison, 2002; Lesh & Rampp, 2000; Maushak, Chen, Martin, Shaw, Jr., & Unfred, 2001; Rockwell, Furgason, & Marx, 2000). Phipps and Merisotis' (1999) review of the research, though, found that the quality of the research was questionable. The shortcomings they found in the research pointed to significant areas such as lack of valid instruments to measure student perceptions or satisfaction in distance education courses.

Continuing research regarding quality in DEC's has identified interactivity, interaction and active learning all as important quality indicators (Bannan-Ritland, 2002; Maushak, 1997; Saba, 2000; Vrasidas & Glass, 2002). Recent research literature on teaching and learning in higher education does affirm the importance of interactivity within the educational process (Hassenplug & Harnish, 1998; Hong, 2002; Jung, Choi,

Lim, & Leem, 2002; Roblyer & Ekhami, 2000). Yet, studies on interaction in distance education reveal variation about its desirability, usefulness, how much is needed, and at what depth or level.

Based on a review of the literature, four main types of interaction can occur in the distance learning process: Learner-Content; Learner-Instructor, Learner-Learner (Moore, 1989, 1993; Moore & Kearsley, 1996), and Learner-Interface (Hillman, Willis, & Gunawardena, 1994; Hillman, 1999). {I removed the LL here because you didn't do them all I think it's good to just wait for the independent variable defining to set these; APA indicates to use them sparingly, APA p.103} The first three types of interaction are consistently suggested in the literature as essential to a DEC; yet learner-interface is not mentioned by Moore in his original definitions (Moore, 1989, 1993). Learner-interface interaction seems to be involved in each distance education course interaction. According to Moore and Kearsley (1996), "Distance education is not about the technologies, but about the consequences of using technology on course design and delivery, interaction and learning, and management and organization in the classroom" (p.2)

Learner-content interaction is where there is an active intellectual participation between the learner (alone) and the subject matter. The learner constructs his or her own knowledge from the interaction with the content by critical thinking, problem-solving and/or application of the information (Moore, 1989, 1993). Studies on learner-content interaction were not easy to distinguish in the literature and may be tied to other types of interaction such as learner-instructor interactions.

Learner-instructor interaction involves two-way communication between the learner and the instructor that are either synchronous or asynchronous (Moore, 1989, 1993). Overall, higher levels of interaction between the instructor and the learner were related to increased learner satisfaction in the distance education context (Stocks & Freddolino, 2000; Thurmond, Wambach & Connors, 2002; Vrasidas & McIssac, 1999).

Learner-learner interaction is intended to promote understanding the course content and stimulate critical thinking (Moore, 1989; 1993). Students' interactions with their classmates in a distance learning environment can contribute to their learning (Moore & Kearsley, 1996).

Interactions may be of more than one type in any educational context. An example of a learner-multiple interaction context would be learner-learner and learner-content interactions that occur at the same time. Some types of interactions develop and arise in the distance education context only when another interaction occurs (Sherry, 2003; Sutton, 2000).

Recent research literature on teaching and learning in higher education does affirm the importance of interactivity within the distance education environment (Bannan-Ritland, 2002; Berge, 2002; Hassenplug & Harnish, 1998; Hong, 2002; Jung, Choi, Lim, & Leem, 2002; Roblyer & Ekhami, 2000; Swan, 2001). Again, these studies on interaction in distance education vary on the importance of interaction types in terms of desirability, usefulness, and level. Themes that emerge from these studies include the importance of interaction, the value of the instructor's role, the amount and frequency of interaction, and the perception of interaction by participants and its relation to student satisfaction with distance education. Therefore, identifying, measuring and evaluating the

importance of specific interaction types in relation to student satisfaction will help researchers and instructors to better address the important issue of quality in DEC's.

Survey Methodologies

Research on the subject of student evaluation of teaching (SET) in the literature is prevalent. Research examining instrument development, validity, and reliability has been conducted by notable scholars on these issues as far back as the late 1920's (Marsh, 1987). Yet, researchers show disagreement on what items encompass effective teaching, learning and student satisfaction constructs, and the development and measurement of the constructs (Beltyukova, 2002) for SETs.

Students' attitudes are measured in course evaluations and have been used routinely in higher education to evaluate the quality of the course and teaching effectiveness (Marsh, 1987). Student attitudes have been found to be a good source of information about the effectiveness of a course in distance education (Willis, 1994). According to the Sloan Consortium (composed of institutions and organizations dedicated to quality distance education), "Student satisfaction reflects the effectiveness of all aspects of the teaching experience" (Allen & Seaman, 2003).

Web-based Surveys

The rapid expansion of Internet uses has given Web-based surveys the potential to become powerful tools in survey research. Internet or Web-based surveys are attracting more attention from social science researchers as there seem to be many advantages to them. Web surveys are more efficient than traditional survey modes such as near elimination of paper, postage, and data entry costs (Dillman, 2000). Although there is an extensive body of literature regarding the principles of good survey design and the factors

influencing response to mail and telephone surveys, the research and applicability to web or electronic surveys is not yet clear (Dillman, 2000; Schonlau, Fricker, & Elliot, 2002; Sills & Song, 2002). There is an insignificant amount of empirical evidence from which to draw definitive conclusions about the optimal development and process of survey research on the Internet (Schonlau et al., 2002).

Technology and the instructional practices used in distance education courses continue to be developed and refined in an effort to provide students with high-quality learning experiences at the postsecondary level. Yet, despite these efforts, a complex array of factors combine to make distance education course experiences varied for students. This study will attempt to provide greater understanding of the experiences of students involved in distance education courses that include more than one type of distance education format in terms of the type of interaction and the relationship to student satisfaction.

Statement of the Problem

DECs are becoming the norm in higher education. Little is known about the variables that contribute to the effectiveness of distance education (Lesh & Rampp, 2000; Phipps & Merisotis, 1999). Research has shown the importance of interaction in traditional higher education courses, yet there are very few empirical studies to evaluate the quality of distance education courses in terms of interaction and the relationship to student satisfaction (Arbaugh, 2000; Bannan-Ritland, 2002; Fulford & Zhang, 1993; Hong, 2002; Phipps & Merisotis, 1999). It is not clear how student perceptions of types of interactions through the Internet and other distance delivery formats contribute to their satisfaction in DECs.

Independent Variables

Interaction is the predictor variable in this study, and is defined with 4 nominal levels: Learner-Content (LC), Learner-Instructor (LX), Learner-Learner (LL), and Learner-Multiple (LM, combinations of all three).

Dependent Variables

The criterion variable “Student Satisfaction” was interval/continuous and assumed to be normally distributed. The scale was defined by items based on a Likert Scale from “Strongly Disagree” equaling 1, and “Strongly Agree” equaling 10. The Likert Scale items were constructed to assess self-reported measures of satisfaction. The Student Satisfaction and Interaction Questionnaire (SSIQ) was developed to measure student satisfaction in relation to type of interaction (see Appendix A).

Extraneous Variables.

Grade in course, age, gender, and previous number of DEC's are the other variables that could possibly influence the criterion variable. The survey collected this information to conduct further analyses, describe the sample for future research studies and to look at proportions in relation to the population.

Research Questions

1. Is there a relationship between learner-content (LC) interaction and student satisfaction?
2. Is there a relationship between learner-instructor (LX) interaction and student satisfaction?
3. Is there a relationship between learner-learner (LL) interaction and student satisfaction?
4. Is there a relationship between learner-multiple (LM) interactions and student satisfaction?

5. Is there a combination of interaction types that predict student satisfaction in a DEC better than any one alone?

Hypothesis

There will not be any one type of interaction that better predicts student satisfaction in a distance education course.

Definition of Terms

Distance Education Courses (DECs). The definition for distance education courses continues to change, but generally includes courses that mainly involve asynchronous communication or communications that are transmitted at different time intervals (Garrison, 1996; Keegan, 1996; Holmberg, 1995; Moore, 1989; Moore, 1993). Traditional education courses occur when the teacher and the student are present at the same time and place during instruction (i.e., synchronous communication). If the student and instructor are in two different places and do not have direct, person-to-person interaction at the same time or place, distance education is occurring (Moore, 1989, 1993).

According to the Council for Higher Education Accreditation (CHEA), distance education courses are also characterized by several key factors. The two most important factors are (Phipps & Merisotis, 1999):

- (1) the teaching/learning process involves activities where learners are at a distance from the originator of the material, and:
- (2) a combination of media, which may include but are not limited to, television, videotapes, audiotapes, videoconferencing, audio conferencing, e-mail, telephone,

fax, Internet, and computer software, may be used, along with conventional textbook materials (p.11).

For this study, distance education courses will be considered as any postsecondary course that involves online or multimodal formats among the instructor, learners, and content.

Multimodal Delivery Format Course. A DEC involving any type of online learning platform (WebCT, Blackboard, etc.), two-way interactive video, audio conferencing, one-way communications and face-to-face interactions, or a combination of two or more of these interface components in a course. This is sometimes called a hybrid or blended distance education course.

Internet. A large global network comprised of thousands of smaller networks. The World Wide Web is one element of the Internet.

Intranet. A private network of various computers within an organization. An Intranet is used to share company information and computing resources among people in the organization. An Intranet uses regular Internet protocols and in general looks like a private version of the Internet.

Online Course. A DEC which is conducted strictly via the Web or the Internet using a type of learning platform or Intranet system.

Student Satisfaction. Student satisfaction is defined as the fulfillment or gratification of a course-related need or desire. Overall Student Satisfaction was measured by an item on the SSIQ on a 10 point Likert scale, with 1 being “Dissatisfied,” to 10 being “Satisfied.”

Interaction. For this study, interaction is defined as a mutual or reciprocal action or influence (Wagner, 1994) and includes five relationships: (1) learner-content (LC); (2)

learner-instructor (LX); (3) learner-learner (LL) (Moore, 1989, 1993); learner-interface (LI) (Hillman, 1999; Hillman, Willis & Gunawardena, 1994); and multiple combinations of interaction, learner-multiple (LM = LC + LX; or LC + LL; or LX + LL; or LC + LX + LL). Interactivity is considered synonymous with interaction for this research.

Learner-content (LC) interaction. According to Moore (1989, 1993), the definition of learner-content interaction is “the process of intellectually interacting with the content that results in changes to the learner’s understanding, the learner’s perspective, or the cognition of the learner” (p. x). DEC’s with only learner-content interaction consist mostly of one-way communications and learning is self-directed. LC interaction examples include reading textbooks, viewing documents and graphics on Web pages, listening to audio files, and using a CDROM.

Learner-instructor (LX) interaction. This type of interaction mode consists of two-way communication between the learner and the instructor. Application of the learner’s knowledge is guided by the instructor through activities and assessments, who assists the learners by stimulating their interest and motivation (Moore, 1989, 1993). Interaction modes may include, but are not limited to lecture, assignments and instructor feedback and assessment.

Learner-learner (LL) interaction. This type of interaction can occur with or without the real-time presence of an instructor and can be one learner with another learner or one learner to a group of learners (Moore, 1989, 1993). Learner-learner interaction modes involve application and evaluation of learning, with examples including peer and group discussion and group assignments and projects.

Learner-interface (LI) interaction. Any type of communication medium or technology device that allows for collaboration, conversation, discussions, and exchange or communication of ideas can be considered a learner-interface (Hillman, 1999). The learning is dynamic and the inquiry is controlled by the learner. Examples of this interaction type include search engines, course management platforms, Webcams, and accessing library resources from remote sites. LI is considered to be involved in every type of interaction in a distance education course, according to its definition and the research (Moore & Kearsley, 1996; Sherry, 2003), and therefore was not measured in Item Congruencies after the first round of review by the panel experts.

Learner-multiple (LM) interactions. Combinations of interactions occur in DECS. Therefore, interactions may be of more than one type and have been labeled as Learner-Multiple (LM) by this researcher. For instance, there may be learner-learner (LL) and learner-content (LC) interactions that occur at the same time in a DEC; an example of this would be structured discussions on a bulletin board according to topics set by the instructor. Another combination example would be learner-learner (LL) and learner-instructor (LX) interactions that occur at the same time; an example of this would be a group discussion using the chat tool in a course management platform.

Delimitations

This study used a convenience sample from a single population, which included graduate students in a distance, Master of Business Administration (MBA) program that might engage in multi-modal DECs during one semester (eight weeks) at a university.

Limitations

The study was restricted to self-reported data and was limited by the respondent's awareness of their satisfactions. Respondents were assumed to have understood the survey instrument items and honestly and accurately reported their satisfaction beliefs, demographic features, and related experiences. This study was limited to the subjects who voluntarily agreed to participate in the survey. Duplication of responses was checked according to demographic information and time of response provided by the e-mail text. This procedure was done to protect the participants' anonymity rather than giving the participants a unique ID number. Access to the survey Web site was limited to those who received the email notification and Web site address.

Significance of the Study

Although there are numerous studies in the area of distance education, few empirical studies that examine exclusively the importance of interaction in relation to student satisfaction in distance education courses (Bannan-Ritland, 2002; Biner, Dean, & Mellinger, 1994; Gunawardena & Zittle, 1997; Phipps & Merisotis, 1999). Therefore, educators and administrators do not know how best to structure the format or design of a DEC to optimize student satisfaction and possibly student success in the distance education context. The distance education and student satisfaction literature borrow from other research in the distance education fields of correspondence study and video-based courses (Russell, 1999). The literature also compares and reviews different variables, such as learning styles, course format, and motivation. (Phipps & Merisotis, 1999).

Distance education research studies have differed on the nature of the task, the student samples, and timeframe. Reliable evaluation instruments that measure interaction

in distance education courses were not found in the literature. The majority of instruments did not have items that were valid. The literature did not definitely answer the question about the different types of interactions in relation to student satisfaction. Therefore, there was a need for defining the constructs of interaction more explicitly, developing a valid and reliable instrument that looked at the connection between to interaction types and student satisfaction and testing what type of interaction is a key component in student satisfaction. The results of this study will be of interest to educators and researchers who teach at a distance and to those who design and administer distance education courses. This study may lead to answers on how to more effectively accomplish the goals and objectives of distance education courses and to assist distance educators in providing the educational experiences students' desire.

Researcher's Perspective

At the time of the dissertation, I was enrolled in distance education courses in a Ph.D. program at Colorado State University (CSU). The program was an Interdisciplinary Ph.D. that involved both Adult Education and Technical Communication. I have over six years experience as a distance education instructor with the University of Maryland Asian Division (UMAD), University of Denver – University College, and CSU. I have a noted preference for distance education formats. I believe that distance education may become a dominant method for higher education courses in the near future, and that little is understood about the implications related to student satisfaction and the importance of interaction in DEC's.

CHAPTER 2 - LITERATURE REVIEW

This chapter reviews the literature important to this study. All the topics covered relate to distance education courses, and the distance education context specific to higher education. Various terms are used interchangeably throughout the literature: (a) postsecondary and higher education; (b) distance education course and DECs; (c) delivery formats, new technologies and mediums of distance education; (d) learner, student and participant; (e) authors and researchers; (f) distant, remote and off-campus; (g) interaction and interactivity; and (h) the Web, Internet and online.

A complex array of factors combine to make distance education course experiences varied for students in higher education. The important factors to consider for this research study include the prevalence of distance education courses (DECs) in postsecondary education, delivery formats and the comparison of traditional courses to DECS in higher education, distance learner characteristics, quality indicators and evaluation of DECs, interaction, measurement of student satisfaction in distance education, and survey research and methodologies.

Distance Education Development

Distance education is not a new phenomenon in higher education as it has its roots in correspondence instruction as early as 150 years ago (Holmberg, 1986). Distance education courses (DECs) in higher education in the United States, though, have been expanding rapidly during the last 10 years due to the Internet, newer technologies and

delivery formats, changes in academia and legislation, and the success of distance education programs around the World.

In the past, distance education research in higher education has focused on the comparison to the traditional on-campus classroom (Lesh & Ramp, 2000; Russell, 1999; Saba, 2000). In recent years, researchers have moved beyond these comparative studies as they have shown, in general, there is no significant difference in student outcome between the traditional classroom and the distance classroom (Bann-Ritland, 2002; Lesh & Rampp, 2000; Russell, 1999; Saba, 2000). Distance education research has evolved and shifted to a more learner-centered approach (Saba, 2000). While there is a continued interest on the technologies, the focus is not on which medium is best in DEC's. The focus of research has turned toward distance education courses using the Internet, the World Wide Web and multiple delivery formats, and investigates the quality of the educational experience for the learner rather than the increase in use of technologies (Bannan-Ritland, 2002; Sherry, 2003). Researchers in distance education are not merely looking at learner achievement or outcome, but are examining learner attributes and perceptions, as well interaction patterns and the level of interactivity associated with these new technological distance education programs and courses (Anderson, 2003).

Technology developments have enabled more collaboration and interaction of learners with instructors and other learners, as well as the content, in distance education courses (Anderson, 2003). The technologies used in higher education distance courses can potentially improve the quality of teaching and learning for the learner and widen access to education by increasing flexibility. As distance education grows and expands,

therefore, so does the need to re-examine its fundamental assumptions and perspectives by research and evaluation, especially as it relates to the higher education environment.

Distance Education Courses in Higher Education

The proliferation of DEC's in postsecondary education needs to be considered when beginning research on distance education. A study done by the National Center for Education Statistics (NCES) found that 56% of all two year and four year, Title IV eligible, degree-granting institutions offered DEC's for any level or audience (i.e., courses designed for all levels of students, including elementary and secondary, college, adult education, continuing and professional education) (Waits & Lewis, 2003). Distance education was defined for this study as education or training courses delivered to remote (off-campus) sites via audio, video (live or recorded), or computer technologies, including both synchronous (i.e., simultaneous) and asynchronous (i.e., not simultaneous).

The study found that college-level, credit-granting distance education courses were offered at the graduate/first-professional level by 52% of institutions that had graduate/first-professional programs. Public institutions were more likely to offer distance education courses (89% of public, 4 year institutions) compared with 40% of private institutions. College-level, credit-granting distance courses were offered at the undergraduate level by 48% of all institutions and at the graduate level by 22% by all institutions. In a study completed by Waits and Lewis (2003), a majority of the institutions that offered distance education courses reported that increasing learner access in various ways was a very important goal of their institution's distance education program. Most institutions were planning to increase their distance education course and

degree program offerings during the next several years. Distance education in higher education appears to be a strategic and integral part of academia for years to come.

Formats of Course Delivery

The Internet and two-way video technologies were most often used as primary modes of instructional delivery for DEC's by institutions during the 12-month academic year period (2000-2001), according to the NCES (Waits & Lewis, 2003). Among the institutions offering distance education courses, 90% reported that they offered Internet courses using asynchronous computer-based instruction. In addition, 43% of the institutions that offered distance education courses offered Internet courses using synchronous computer-based instruction, 51% used two-way video with two-way audio, and 41% used one-way pre-recorded video as a primary mode of instructional delivery for distance education courses. Twenty-nine percent used CD-ROM as the primary mode and 19% used multi-modal packages. Therefore, the mediums used to deliver distance education courses are varied in higher education and appear to be offered in multiple or hybrid formats. The primary modes were different for the different distance education courses across the various institutions in the study.

Learner Characteristics

As noted earlier, past research on media and technology in distance education courses has focused on comparison studies, descriptive studies and evaluation reports in distance education (Russell, 1999). While media comparison studies may be useful for making media selection, in fact, they do not contribute much to understanding of distance education context, according to the research (Moore & Kearsley, 1996; Schrum & Hong, 2002; Sciuto, 2002). The recommendation for research in distance education has shifted

toward learner characteristics and factors appropriate to the learning environment (Schrum & Hong, 2002; Sciuto, 2002). Therefore, it is important to determine how similar or different present day distance learners are from non-distance learners, so that the distance learner can be better understood and provided for in higher education courses.

A study by Latanich, Nonis and Hudson (2001) attempted to compare the key demographic variables and individual difference variables of distance from non-distance learners. The data was collected using a convenience sample of 184 undergraduate, business students at a mid-size accredited university in the south. The students were in four core courses in the undergraduate business program, with each core course having both a resident component and a distance component. A total of 130 students took the course on-campus and 54 students took the courses at the distant sites, with compressed video as the technology providing the distance education course delivery.

The results revealed significant differences in gender, age, employment status, motivation and risk taking propensity between distance and non-distance learners. An independent samples *t* test showed the mean age for the two groups to be significantly different, with the mean age 26.21 years for distance courses, while the mean age was only 23.45 years for non-distance courses. This study selected a sample population of undergraduate students rather than graduate students, who may show an even higher mean age for distance students. Also, different programs of study or majors may have different learner characteristic needs in terms of the programs and courses offered.

In another study, Seemann, Buboltz, Jr., and Wilkinson (2000) tried to examine the impact of technologies on higher education students by comparing student

demographics and academic qualities from 30 years ago to those of more recent students. The changes in accessibility of college classes offered to nontraditional students due to multimedia and Internet technology was discussed in respect to the changing nature of distance education in a survey developed by the researchers. Fourteen veteran faculty members (those who began instructing at the college level before 1976) and 12 new faculty members (those who began instructing after 1994) were surveyed. The faculty responded to an e-mail survey about changes in higher education, where they were asked to describe their observations and opinions of their student populations during their first three years as an instructor.

Seemann et al (2000) reported major differences in terms of delivery of instruction (newer technologies) and demographics of the student (more nontraditional students who were married, over age 24, non-white and female) between the faculty group members (veteran versus new). The researchers did not provide any discussion of the development of the survey or how the faculty sample was selected. Statistical analyses were not provided, nor was information regarding response rate, validity or reliability in regards to the survey given. Therefore, no conclusions regarding distance learner characteristics can be drawn from the data and no comparison to other studies can be made.

A research report completed by the Washington State Community and Technical Colleges (1999) showed that over a four year period, there was a rapid growth in the number of students in higher education taking classes via distance education at community and technical colleges in the State of Washington. In the fall of 1994, 1926 college students were enrolled in distance education courses, but by 1998, the number had grown to 4025, more than doubling the amount of distance education students in

Washington State community and technical colleges. About 80% of the distance education students took classes that required some attendance at the original site (hybrid format), but 20% were distance-only students. The students in this study reported taking distance classes because of full-time work, family obligations, or other life circumstances that precluded regular attendance at campus classes. Other statistics regarding the learners in this study from these institutions included that: (a) females made up 65% of the distance students; (b) the typical online student was between 26 and 27 years of age, compared with 23 for other college courses; and (c) that by fall 2003, the two-year colleges would have enrollment of more than 7700 distance learning students (Seppanen & Stern, 1999).

Mattes, Nanney and Coussons-Read (2003) went further into “why” the learner took distance education courses in a recent study. They examined the relationship between student personality and their choice of either traditional either on-campus courses or the choice of online college classes. The personality profiles of the students were determined using the 16 Personality Factor questionnaire. The researchers hypothesized that students choosing online coursework would have significantly different personality profiles and computer comfort levels than students who did not choose courses in the online format. The students in the study were enrolled a major, metropolitan university and were of varying ages, gender, racial backgrounds, and fields of study. They were volunteers drawn from four on-campus introductory psychology classes and online classes in psychology, mathematics, sociology and history. All classes used in the study were offered in both the online and on-campus formats, so students had a choice of medium for all classes.

Mattes et al. (2003) invited students to participate in the study for extra credit, and those who did not choose to participate were given alternative extra credit opportunities, preventing bias in the sample selection. Students from on-campus classes completed the survey using the paper and pencil method once and once using the online version to verify that there were no differences in the two evaluation forms of the test. Demographic data was analyzed by the researchers to determine if the online samples ($N = 81$) and on-campus samples ($N = 90$) differed in terms of personality, age, gender or computer comfort. The results showed that the sample groups did not differ on gender, but differed on mean age, with the online sample significantly higher (mean age = 27 years) and the on-campus sample (mean age = 22 years). In addition, the online students reported significantly higher levels of comfort with computers than on-campus students. Students in the online sample also scored significantly higher on the 16PF's Reasoning factor, indicating more facility for abstract thought and processing. There were no significant gender differences in the composition of courses, and no gender differences in comfort with computers.

Mattes et al. (2003) concluded that the online education affords the flexibility of class attendance for the learner, yet the factor of selection or choice of course format was not asked by the researchers. The researchers felt that the findings had implications for delivering education via the Internet and for understanding non-traditional students' needs in the university environment. They suggested that the presence of older students in higher education distance courses as an area for future research to support more effective distance education. The authors also suggested a broader sampling frame in order to better characterize university populations and subsets of on-campus versus online

students. This would need to be done in further research as the selected group samples were different as the online sample included a mixture of courses.

Evaluation of Distance Education

The question posed by many educators, administrators and others in higher education is how should distance education courses be evaluated? Distance education course effectiveness is still judged on whether distant students learn as much as students receiving traditional face-to-face instruction (Phipps & Merisotis, 1999; Willis, 1994). Research comparing distance education to traditional face-to-face instruction indicates that teaching and studying at a distance can be as effective as traditional instruction, when the method and technologies used are appropriate to the instructional tasks, there is student-to-student interaction, and when there is timely teacher-to-student feedback (Phipps & Merisotis, 1999; Russell, 1999).

Traditional versus Distance Education Courses

Although more access and choice are available in distance education programs and degrees, an image that distance education is inferior to traditional face-to-face education remains (Sherry, 2003). The focus of much of the distance education research has been on the effectiveness of traditional face-to-face courses versus those offered via distance (Moore & Thompson, 1997; Phipps & Merisotis, 1999; Russell, 1999). Moore and Kearsley (1996) support the idea of no significant difference between the traditional classroom and the distance classroom. They consider media effectiveness studies no longer worth pursuing and concluded the following:

The evidence that can be gathered from the literature points overwhelmingly to the conclusion that teaching and studying at a distance, especially those that use

interactive, electronic telecommunications media is effective when effectiveness is measured by the achievement of learning, by the attitudes of students and teachers, and by return-on-investment (p. 59).

Russell (1999) cataloged over 350 distance education studies, technical reports and dissertations that document the effects of technology on learning from the late 1920s to the late 1990s. The research reviewed included student learning outcomes, grades, standardized test scores, frequency of interaction between students and faculty, as well as other factors to measure selected differences that exist between technology-mediated and traditional classroom instruction. The studies, in general, demonstrated no significant differences in student performance between distance education and face-to-face settings. Russell concludes the following:

If the amount of learning produced by different media is similar but adequate to meet our instructional goals, then all treatments are equally valuable for learning but will usually differ in their cost and convenience (p. x).

Learner Evaluation of Distance Education Courses

One way to assess or evaluate the quality of distance education is in terms of the learner perceptions of quality. Holmberg (1986, 1995) suggested that student attitudes affect the learning. He made several assumptions to support this statement and the ideas that student will be more motivated and successful in any learning environment when the following characteristics are present:

1. The basis of all learning is interaction between the teaching and learning parties.
2. Positive attitudes and feelings by the learning parties towards the learning process are likely to contribute positively to their learning pleasure.

3. Increased pleasure will tend to increase student motivation to interact with the learning process.
4. Higher levels of student motivation to interact with the learning process should facilitate and increase student learning of the subject matter.
5. The effectiveness of teaching is measured by the amount of student learning that occurred during the learning process. (p. 47).

The statements made by Holmberg can be applied to any distance education course in that student attitudes and interaction in a course are important when evaluating distance education (Moore & Kearsley, 1996).

Student Satisfaction

Students attitudes are measured in course evaluations and have been used routinely in higher education to evaluate the quality of the course and teaching effectiveness (March, 1987). Student attitudes have been found to be a good source of information about the effectiveness of a course in distance education (Willis, 1994). According to the Sloan Consortium (composed of institutions and organizations dedicated to quality distance education), “Student satisfaction reflects the effectiveness of all aspects of the teaching experience” (Allen & Seaman, 2003).

Moore & Kearsley (1996) found a number of things that students expected from a distance education course or program, including:

1. Information that is up-to-date and authoritative;
2. Courses that are flexible and accommodate different learning styles;
3. Guidance on what and how to study;
4. Opportunities to do something with what they learn (assignments, projects);
5. Feedback on their work and progress;

6. Satisfying these expectations should dictate how the course is designed and implemented along with the nature of teaching involved and the type of student support provided (p. 168).

One of the first valid methods for measuring student perceptions in distance education courses was developed by Biner (1993). He detailed a method for developing a valid instrument for measuring students' attitudes based on substantiating the construct items in a survey. Up until that point in time, researchers had developed their own evaluation instruments on an ad hoc, non-empirical basis, with no explanation as to how or what basis the survey questions were generated. Biner conducted a series of four investigations to develop and test a method of constructing an empirically-based attitudinal assessment instrument for televised courses.

To ensure a comprehensive, relevant sample of attitudinal questions, Biner felt it was first necessary to identify the items most closely related to course satisfaction in the minds of the telecourse students, instructors, staff, and administrators. Fifty individuals experienced in distance education were asked to list as many factors as they could think of that would influence student satisfaction in a televised distance learning course. The responses were then submitted to a panel of seven experts to be categorized. Three basic categories of factors emerged from the study: (a) instruction-instructor factors; (b) technological factors; and (c) management/coordination factors. Biner took the three factors, expanded them into seven factors, and then developed an instrument, the *Telecourse Evaluation Questionnaire (TEQ)*, to test what factors influenced student satisfaction in distance education courses. The small sample size of the experts and the opinion-based categorization limited the generalizability of the study, but was important research regarding the method for measuring student satisfaction and development of an

evaluation instrument to be used in a distance education course. Also, the categories of factors built a basis for measuring the constructs of interaction.

In follow-up research, Biner, Dean and Mellinger (1994) used the TEQ to identify the major dimensions of distance learner satisfaction using a larger sample of students. Using standard factor-analytic techniques, the researchers attempted to identify both the number and types of dimensions in the items of the TEQ. Seventy-four undergraduate and 127 graduate students (total 141 students) who were enrolled in 14 live, interactive (one-way video, two-way audio) televised courses offered by a major, metropolitan university were the subjects. To eliminate potential biases in the wording of questions, the TEQ listed the dimension and asked students to rate their level of satisfaction on a five-point Likert scale. The TEQ was administered to the students by their respective distance site coordinators, along with a brief videotape introducing the research and providing instructions on how to complete the questionnaire.

A factor analysis was performed on the student responses to the 33 satisfaction items on the TEQ (the rest of the items were for demographic variables). The target factor loadings for the items ranged from fairly high to very high levels, with all at 0.50 or greater, all valid levels. Based on the results, the researchers were confident in making predictions regarding the dimensions underlying student satisfaction with distance education courses as measured by the TEQ.

Biner et al. (1994) went on to conduct another large-scale survey to confirm their findings. In the second study, 72 undergraduate students and 105 graduate students enrolled in 13 live, interactive (one-way, two-way audio) televised courses at a university

took the TEQ in 1993. All of students were taking courses at one of 36 off-campus locations in the state where the university resided.

Again, factor analysis was performed on the student responses to the TEQ's 33 satisfaction items (Biner et al., 1994). The seven factors accounted for 71% of the variance in the data. The results showed that the seven factors were generally uncorrelated with each other (i.e., factor correlations were lower than .30). To assess inter-item reliability among the groups of items constituting each of the seven factors, Cronbach's Alphas were computed. The resulting alpha estimates ranged from moderate to very high levels (.51 to .94) for the seven categories. The final seven factors associated with student satisfaction were: (a) instructor and quality of instruction; (b) quality and reliability of the technology medium used; (c) quality of program management and administration; (d) quality and capability of the remote site facilitators; (e) promptness of feedback; (f) the quality and availability of support services to students at remote sites; and (g) interaction with instructor and students at other sites. This research supports the importance of interaction constructs in relationship to student satisfaction in distance education courses.

Learner characteristics. Biner, Summers, Dean, Bink, Anderson, and Gelder (1996) investigated student satisfaction in relation to demographic variables and prior distance education course experience. The primary goal of the research was to extend the research linking student demographics and prior course experience as predictors of achievement in telecourses, to the potential role of these variables in predicting student attitudes in the same courses. Participants in the study were 699 undergraduate and graduate students enrolled in 33 telecourses at a large Midwestern university during years

1993 to 1995. Class sessions were broadcast live (one-way video, two-way audio) to 122 remote sites across the state.

Of the 669 students enrolled in courses, 447 were female, 248 were male and 4 did not report their gender (Biner et al., 1996). Students ranged from 17 to 57 years old, with the average age being 34 years. The TEQ mentioned in earlier research studies by Biner (1993) was used as the survey instrument. Several questions were appended to the TEQ to assess the demographic status and telecourse experience of the participants including age, gender, annual income, socioeconomic status, and number of prior telecourses completed. The TEQ was administered to the telecourse students at each site by their site coordinators, with a brief video given before survey administration that explained the research project, invited the students to participate, stressed the importance of participation, and offered instructions on how to record the responses. The response rate was recorded at 100%.

Biner et al. (1996) used multiple regression with income, gender, age and socioeconomic status to identify which of the demographic variables were predictive of satisfaction in telecourses. The results showed that the composite of the four demographic variables did not predict overall student satisfaction in any significant manner. To assess the effects of prior experience with telecourses on satisfaction, regression analysis was also performed. The results showed that only student ratings of instruction/instructor satisfaction were significantly related to prior telecourse experience, which meant that increased experience with the telecourses was associated with decreased satisfaction with the instruction/instructor aspects of those courses. This finding was apparently contradictory to the idea that satisfaction with televised

instruction tends to increase with time and experience. Further analysis indicated that students' college-level status (freshman, sophomore, junior, senior, graduate student) was not the reason for the experience-related decrease in overall student satisfaction.

Biner et al. (1996) had a relatively large sample size and high response rate, so the argument can be made that the subjects represented the telecourse student population and possibly the distance education course context. The study was conducted at a large university (over 20,000 students) that was very similar to other institutions of higher education worldwide. This broadens the case for sample representativeness of this study for the distance education context. Therefore, it may be appropriate to assume that the results of this research may generalize to similar college-level distance education programs at comparable institutions. The case can be made that demographic variables are not important to student satisfaction in distance education courses.

Lim (2001) tried to develop a predictive model of satisfaction for adult learners in a Web-based distance education course and their intent to participate in future Web-based distance education courses. The factors examined were computer self-efficacy, academic self concept, age, gender, academic status, years of computer use, frequency of computer use, computer training, Internet experience in a class, and participation in a workshop for a Web-based course. The study's population consisted of 235 adult learners who were taking a Web-based distance education course at five different institutions across the United States and were a mixture of undergraduate, graduate, and continuing education students.

Lim's (2001) participants were apparently volunteers and no incentives were offered. No other information on participant recruitment was discussed by the researcher.

The instrument to survey the participants had four parts: (a) demographic information was captured in the first section; (b) a portion of Eachus and Cassidy's (1996) Computer Use Self-Efficacy Scale was used in the second section; (c) a third section explored overall satisfaction and intent to participate in Web-based courses; and (d) the fourth section contained the General Academic Self-Concept Scale. The method of posting the questionnaire was selected by the faculty at the five participating educational institutions, with some selecting a Web format and the others selecting a listserv format. The author did not discuss the protocols for survey development, and no information on validity or reliability measures for the original or final instruments was given. The response rate for the survey was also missing in the report.

Multiple regression was used to test Lim's (2001) hypotheses, with personal and experiential variables used as the predictor variables. Personal variables were described as age, gender, computer self-efficacy, academic self-concept, and academic status. Experiential variables were listed as years of computer use, frequency of computer use, computer training, Internet experience in a class, and participation in a workshop to prepare for a Web-based course. The criterion variables were satisfaction levels with Web-based distance education courses and intent to participate in future Web-based courses.

Lim (2001) reported findings that most of the participants were female, ranging in ages from 30 to 49 years old, and more than half were graduate students. No specifics of the data analysis were given. The author pointed to the demographic distribution as consistent with adult learners in other distance education modes, according to past research. The results of the multiple regression analysis revealed that only 15% of the

variability in the criterion variable (satisfaction) was explained by the predictor variables. The researcher tried to reduce the model for computer self-efficacy to see which of the variables contributed most significantly to the model, as computer self-efficacy was the only predictor variable that was statistically significant. In the reduced model, 27% of the variability for computer self-efficacy was explained by number of courses using the Internet and years of computer use. There was a positive relationship between learners' satisfaction with their Web-based distance education courses and their intent to participate in future Web-based courses.

The study by Lim (2001) was not generalizable. No reliability or validity measures were given for the initial or final instruments, and therefore, do not allow use for comparison with other studies. The choice of the sample, recruitment and extraneous variables were not discussed in relation to results, and therefore cannot be generalized. The predictor variables need to be looked at again in relationship to demographic characteristics, control of sample selection and the development of an instrument to predict student satisfaction for distance education evaluation.

Interaction. Gunawardena and Zittle (1997) examined how effective “social presence” was a predictor of overall learner satisfaction in a computer-mediated conferencing (CMC) environment. In CMC research, social presence theory had been used to account for interpersonal effects such as online communities and friendships, which are related to the concepts of interaction and interactivity. The participants of this study were fifty students from five universities who participated in an inter-university virtual conference. Demographics of the participants were 62% female, the mean age was 40 years old, and over 88% selected Caucasian for ethnicity on the survey. All the

participants were graduate students in distance education courses at each of the universities, of which the course responsibilities included sharing the results of a research project, moderating a discussion on the research project, and contributing to the discussions in the course conference.

Following the conference, participants completed a 61 item questionnaire that was developed by Gunawardena (Gunawardena et al., 1997). The paper and pencil questionnaire was administered at each institution by a faculty member. The questionnaire was developed to assess participants' responses to CMC, the conference experience, and areas that had been identified in the literature as potential influences on CMC satisfaction. The social presence dimension was based on definitions from other studies and measured through correlational analysis. There was no other information or discussion regarding the development of the other constructs, such as student satisfaction, or other items and constructs on the questionnaire.

The final question items were placed on a Likert scale constructed to assess self-reported measures of satisfaction, social presence, barriers to participation, attitude, and technical experience with CMC (Gunawardena et al., 1997). Multi-item scales were computed for internal consistency using Cronbach's Alpha, with results ranging from 0.72 to 0.88, high values for consistency and reliability. Overall satisfaction with the conference was measured by a 10 item scale that sought student perspectives on their ability to learn through the medium of CMC and discussions, the value of the conference as a learning experience, motivation to conduct additional research on topics discussed and motivation to participate in a similar conference in the future.

Gunawardena et al. (1997) used stepwise regression to examine the hypothesis that social presence was a predictor of overall satisfaction in CMC. Social presence contributed approximately 60% of the variance, with student perception of having equal opportunity to participate adding about another 7% and technical skills and experience contributing 4% of the explainable variance. A case-wide examination of the residuals revealed there were no outliers or potential influence points in this model, and collinearity statistics were within acceptable levels. The researchers concluded that social presence was an important predictor of overall student satisfaction in distance education, yet due to sample size and selection and survey development, and the use of stepwise regression, generalizability of the data cannot be made for this study. The study, though, does support the importance of interaction in relation to student satisfaction in a distance education context.

In an earlier study, Fulford and Zhang (1993) had examined learner perceptions of interaction and satisfaction in a course delivered by interactive television. The participants were 223 K-6 teachers in five locations for an in-service training program. Three sessions of a 10 session course were examined. A total of 123 participants provided complete data for the three sessions. After each session, participants completed a survey regarding their perceptions of the amount of interaction and the quality of instruction. The researchers tracked the responses according to three variables: (1) personal interaction (perceived individual involvement of each participant); (2) overall interaction (perceived involvement of other members of the class; and (3) satisfaction (perceived value and quality of instruction). The responses were measured at the beginning, middle, and end of the two-semester, ten-session course. The survey used a

six-point semantic-differential scale and satisfaction ratings at the beginning of the class were somewhat positive (4.5 on a 6-point scale), but average ratings fell to a neutral, neither positive nor negative, position (3.6) by the end of the course.

Fulford et al. (1993) found significant correlations between perceptions of personal and overall interaction within the class. The critical predictor of satisfaction was the perception of overall interaction. The findings suggested that when learners perceived the level of interaction to be high, they will be more satisfied with instruction than when they perceive the level of interaction to be low. The authors suggested that interaction should be treated as a desired learning outcome in future research studies for sustaining student satisfaction in distance education courses.

Sherry, Fulford and Zhang (1998) examined two approaches to student-based evaluations for their potential application to distance education. The first approach was a brief, written survey on key aspects of interaction based on the earlier one developed by Fulford and Zhang (1993) in the study mentioned previously. The written survey was based on Moore's (1989) framework for studying learner-to-instructor, learner-to-learner, and learner-to-content interaction in distance education. The second approach investigated the Small Group Instructional Diagnosis (SGID), a widely focused measure to obtain a global and detailed view of instructional climate. It employed a trained facilitator who interviewed students regarding mid-semester about multidimensional factors related to teaching effectiveness.

The two studies were carried out at a major university in the western region of the U.S., which offered more than 280 courses per year primarily through live two-way audio and video technology (Sherry et al., 1998). The written survey was given to 84 distance

learners enrolled in three classes. Sixty-one of the distance learners were participants at origination sites and 23 were located at four remote sites. The participants represented multiple ethnic groups. Ninety-five percent of the participants had earned either a bachelor's degree or engaged in graduate study.

Sherry et al. (1998) had revised the survey by altering the response format from a six-point semantic differential scale to a Likert scale ranging from 1 (strongly disagree) to 7 (strongly agree). There were 14 total items on the survey, yet no other information on constructs or item development was discussed. Principal component analysis was conducted at the beginning and end of the semester to help understand the stability of factors over time.

Sherry et al. (1998) examined the effectiveness of the evaluation approaches through a statistical analysis of the reliability of the written survey instrument and a qualitative analysis of students' perceptions in the SGID. For the written survey, only learner-to-instructor interaction and learner-to-learner factors (learner-to-content was not included) were measured and accounted for 49% of the total variance in the beginning of semester data and 54% of the variance in the end of semester data. A Cronbach's alpha of 0.85 was attained for both surveys, which was a high level of consistency or reliability. Unfortunately, by choosing only two of the three interaction factors that Moore (1989) defined, the researchers limited the usability of the survey in future studies that examine the importance of interaction types in distance education courses.

Overall, the literature supports the idea that measuring student satisfaction in relation to distance education effectiveness is appropriate. The importance of interaction in relation to student satisfaction is also supported in the literature. Unfortunately, the

methods to develop and distribute survey instruments have been less rigorous than expected and not generalizable as question items and constructs are lacking in reliability and validity measures for the survey instruments. The construct of interaction is also ambiguously defined and measured in the literature. Further discussion of the topics of interaction and survey methodology will be covered in the following sections.

Interaction in Distance Education Courses

Interaction is a complex and multifaceted concept and has been identified as one of the major constructs in distance education research (McIsacc, Blocher, Mahes, & Vrasidas, 1999; Moore, 1989; Moore & Kearsley, 1996; Sherry, 1996; Tuovinen, 2000; Vrasidas & McIssac, 1999; Wagner, 1994). To examine a complex construct such as interaction, it should be studied within the context it takes place (Vrasidas & Glass, 2002). The context of distance interaction consists of the technologies, the teacher, course content, and the students enrolled in a distance education courses or program, yet no consensus on the definition for interaction exists in the educational literature (Soo & Bonk, 1998). The concept of interaction can be found as a core element in the seven principles of good practice in higher education, though (Chickering & Gamson, 1987). These practices include: (a) encouraging faculty-student contact; (b) developing reciprocity and cooperation; (c) engaging in active learning; (d) providing quick feedback; (e) emphasizing time on task; (f) communicating high expectations; and (g) respecting diversity.

Wagner (1994) attempted to address the problem of defining interaction and defined interaction in a distance education context as “reciprocal events that require at least two objects and two actions. Interaction occurs when these objects and events

mutually influence one another” (p. 8). The definition seems to include the essential components and nature of interaction without restricting the wide range of possible types of interactions within multiple distance education contexts.

Types of Interaction

Four types of interaction were identified in the literature: learner-content, learner-instructor, learner-learner (Moore, 1989; Rovai, 2002; Swan, 2001) and learner-interface (Hillman, Willis & Gunawardena, 1994). Hillman et al. (1994) described learner-interface interaction as the “process of manipulating tools to accomplish a task” (p. 34). Learner-interface interaction therefore focuses on the access, skills and attitudes necessary for successful mediated interaction. Yet, all forms of interaction in a distance education context are mediated forms of interaction, and therefore, learner-interface is not a unique form of interaction, but a component of each of the three other types of interaction (Anderson, 2003).

Sutton (2000) proposed another form of interaction known as “vicarious interaction.” This type of interaction was built on the idea that not all students interact during individual course sessions or discussions in a distance education course. However, these students may “interact” vicariously. Sutton defined vicarious interaction as what “takes places when a student actively processes both sides of a direct interaction between two other students or between another student and the instructor” (p.4). Sutton found that those who interacted vicariously had read, appreciated and learned from the interactions of others and perceived that their interaction would add little to the context or content of the study. Again, vicarious interaction, like learner-interface interaction, is not a unique form of interaction and requires the active interaction of participants in a distance

education course, and therefore develops from other types of interaction (Anderson, 2003).

Learner-content (LC) interaction. Learner-content interaction results from learners examining and studying the course content and completing course assignments (Moore & Kearsley, 1996). Studies on learner-content interaction were not easy to distinguish in the literature and may be tied to other types of interaction such as learner-instructor interactions. Factors that affected students' perception of learning the course content included continuous contact with the content (Leasure, Davis, & Thievon, 2000); clarity of course design (Swan, 2001); time (Atack & Rankin, 2002); participation in online discussions (Jiang & Ting, 1999); and mode of delivering course content (Faux & Black-Hughes, 2000).

Current technologies provide a variety of media alternatives for creating learner-content interactions. Tuovinen (2000) classified these media into five basic categories: sound, text, graphics, video, and virtual reality. He argued that the combinations that included sound with any of the other media were less likely to produce cognitive overload than the other combinations as sound and images are processed by different parts of the brain.

Swan (2001) evaluated perceived learning as it related to students' perceptions of interacting with the course content by collecting data from over 1,400 students in 73 asynchronous courses. The findings revealed a positive relationship between high levels of activity in the courses and learning. The more students believed that their participation in discussions enhanced their learning, the more they thought they learned. Additionally,

Swan found that students were more satisfied with the course and perceived greater learning when more of their course grade was based on participating in discussions.

Learner-instructor (LX) interaction. The interaction that occurs between the learners and the instructor is intended to help reinforce the understanding of material. Interacting with the instructor can help learners clarify key points of information and reinforce the correct interpretation of concepts (Moore, 1989). In a distance education context, the instructor becomes more of a facilitator (Gutierrez, 2000). A significant number of studies defined “interactivity” as a pattern of communication among the learner and the instructor such as face-to-face meetings, timely feedback and performance outcomes (Berge, 2002; DeBourgh, 1999; Restauri, King, & Nelson, 2001; Swan, 2001; Thurmond, Wambach, Connors, & Frey, 2002; Vrasidas & McIsaac, 1999). These operational definitions of interaction and interactivity were the most common across the literature reviewed for this study.

Learners value the interaction with their instructors and much of the research supported learner-instructor interactions. For instance, using survey data collected from 287 students in 78 Web-based courses, Jian and Ting (1999) examined what variables were predictive of students’ perceptions of learning. Results of the multiple stepwise regression analysis indicated that learner-instructor interaction was the most significant predictor of perceived learning.

Another research study that focused on learner-instructor interaction was done by Mahesh and McIsaac (1999). They examined the dynamic of instructor-student communication and the actions of the instructor to encourage communication among students. The instructor spending time on these specific actions and activities provided

the operational definition of interaction in this study. The researchers concluded that learning is dependent on the personal and unique style of instructors and their activities in DEC. Instructional methods were important, therefore, to fostering interaction in a DEC. Again, this research focused on the types and quantities of the interactions rather than the importance or quality of the interactions.

Feedback can be defined as the exchange of information between student and instructor about an action, event, or process that results in enhanced student learning (Moore, 1989). Timely feedback has been noted as an important variable in student learning (Chickering & Gamson, 1987) and distance education courses (Berge, 2002; Thurmond et al., 2002; Vrasidas & McIsaac, 1999). Feedback is critical to assessment and provides students information about their progress in the course (Collis, DeBoer, & Slotman, 2001).

Overall, higher levels of interaction between the instructor and the learner were related to increased learner satisfaction in the studies examined. Therefore, learner-instructor interaction was examined in this study (Vrasidas & McIsaac, 1999; Thurmond et al., 2002; Stocks & Freddolino, 2000).

Learner-learner (LL) interaction. Learner-learner interaction can occur between one student and another or between several students (Moore, 1989). In order for effective learning to occur, four types of peer behavior are necessary in a computer mediated environment: (a) participation, (b) response, (c) provision of affective feedback, and (d) short, focused messaging (Alavi, 1994; Palloff & Pratt, 2001). Teamwork, or collaborative learning, involves students working together in groups to complete

academic assignments. This form of learner-learner interaction is intended to promote understanding the course content and stimulate critical thinking (Moore, 1989).

Collaborative projects may lessen feelings of isolation and promote a sense of a learning community in distance education courses (Abrahamson, 1998; Palloff & Pratt, 2001). On the other hand, students who were required to participate in teams or group projects in a Web-based course have reported less satisfaction with the course (Thurmond, Wambach, Connors, & Frey, 2002). Thurmond et al. (2002) stated that the reason for the dissatisfaction may have been due to the challenge of completing course assignments without the face-to-face contacts.

In a study by Stocks and Freddolino (2000), the effects of increasing opportunities for interactivity on student attitudes and behavior over two iterations of an Internet-based graduate social work research methods course were evaluated. The interaction methods used in both cases were lectures and class discussions over the Internet. In the second iteration, additional opportunities for interaction (self-tests, automated feedback, discussion questions, and links to an Internet discussion list) were added.

The type and frequency of class participation were measured for both iterations, as well as student attitude toward the course. The results showed that students in the second iteration participated in class discussions more frequently than their first iteration counterparts. Students in the second iteration also tended to rate their experience more positively than did their counterparts in the first class. The researchers concluded that incorporation of interactivity into a distance education course created an active learning environment for students. This generalization should not have been made, though, as the

increased interactivity could have been due to other factors such as group development and cohesion, which were not discussed in the study.

Recent research literature on teaching and learning in higher education does affirm the importance of interactivity within the distance education environment (Bannan-Ritland, 2002; Berge, 2002; Hassenplug & Harnish, 1998; Hong, 2002; Jung, Choi, Lim, & Leem, 2002; Roblyer & Ekhami, 2000). Yet, these studies on interaction in distance education reveal variation about its desirability, usefulness, how much is needed, and at what depth or level in DEC. Themes that emerge from these studies include the importance of interaction, the value of the instructor's role, the amount and frequency of interaction, and the perception of interaction by participants and its relation to student satisfaction with distance education. Therefore, identifying, measuring and evaluating the importance of specific interaction types in relation to student satisfaction will help researchers and instructors to better address the important issue in DEC.

Survey Research and Methodologies

Online student evaluation of teaching is a fairly recent topic of research interest in the literature. Paper-and-pencil methods have proven insufficient in addressing the breadth of instructional delivery and course design methods in the distance education context (Biner, 1993; Chambers, 1995). There is no consistency in the instruments chosen by colleges and universities or how the instruments are distributed to students (Achtemeier, Morris, & Finnegan, 2003; Thorpe, 2002).

Student Evaluations of Teaching in Distance Education Courses

Research on the subject of student evaluation of teaching (SET) in the literature is prevalent. Research examining instrument development, validity, and reliability has been

conducted by notable scholars on these issues as far back as the late 1920's. (Marsh, 1987). Yet, researchers show disagreement on what items encompass effective teaching, learning and student satisfaction constructs, and the development and measurement of the constructs (Beltyukova, 2002) for SETs.

The reliability of students' evaluations of teaching (SETs) is most appropriately determined from studies of inter-rater agreement that assess agreement among different students within the same course (March, 1987). SETs should be designed to measure separate components of teaching effectiveness and support for the construct validity of the multiple dimensions should be evaluated. The failure to recognize the multidimensionality of SETs undermines the ability to understand their reliability, validity, relation to potential biases and utility in improving teaching effectiveness (Marsh & Roche, 1997). The lack of reliability and validity measures was commonly found in the distance education and student satisfaction literature, as noted in previously discussed research studies.

Scaling of Survey Items

The widespread use of rating scales in market and social research has generated considerable discussion over the optimal number of scale points to use to measure items. The purpose of a rating scale is to allow respondents to express both the direction and strength of their opinion about a topic. Preferably, researchers would prefer survey participants to make a definitive choice rather than choose a neutral or intermediate position on a scale (Bond & Fox, 2001). For this reason, a scale without a mid-point would be preferable in a survey, provided it does not affect the validity or reliability of

the responses. Few published studies were found in the literature that addressed the issue of whether or not a mid-point category should be included on rating scales.

The objective of a study done by Garland (1991) was to examine the effect on survey results of having no neutral or mid-point on a Likert scale. A Likert scale was chosen as it has been widely used in market research and extensively tested in the marketing and social science literature. Grocery shoppers were shown either a five-point Likert scale (with a mid-point) ($n = 225$) or four point Likert scale ($n = 223$) of importance on a card and requested to state their opinion on the importance of product labeling. The results were statistically significant in that denial of a mid-point resulted in more negative ratings than were achieved when a mid-point was available. The authors stated that a scale without a mid-point seemed to help alleviate a social desirability bias without changing the direction of opinion. Yet, it seemed as the intensity of the opinion held was changed with the scale without the mid-point. They also suggested that people may respond to a balanced Likert type scale without a mid-pint based on content. The results raise the question as to whether the presence of a midpoint on an importance scale can distort the overall result as the results of differences between the 5 point and 4 point scale should have been similar, but they were different. The question of whether the results from this study are generalizable remains to be addressed in future studies.

Web-based Surveys

The rapid expansion of Internet uses has given Web-based surveys the potential to become powerful tools in survey research. Internet or Web-based surveys are attracting more attention from social science researchers as there seem to be many advantages to them. Web surveys provide more efficiencies than traditional survey modes such as near

elimination of paper, postage, and data entry costs (Dillman, 2000, p. 352). Other advantages include making international studies easier, targeting specific groups, and collecting a large amount of data in a small amount of time.

Literature found on Internet or Web surveys seemed mostly addressed at surveys targeted towards general populations such as users of products rather than educational research studies using specific populations (Coomber, 1997). Although there is an extensive body of literature regarding the principles of good survey design and the factors influencing response to mail and telephone surveys, the research and applicability to Web or electronic surveys is not yet clear (Dillman, 2000; Schonlau et al., 2002; Sills & Song, 2002). There is an insignificant amount of empirical evidence from which to draw definitive conclusions about the optimal development and process of survey research on the Internet (Schonlau et al., 2002).

Schonlau et al. (2002) reported that not much is known about the effects of Web survey instrument design on how survey participants respond to a particular survey question or the survey as a whole, or what sort of design enhances response rates or information accuracy. There is little mention of incentives in the Web and e-mail survey literature. With traditional survey modes, it has been shown that incentives are more effective when sent with the questionnaire (Dillman, 2000). It is not clear how incentives are best used for Web surveys or whether they affect nonresponse or measurement error.

A study conducted by Shannon, Johnson, Search & Lott (2002) regarding the use of electronic surveys was administered to the American Educational Research Associations Survey Research Special Interest Group. The participants for this study were part of a special interest group on survey research, which may have biased the

results positively. The sample was small ($n=63$) and no response rates were given. No other information was given on the survey instrument other than there were 33 Likert scale items. Overall, the participants reported a high use and level of confidence in using electronic mail and the Internet. The researchers reported a Cronbach's alpha of 0.83 for the survey, a relatively high consistency number. Overall, the respondents seemed to support using Web-based surveys even with the concern of experience with technology. The participants suggested that before using a Web-based survey, the selected participants should probably have some experience in using the technology.

Response Rates

While some researchers feel that the results from Web surveys are not generalizable due to the survey techniques, others feel that certain populations can benefit from this type of research (Coomber, 1997; Crawford, Couper, & Lamias, 2001; Dillman, 2000). Sills and Song (2002) proposed that the Internet as a delivery method for survey research could be useful for studying populations that were "technologically savvy," yet found that most e-mail and Web-based surveys have not had response rates consistently high enough to be generalizable.

Schonlau et al. (2002) summarized the literature on response rates for Internet surveys and suggested that mail surveys and surveys using both mail and Web response modes tended to have higher response rates than those just using e-mail or Web response mode. Response rates ranged from 7 to 44 percent for Web Surveys and from 6 to 68 percent for e-mail surveys. The authors examined only 7 studies and felt that the context of the individual study seemed to affect response rates. They also looked at several studies that involved experiments examining whether e-mail surveys had lower or higher

response rates than postal mail surveys. In the studies, identical questionnaires had been sent via e-mail or post mail. In most studies, the mail response rate was higher, yet the studies varied as to how the Web survey participants were recruited.

In the study done by Sills and Song (2002), both the power and problems of Web-based survey research in higher education were exposed. A survey was designed to explore the factors that might influence choice of college majors at a large university. Cover letters with links to a Web-based questionnaire were sent through the e-mail to the entire international students' (both undergraduate and graduate) population. The selected population all had e-mail accounts and access to the survey through on-campus computing centers, and the libraries on-campus. No incentive was offered for participation in the survey. The final response rate was only 22% after three waves of e-mail solicitations to the selected participants, including the opportunity to collect paper surveys from nonrespondents during an international student fair on-campus.

The researchers reported that factors affecting nonresponse in this study may have included technical problems with the Web page link in the initial batches, timing of follow-up waves, confidentiality concerns, and misidentification of the survey as Spam. Although each e-mail recipient received a unique, secure password that was randomly generated prior to the mailings, the survey was not anonymous. This may have been perceived by the selected participants as lack of confidentiality and affected response rates.

Recent research attention has been given to the possibility of using multiple modes of presenting surveys to increase response rates (Dillman, 2000; Schnolau et al., 2002). For example, the permanent faculty of Washington State University was surveyed

for an experiment on mixed modes of survey distribution (Schaefer & Dillman, 1998). The 904 faculty members in the survey population were randomly divided into four groups. Each group received four contacts (prenotice, questionnaire, thank you/reminder, and replacement questionnaire), the only differences being the mode of contacts: (a) all paper; (b) all e-mail; or (c) two groups with a mixture of more e-mail or more paper. The overall response rate reported for the study was 55%. Results of this experiment showed that for this population, comparable response rates can be obtained for regular mail surveys and electronic mail surveys (57.5% and 58%, respectively) when a mixed mode strategy is used to obtain responses by mail for sampled individuals who do not have e-mail addresses. The researchers also documented faster response rates with e-mail as it took an average of 9.16 days to receive the questionnaires by e-mail versus an average of 14.39 days by post mail.

Tse (1998) also found a statistically significant difference in the average initial response time for those who received an e-mail survey versus those who received a paper survey through their university's campus mail. Five hundred potential respondents in this study were randomly assigned from the Chinese University telephone directory to receive either an e-mail survey or an equivalent paper survey sent through the campus mail. The result was a seven percent response rate for the e-mail survey and a fifty-two percent response rate for the mail survey. Further, in Tse's experiment, most e-mail survey recipients either responded immediately (within one day), or they did not respond at all. This study raises the question of the effectiveness of nonresponse follow-up in the electronic forum.

The best chance for a decent return rate for a mail survey occurs if (Goodwin, 2002):

1. The survey is brief, easy to fill out;
2. Contains mostly closed questions, with open-ended questions as options;
3. The survey form starts with interesting questions and ends with demographic information;
4. Participants are notified that a survey is on the way;
5. Participants are asked for their help in the survey;
6. Follow-up reminders and second mailings are sent to selected participants; and
7. The survey is professional in appearance with a signed cover letter (p. 400)

All of these protocols discussed can be easily applied to Web-based surveys (Dillman, 2000). A recent meta-analysis of electronic surveys found personalized pre-notification and number of contacts to influence response rate in Web-based surveys (Cook, Heath, Thompson, & Thompson, 2001).

Design

Many of the visual design principles used for paper questionnaires apply to Web surveys as do the protocols (Dillman, 2000). Web surveys can be constructed in a format with the goal of making the questionnaire appear the same for all participants, in most cases. Use of advanced features (such as pop-up boxes or progress monitors or animation) may make it difficult or impossible for people with older, less powerful browsers or computers to receive or respond to such surveys. The more such features are used, the greater the likelihood that some people's browsers will receive the Web questionnaires more slowly and that they will crash from being overloaded or not

received at all (Dillman, 2000). Therefore, no pop-up windows were utilized by the Web survey in this study and the survey was checked in multiple browsers to ensure consistency.

A number of thoughts can be highlighted from the survey literature that are relevant to this study. First, e-mail surveys do seem to benefit from advance notification and follow-up in the same way that mail surveys (Schonlau, et. al, 2002). Second, because researchers at this point do not know how to most effectively employ incentives for surveys that are conducted exclusively via the Internet, response rates for Internet surveys may continue to lag until they are better understood (Dillman, 2000). Third, the methodological consequences of one participant seeing something different from another participant on a computer screen taking a survey are not yet known (Dillman, 2000). Also, there were no studies found that evaluated mixed modes using either the Web and the telephone or e-mail and the telephone. This will probably continue to be the case as Web surveys are often used to reduce survey costs and telephone interviewing is time consuming and expensive. Telephone contact may improve response rates for Web-based surveys and could be studied in future research.

Conclusion

Interaction and interactivity have been described in several, important research studies noted in this literature review as fundamental aspects of both traditional face-to-face college courses and distance education courses (DECs). In general, many of the sources reviewed attempted to identify principles of good practice rather than report original research in relation to DEC, types of interaction and student satisfaction. The studies varied greatly on sample selection, demographics, timeframe, delivery format,

instrumentation, etc. Therefore, further explanation and analysis of types of interaction in relation to student satisfaction in the distance education context are needed. The terms distance education and interaction have been used in a multitude of ways in the literature and research. Further research is also needed to identify the interaction constructs more explicitly.

Educators need to evaluate distance education courses to determine the effectiveness of each type of interaction and ensure that educators provide interactions for various teaching tasks, the different type of learners, and the different learning styles. Technology and the instructional practices used in distance education courses continue to be developed and refined in an effort to provide students with high-quality learning experiences at the postsecondary level. Yet, despite these efforts, a complex array of factors combine to make distance education course experiences varied for students.

This study attempted to provide greater understanding of the experiences of students involved in distance education courses (DECs). These DECs included more than one type of distance education format in terms of the type of interaction. This study examined the relationship of interaction type to student satisfaction in a distance education format.

CHAPTER 3 – METHOD

This chapter presents the research methodology undertaken in the completion of this study. Included in the chapter are the research design and rationale, participant selection process, data collection and instrument design, and the statistical and qualitative analyses conducted.

Research Design and Rationale

This study utilized a quantitative approach to determine the relationship between types of interaction and student satisfaction. Research has shown the importance of interaction in traditional higher education courses, yet there are very few empirical studies to evaluate the quality of distance education courses in terms of interaction and the relationship to student satisfaction as discussed in Chapter 2. It was not clear from the literature how student perceptions regarding types of interactions through the Internet and other distance delivery formats contributed to their satisfaction in DEC's. The research approach, therefore, was quantitative in nature to build the empirical research base for distance education, and included one qualitative item to clarify the statistical findings.

Reliable evaluation instruments for distance education courses, with valid items related to interaction and student satisfaction were not found in the literature. A survey, the Student Satisfaction and Interaction Questionnaire (SSIQ) (Appendix A), was developed by the researcher. A Web survey was the preferred method of data collection for both the ease of collection from a large sample, and the possibility of identifying attributes from the sample to a large population (Babbie, 1990). The form of data

collection was a self-administered questionnaire distributed online for the following reasons: (a) ease of reaching those with access to e-mail; (b) capability of providing a more dynamic interaction with the respondent (color) than paper and pencil questionnaires; and (c) participant experience and familiarity with the online, Web format (Dillman, 2000).

The research design for this study was a complex associational approach, because there was one continuous, criterion variable and several normally distributed predictor variables as noted in Gliner and Morgan (2000). Therefore, the data analysis involved multiple regression to examine the variables.

Independent Variables

Interaction types were the predictor, attribute variables in this study including: (a) Learner-Content (LC); (b) Learner-Instructor (LX); (c) Learner-Learner (LL); and (d) Learner-Multiple (LC + LX; or LC + LL; or LX + LL; or LC + LX + LL). Each item on the SSIQ was validated as representing a particular type of interaction based on the Index of Item-Objective Congruence (IIOC) (see Appendix B for definitions and instruments) (Rovinelli & Hambleton, 1976; Turner & Carlson, 2003).

Dependent Variable

The criterion variable satisfaction was interval/continuous and assumed to be normally distributed. The scale for satisfaction was defined by items on a Likert Scale from “Strongly Disagree” equaling 1, to “Strongly Agree” equaling 10. Use of a 10 point Likert Scale had shown greater reliability for survey responses based upon past research, and was therefore used rather than a five or seven point scale. According to Cook, Heath,

Thompson, & Thompson (2001), one way to increase score variance, and thus score reliability, is to increase the number of response alternatives used on an attitude measure.

Extraneous Variables

Grade in course(s), age, gender, and previous number of distance education courses (DECs) were other variables that could possibly influence the criterion variable. These variables were not controlled as this was not a random sample. Therefore, the SSIQ collected information on grade in course(s), age, gender, and previous number of DECs, and used the information gathered to conduct further analyses for nonresponse bias and sample description for future studies with the instrument.

Research Questions

1. Is there a relationship between learner-content (LC) interaction and student satisfaction?
2. Is there a relationship between learner-instructor (LX) interaction and student satisfaction?
3. Is there a relationship between learner-learner (LL) interaction and student satisfaction?
4. Is there a relationship between learner-multiple (LM) interactions and student satisfaction?
5. Is there a combination of interaction types that predict student satisfaction in a DEC better than any one alone?

Hypothesis

There will not be any one type of interaction that better predicts student satisfaction in a distance education course.

Participants and Site

The chosen population for this research was based on the Sloan survey, *The Quality and Extent of Online Education in the United States (2002 and 2003)*, that found that master's degree students take the most distance education courses(DEC), either online or in a blended (hybrid) format (Allen & Seaman, 2003). A convenience sample was utilized for this study, which included graduate students in a distance, Master of Business Administration (MBA) program at a large, Carnegie Classification, Doctoral/Research Extensive, public university. The SSIQ was placed on the World Wide Web (WWW) for participants. The survey was administered in Spring, 2005, with an estimate of N ~ 373 based on student enrollment statistics from the distance MBA program.

The population for this study was all graduate, master's degree students in DEC's. The convenience sample of graduate, distance, MBA students had the following desirable characteristics for this study: (a) master's degree level courses and program; (b) similar extraneous variables (course content, syllabus, and instructors, as all students were in one distance MBA program and took courses in the same distance education program); (c) multi-modal format of the DEC's; and (d) experienced students (the semester was near mid-term), so there was less chance of interface problems, as students had experience using the interface.

Other descriptive data such as gender, age, course grade, and previous distance education course experience were reviewed in further data analyses and examined for proportions in relation to the sample population (extraneous variables). This descriptive data was used in the bias analyses to determine the common characteristics of nonresponders to responders in the study. It has been found that the nonresponders can be

compared to the late responders in survey analysis (Bose, 2001; Mott, Pedersen, Doucette, Gaither, & Schommer, 2001).

The distance MBA program at the chosen institution was delivered in a multi-modal format, using an Intranet (online) system, along with video-taped lectures. The participants were enrolled in one of four courses in the distance MBA program. Each course had up to three sections, with no more than 30 students enrolled in each section. Each course was videotaped on-campus in a specially designed, state-of-the-art multimedia classroom. Distance students were sent the videotape or digital video disk (DVD) of each class once a week. Distance students viewed the videotapes or DVDs of the course exactly the way the class progressed on-campus, and listened to the dialogue and questions asked by the on-campus students. The distance students also participated in an Intranet (online) section of the class, using e-mail, discussion boards, and a chat system for communications.

Data Collection

Permission was obtained from the distance MBA program for the research study. The Human Research Committee at the University was presented with the proposal and forms for an Exempt Study and was approved. The professors and instructors for the courses in the distance MBA program were contacted regarding the study via e-mail for three objectives: (a) to inform them about the survey distribution to their students; (b) to decrease possible faculty resistance; and (c) potentially increase participant response (Thomas, (2004). Among suggested techniques on survey protocol, it was inferred that participant response rate may be increased by informing stakeholders connected to the survey process, i.e. faculty in the distance MBA program (Thomas, 2004). To address any potential questions by the distance education MBA faculty, an e-mail was sent to

them that discussed both the purpose and method of the study and gave contact information for the researcher.

Dillman (2000) suggests a set of procedures for conducting successful self-administered surveys to produce quality information and high response rates called the Tailored Design Method. The most important concepts emphasized are applying social exchange ideas and understanding why respondents do or do not answer the surveys (Dillman, 2000, p. 29). According to Dillman (2000), using mixed modes (such as both Web and paper versions) within a single administration can be problematic in that different modes may impact responses. Thus, using more than one mode may not be advisable if the results from the two modes cannot be equated because of differences in who responds and in how they respond. Therefore, a modified Dillman approach was utilized in this study to meet the respondents' expectations.

The specific steps taken in the survey distribution process for this study are displayed in Appendix C. The steps were a modified Tailored Design Method in order to support collection of meaningful survey data (Dillman, 2000). A modified approach was utilized that made sense for the sample population expectations and the literature review of best practices in Web survey research. The following methods were used in this study: a) multiple e-mail contacts; b) personalized letters of invitation; c) additional requests to participate in the survey were kept similar to earlier requests; d) describing the purpose and importance of the study to the potential participants; and e) thanking the participants and acknowledging their time.

The first step in the survey process was an e-mail (Appendix D) that was sent by the distance education program's administrative contact to the students announcing the

SSIQ in early Spring, 2005. This administrative contact was a recognized member of the MBA community who had frequent e-mail communication with the students in the program and, therefore, had established credibility for the potential participants (Dillman, 2000, p. 20). The method was used to ensure that the e-mail was not seen as spam by the participants (Shannon, Johnson, Searcy, & Lott, 2002). Though the administrative contact had access to a e-mail list, the individual e-mail addresses were not shown in the e-mail message to protect the participants' anonymity and establish trust (Dillman, 2000, p. 18).

The first e-mail was sent after mid-semester so as not to occur at mid-term exams or conflict with final course evaluations (Dillman, 2000, p. 18). The researcher confirmed with the administrative contact that no other outside or research surveys were scheduled or given to this participant group during the selected semester. The initial timeframe was chosen to allow for student experience with the technology interface (survey occurred several weeks into the semester), to increase response rate (before spring break), and allowed for multiple e-mails within a four-week period (multiple contacts) (Dillman, 2000).

The initial e-mail to the participants announced their selection to voluntarily participate in the study, along with a link to a Web site containing the letter of invitation (Appendix E). The initial and subsequent e-mails and letters of invitation were personalized with information on the following: a) purpose of the study; b) contact information for the researcher, and; c) details as to how the participant would help in the study (Dillman, 2000). The purpose of the study was described briefly to make the task of completing the survey important (Dillman, 2000, p. 20). The contact information provided the participants with an alternative to responding to the survey (Dillman, 2000,

p. 369). The letter of invitation provided the Web site link to the SSIQ, limiting the survey to invited participants (Dillman, 2000, p. 378). Once at the SSIQ site, the volunteer participants anonymously completed the survey with no PIN identification, so as to minimize the requests for personal information (Dillman, 2000, p. 18).

In following a modified Tailored Design Method for survey implementation, 8 days after the initial e-mail, another e-mail (Appendix D) was sent by the same MBA administrative contact, again asking the distance MBA students to participate in the study. In total, three email contacts were utilized, as repeated contacts were found to be key to improving survey response (Dillman, 2000, p. 149). Each email contact was consistent in the overall message, yet unique enough to convey a new message to potential participants (Dillman, 2000, p. 151).

The second e-mail reminded the graduate students of the SSIQ and provided the secure link to the letter of invitation to facilitate an improved response. After another eight days had passed, one last follow-up e-mail message was sent by the same administrative contact, which thanked those distance MBA students who had already completed the SSIQ and provided one last e-mail reminder with the link to the letter of invitation for the study. Therefore, the procedures used to facilitate an improved response rate for the SSIQ were the following: a) multiple e-mail contacts; b) personalized letters of invitation; c) keeping additional requests similar to earlier requests; d) describing the purpose and importance of the study; and e) thanking the participants and acknowledging their time (Dillman, 2000).

As noted earlier, an incentive was another approach utilized in this study to further increase response rates (Dillman, 2000, p. 149). The incentive was offered at

different time intervals based on the survey submission timeframe. Participants who submitted the survey were able to enter a drawing for a gift certificate to a major online retailer in the amounts of \$100, \$50, and \$25, depending on when they submitted the survey. When to use an incentive depends in part on the existing motivation of the potential respondents and whether they will find the incentive worthwhile to their time and effort (Thomas, 2004). In this study, graduate MBA students, as adult learners, needed to find an activity meaningful and worthwhile (Wlodkowski, 1998). The use of the incentive was to show the participants that their time and effort were valued.

Web surveys response rates may be affected by the lack of anonymity (Dillman, 2000, p. 378). Anonymity was promised to the participants due to the capability of a Web site. There was no connection between the survey responses and the information the participants entered for the drawing. The participants were not required to enter the drawing, but were instructed to participate only once in the survey and the drawing. Duplication of responses was checked according to demographic information and time of response provided by the e-mail text. This procedure was done to protect the participants' anonymity rather than giving the participants a unique ID number and possibly decrease the survey response rate with lack of anonymity (Dillman, 2000, p. 378). Access to the survey Web site, though, was limited to those who received the email notification and Web site address.

Completion of the survey averaged less than 15 minutes for the participants, based on piloted timeframes. Submission of each subject's completed SSIQ generated an e-mail to the researcher with responses to the items as an individual text file void of all identifying information (IP addresses, e-mail addresses, etc). These text files were

downloaded into Microsoft Excel to create a database and then put into Statistical Package for the Social Sciences (SPSS) 12.0 for quantitative analyses (items 1 through 32) and NVivo 2.0 for qualitative analyses of the comments (item 33 on the SSIQ). SPSS was chosen for the statistical analysis as it has predictive analytic technologies that use advanced analytics and decision optimization capabilities. NVivo was chosen to assist with the analysis of participant comments because of its unique ways to link data and ideas, its ability to make compound documents, and its integrated ability to search text, code, and develop attributes.

Measures

Research has shown the importance of interaction in traditional higher education courses, yet there are very few empirical studies to evaluate the quality of distance education courses in terms of interaction and the relationship to student satisfaction as discussed in Chapter 2. It was not clear from the literature how student perceptions regarding types of interactions through the Internet and other distance delivery formats contributed to their satisfaction in DECs. Reliable evaluation instruments for distance education courses, with valid items related to interaction and student satisfaction were not found in the literature. Previous research studies had not definitively answered the question about the different types of interactions in relation to student satisfaction or were flawed in their methodology (Arbaugh, 2000; Bannan-Ritland, 2002; Biner, Dean, & Mellinger, 1994; Bolliger, & Martindale, 2001; Fulford & Zhang, 1993; Gunawardena & Zittle, 1997; Phipps & Merisotis, 1999; Wang, 2003).

Validity

Gliner and Morgan (2000) defined validity as whether the instrument is actually measuring the proposed constructs. There are four types of measurement validity recognized in the research: a) face; b) content; c) criterion-related; and d) content validity. Content validity (Creswell, 2002) is the most commonly addressed validity in the research literature, and refers to the actual content in the instrument. The content validity of the SSIQ was first established by basing the items on the academic literature, research, and constructs from existent surveys concerning student satisfaction, course evaluation, and interaction in distance education (Biner, Dean, & Mellinger, 1994; Fulford & Zhang, 1993; Gunawardena & Zittle, 1997; Moore, 1989, 1993).

A survey instrument, the Student Satisfaction and Interaction Questionnaire (SSIQ) (Appendix A), was developed for this study to measure student satisfaction in relation to type of interaction. The use of any new research instrument, even one derived from a synthesis of other instruments with a similar intent, raises concerns about the instrument's validity and reliability (Salant & Dillman, 1994). Instrument development, including validity and reliability testing, were carried out in several phases for this survey.

The Likert Scale items were constructed to assess self-reported measures of satisfaction. The SSIQ measured student satisfaction regarding type of interaction and overall student satisfaction. A possible score ranged from zero to 230 points total, with 23 individual items on student satisfaction for the SSIQ. Nine items collected demographic information and comments on the SSIQ. The total number of items numbered 33 questions on the final SSIQ. The interaction constructs were measured as

follows: (a) seven items measured learner-content interaction (LC); (b) five items measured learner-instructor interaction (LX); (c) five items measured learner-learner interaction (LL); and (d) six items measured learner-multiple interaction (LM).

Item Congruence

The next step in augmenting the measurement validity of the SSIQ items involved assembling a panel of experts. Gliner and Morgan (2000) stated that one method of establishing content validity is by having several experts (a panel of people who are familiar with the subject the instrument purports to measure) judge the adequacy of the instrument. Originally, eleven professors and instructors, all of whom had research backgrounds in distance education, adult education, curriculum development, and research methods, were recruited to participate in the panel of experts to examine validity of the SSIQ (Appendix F). The experts for this study were selected primarily on the extent and diversity of their experience with distance education courses. Eight of the recruited experts were from public, higher education, research institutions, two of the experts were from private corporations involved in developing higher education resources, and one expert was from a private, non-profit, higher education teaching institution. All of the experts had experience in teaching distance education courses with at least 10 years of higher education teaching experience, and many of the courses taught in a distance education delivery format.

Six professors participated in all three rounds of item validation by reviewing the SSIQ items for representation of the concepts of interaction using the Index of Item-Objective Congruence (IIOC) method (Rovinelli & Hambleton, 1976; Turner & Carlson, 2003). The IIOC (Appendix B) is a procedure and test statistic developed for the purpose

of assessing the degree to which an item on an instrument measures the objective or construct that it intends to measure (Rovinelli & Hambleton, 1976). Turner and Carlson (2003) further developed the index to measure multidimensional items. The multi-dimensional formula was used in this study to measure type of interaction. Panel experts were given a definition list and instructions on how to complete the IIOC for this study (Appendix B). Interaction, the predictor variable, was defined as four types in this study: (a) Learner-Content (LC); (b) Learner-Instructor (LX); (c) Learner-Learner (LL); and (d) Learner-Multiple (LM = LC + LX, or LC + LL, or LX + LL, or LC + LX + LL).

The content experts were not told which constructs the individual items were intended to measure, and thus they remained independent and unbiased evaluators. Each content expert was asked to evaluate each item by giving the rating of 1 (for clearly measuring), -1 (clearly not measuring), or 0 (degree to which it measures the content area is not clear) in terms of type of interaction. The index of item-objective congruence formula was used to confirm the degree to which each single item represented the intended interaction type. The procedure also ensures that the item does not represent an unintended construct. A level of 0.70 for the index was chosen as the minimum requirement for interaction type based upon past research (Sireci, 1998). The initial analyses indicated that none of the items met the minimum level of acceptance. A total of three rounds of item-objective congruence were conducted to ensure the minimum level of 0.70 item validity and an adequate number of items for the final SSIQ instrument. The items were revised after all rounds of IIOC testing with respect to clarity, comprehension, grammar, spelling, format and level of readability. Final index of item-

objective congruence scores for the 23 items of the SSIQ ranged from 0.70 to 0.95. The IIOC scores are provided in Table 3.1.

Table 3.1

Index of Item-Congruence Values for Items on Student Satisfaction and Interaction Questionnaire (SSIQ) (N = 6)

Item Number	Survey Item Description	IIOC Score	Type of interaction
The instructor:			
1	motivated individual student learning	0.81	LX
2	was available for extra help on issues unrelated to the course	0.94	LX
3	acted as a facilitator by modeling desirable behaviors in the course	0.80	LX
4	made content delivery accommodations for individual student learning differences	0.91	LM (LC + LX)
5	In general, gave timely feedback	0.94	LX
As a group, the students:			
6	responded appropriately to other students' opinions	0.75	LL
7	created electronic friendships by exchanging personal information	0.89	LL
8	used chat	0.88	LL
The content (textbooks, Web sites, study guides):			
9	Involved the use of my critical thinking skills	0.75	LC
10	added to my understanding of the overall subject	0.88	LC
11	was well-written	0.70	LC
12	stimulated student-to-student discussion	0.95	LM (LC + LL)

Item Number	Survey Item Description	IIOC Score	Type of interaction
13	fit the course description	0.80	LC
14	stimulated student-to-student collaboration	0.70	LM (LC + LL)
15	stimulated my interest in the course	0.88	LC
The multimodal delivery format:			
16	added to the overall learning experience in the course	0.72	LM (LC + LX +LL)
17	promoted student-to-student communications	0.81	LL
I was satisfied:			
18	with my understanding of the content	0.90	LC
19	applying the information from the content	0.83	LC
20	using the delivery format to communicate with other students in the course	0.88	LL
21	with the amount of student-to-student collaboration	0.88	LM (LC + LL)
22	with the amount of instructor contact	0.81	LX
23	Overall, I am satisfied with this course:	0.71	Criterion Variable

Note. LC = Leaner-Content; LX = Learner-Instructor; LL = Learner-Learner; LM = Learner-Multiple.

Reliability

Reliability is defined as consistency of results if the procedure was repeated again (Gliner & Morgan, 2000). The SSIQ items were initially developed based on a review of multiple student evaluation questionnaires in the literature, including those developed by

Gunawardena and Zittle (1997), Biner (1993) and others (Arbaugh, 2000; Clouse, 2001; DeBourgh, 1999; Hassenplug & Harnish, 1998; Jung, Choi, Lim, & Leem, 2002; Sherry, Fulford, & Zhang, 1998; Wang, 2003).

Gunawardena and Zittle (1997) looked at measuring students' overall satisfaction and their ability to learn through the medium of computer-mediated-communication (CMC). From a sample of 50 students at five universities, the multi-item scales were analyzed for internal consistency with a resulting Cronbach's Alpha of 0.87 (a high value of reliability). Ten items were related to student satisfaction on the Gunawardena and Zittle survey. The sample was similar to this study in terms of post-secondary institutions and the use of multi-modal delivery formats.

In another study, Biner (1993) developed an instrument that measured student attitudes toward televised distance education, which included a total of 42 questions, 34 of which related to student satisfaction. No reliability coefficient was given for the instrument, but 50% of the items were kept by the researchers for their final study. Again, the sample for this study was similar in terms of a post-secondary institution, multi-modal delivery formats, and in this case, graduate students.

Because key concepts from these and other instruments were identified and reviewed in relation to the concepts of interaction and student satisfaction and were then incorporated into initial items for the SSIQ, original instrument reliability is germane to early reliability for the SSIQ. The 10 point Likert Scale added overall reliability for survey responses based upon past research, and was therefore used rather than a five or seven point scale for the SSIQ (Arbaugh, 2000; Biner, 1993; Gunawardena & Zittle, 1997; Sherry, Fulford, & Zhang, 1998).

A Cronbach's Alpha was run after administration to determine reliability with survey respondents. The Cronbach's Alpha was chosen to measure internal consistency reliability as each item on the test had multiple choices, and only one administration of the instrument was necessary for the results (Gliner & Morgan, 2000). The SSIQ yielded a Cronbach's alpha of 0.95, a strong value and indication of good reliability for the SSIQ.

Data Analysis

Data was collected via the SSIQ on the Web. The majority of the items on the SSIQ were Likert-scale items, with other items asking for descriptive information, such as grade in course(s), gender, number of distance education courses (DECs) taken in the MBA program, number of DECs outside the distance education program, and rank order of importance regarding types of interaction. The demographic statistics from the survey were compiled to describe the characteristics of the participants who were responders and to check for bias.

All statistical analysis was completed using SPSS version 12.0. The Likert-scale information was analyzed and displayed using frequency distributions, means, standard deviations and ranges. Student satisfaction with the types of interactions was analyzed along with overall student satisfaction. To draw conclusions from the multiple regression analysis, several assumptions were examined, including the following: (a) number of subjects per predictor; (b) multicollinearity; and (c) homoscedasticity. Themes from the open-ended question on the SSIQ labeled "Comments/Feedback" were analyzed using NVivo 2.0 and reported in Chapter 4.

As this was an associational study, the *F* statistic was the summary statistic for the regression analysis. A significant *F* would indicate that one or more types of interaction

were a significant predictor of student satisfaction. The multiple correlation coefficients, R , using all the predictor variables simultaneously, was calculated, and the adjusted coefficient R^2 was analyzed to determine how much student satisfaction can be predicted from all four types of interaction. Simultaneous multiple regression was chosen as the statistical method of analysis for this study as there were only four predictors, and no definitive research existed in the literature on the most important type of interaction in relation to student satisfaction in distance education courses.(Field, 2000). Confidence intervals and effect sizes were also calculated to determine practical importance from the research.

CHAPTER 4 - RESULTS

This chapter presents the analyses of the survey responses from the Student Satisfaction and Interaction Questionnaires (SSIQ) (Appendix A). All statistical analysis was completed using Statistical Package for the Social Sciences (SPSS) version 12.0, with themes from the comments analyzed using NVivo 2.0.

Descriptive Data for the SSIQ

The SSIQ was placed on the World Wide Web (WWW) in Spring, 2005 for graduate students in a distance, Master of Business Administration (MBA) program at a large, Carnegie Classification Doctoral/Research Extensive, and public university.

Demographic Characteristics

In theory, the best way to identify bias in the estimates from a sample of respondents would be to compare the estimates to the true population values (Bose, 2001). The distance MBA population at the University for Spring, 2005 consisted of approximately 23% females and 77% males, with an average age of 39 years old. The actual survey respondents were an average age of 38 years old. Twenty-seven percent (27%) of the survey respondents were female and 72% male. Survey respondents generally appear to be representative of the distance MBA sample population (Tables 4.1, 4.2, and 4.3)

Table 4.1

Demographic Characteristics of Participants

	n	Female	Male	Age in Years	GPA	Average grade in course
Distance MBA Population	368	23%	77%	38	3.20	NA
Survey Participants	105	27%	72%	39	NA	3.66

Table 4.2

Number of Participants by MBA Course

Characteristic	N	Population	Percent
BG 620 Course	37	105	35
BG 630 Course	41	89	46
BG 645 Course	28	82	34
BG 665 Course	32	92	34

Note. Participants may be enrolled in more than one course; n = 105

Table 4.3

Number of Distance Education Courses (DECs) Taken in the MBA Program versus Other DECs

Characteristic	N = MBA Program DECs	N = Other DECs
0 Courses	13	67
1-2 Courses	15	20
3-4 Courses	18	3
5+ Courses	56	14

Survey Responses

The SSIQ was administered online and introduced to the participants by three waves of e-mails that included a link to the survey. As per Dillman's (2000) modified guidelines multiple e-mails were sent by the administrative contact for the program, approximately eight days apart, to encourage response. The last e-mail was sent during the spring break timeframe. The development and distribution of the SSIQ followed recommended procedures and protocols from the literature regarding Web surveys, including voluntary participation, personalization, privacy protection, e-mail reminders, incentives and simplicity.

The sample population was found to be 368 after withdrawals and drops for the semester. Of the 368 in the sample population, 105 returned the survey (28.53%). The National Center for Education Statistics (NCES) conducts nonresponse bias analysis for surveys that have a response rate lower than 70% (Bose, 2001). However, Bose did not specifically address Web or e-mail survey formats in her article titled, *Nonresponse Bias Analyses at the National Center for Education Statistics*. According to a review of the

literature on Internet surveys by Schonlau, Fricker, & Elliot (2001), response rates ranged from 7 to 44 % for Web surveys and from 6 to 68 % for e-mail surveys, which are lower rates than the NCES minimum guideline of 70%. There is no agreed-upon minimum acceptable response rate for Web surveys (Fowler, 2002). Therefore, the higher, NCES standard of a minimum response rate of 70% was used to assess for any bias in this study and ensure valid analyses and conclusions.

Bias Analysis

Bias is the difference between a survey estimate and the actual population value (Bose, 2001). Nonresponse bias analyses serve as an indicator of the quality of the data collected and help identify potentially biased estimates. Nonresponse bias consists of two components, according to Bose (2001): (a) the extent of nonresponse and (b) the difference between the observed outcomes from respondents and the unobserved outcomes from nonrespondents. Bias analysis does not necessarily need to be done for all survey studies. For instance, a high response rate might indicate no need for further analyses of the sample participants. Also, low response rates alone do not necessarily suggest bias. According to Krosnick (1999) and Dillman (1991), when respondent characteristics are representative of nonrespondents, low rates of return are not biasing. In this study, the response rate was 28.53%, which is significantly below the 70 % response rate guideline from the NCES, and therefore, a nonresponse bias analysis was essential for this study before conducting any further analyses.

Nonresponse Bias Analysis. When data are not available from or on the nonresponders to a survey, one analysis approach is to identify those respondents who are most “like” the nonresponders (J. R. Zumbunnen, personal communication, May 11,

2005). Nonresponse bias estimates were done on the early responders versus late responders for this study, as the key assumption is that later responders to a survey are more similar to nonresponders than are earlier respondents (Bose, 2001; Mott, Pedersen, Doucette, Gaither, & Schommer, 2001).

To evaluate the early responders versus the late responders, the groups were evaluated on the criterion variable and demographic characteristics. A Mann-Whitney *U* test was conducted to see if the participants differed significantly on the interval, criterion variable of overall satisfaction (as noted earlier in this chapter). Grade in course(s) (as measured on a 4 point scale), gender, age, number of distance education (DE) courses taken in the MBA program, and number of DE courses outside the distance education program were analyzed for differences between the early responders and the late responders using the statistics Chi-square and Phi for nominal data and Kendall's tau-b for ordinal data (Morgan, Leech, Gloeckner & Barrett, 2004).

Because the assumption of normal distribution was violated and unequal group sizes were obtained, the nonparametric Mann-Whitney *U* test was chosen to investigate for differences between early responders and late responders on the criterion variable of overall satisfaction (Gliner & Morgan, 2000). The Mann-Whitney *U* test ($U = 1231.50$, $p = .955$) however, did not indicate a statistically significant difference ($p < .05$) between the SSIQ early and late responders on overall satisfaction. Therefore, bias was not assumed in the criterion variable data from nonresponse (Bose, 2001; Mott, Pedersen, Doucette, Gaither, & Schommer, 2001).

To investigate whether grade in course(s), gender, age, number of DE courses taken in the MBA program, and number of DE courses outside the distance education

program differed significantly between early responders and later responders of the SSIQ, Chi-square, Phi and Kendall's tau-b were used to analyze the groups. Table 4.4 displays the participant characteristics, the statistics used to analyze the groups, and the results of the analyses. Gender was analyzed using Phi as both variables (gender and group) were nominal and had two levels (Morgan, Leech, Gloeckner & Barrett, 2004). The other demographic characteristics were analyzed using Kendall's tau-b as the data were ordinal. No significant differences ($p < .05$) were found between the early responder and late responder groups. Therefore, as none of the groups differed significantly between early responders and late responders on any of the demographic characteristics, bias was not assumed in the data from nonresponse (Bose, 2001; Mott, Pedersen, Doucette, Gaither, & Schommer, 2001).

Table 4.4

Early versus Late Responders for Survey Participants

Participant Characteristic	N	Statistic	Results	P
Gender	104	Phi	-.055	.572
Grade	103	Kendall's tau-b	-.062	.523
Age	95	Kendall's tau-b	-.007	.934
Number of DE MBA Courses	99	Kendall's tau-b	.026	.787
Number of Other DE Courses	103	Kendall's tau-b	.036	.705

Quantitative Analysis

As there were four predictor variables, and one criterion variable, a multiple regression analysis was conducted for this study. Due to the lack of literature and reliable studies on interaction and student satisfaction, the hypothesis for analysis was the following:

Hypothesis

There will not be any one type of interaction that better predicts student satisfaction in a distance education course.

Research Questions

As noted in Chapter 3, the research questions for the study were the following:

1. Is there a relationship between learner-content (LC) interaction (SSIQ items 9, 10, 11, 13, 15, 18, and 19) and student satisfaction (SSIQ item 23)?
2. Is there a relationship between learner-instructor (LX) interaction (SSIQ items 1, 2, 3, 5, and 22) and student satisfaction (SSIQ item 23)?
3. Is there a relationship between learner-learner (LL) interaction (SSIQ items 6, 7, 8, 17, and 20) and student satisfaction (SSIQ item 23)?
4. Is there a relationship between learner-multiple (LM) interactions (SSIQ items 4, 12, 14, 16, and 21) and student satisfaction (SSIQ item 23)?
5. Is there a combination of interaction types that predict student satisfaction in a DEC better than any one alone?

Multiple Regression

This study used regression analysis. Multiple regression was used to determine the best linear combination of interaction types [learner-content (LC), learner-instructor (LX), learner-learner (LL), and Learner-Multiple (LM = LC + LX; or LC + LL; or LX +

LL; or $LC + LX + LL$)] to predict overall student satisfaction in distance education courses.

To draw conclusions from the multiple regression analysis, several assumptions were examined, including the following: (a) number of subjects per predictor; (b) multicollinearity; and (c) homoscedasticity. The number of subjects for the study is one of the most important criteria for a regression analysis. At least 15 participants for each predictor are needed for an analysis (Field, 2000). Therefore, in this study of four predictors, a minimum response from 60 participants was needed. The minimum number of responders was exceeded with 105 participants responding to the SSIQ.

Multicollinearity was assessed to make sure that the predictor variables were not highly correlated. The four predictors were not significantly correlated with all values below 0.80 (Field, 2000). Table 4.5 shows the means, standard deviations and intercorrelation values between the predictors. In reviewing the criterion variable for normality, the regression plot showed a normal histogram of the standardized residuals, therefore, the assumption of homoscedasticity was met, and there was a normal probability plot of the residuals. Normality of overall student satisfaction was assumed.

Table 4.5

Means, Standard Deviations, and Intercorrelations for Predictor Variables (Interaction Types)

Predictor Variable	M	SD	LC	LX	LL	LM
1. Learner-Content Interaction (LC)	7.51	1.54	--	.72	.56	.74
2. Learner-Instructor Interaction (LX)	8.25	1.29		--	.65	.76
3. Learner-Learner Interaction (LL)	7.61	1.47			--	.66
4. Learner-Multiple Interaction (LM)	7.59	1.47				--

Note. N = 104.

The 22 individual, question items on the SSIQ were grouped according to interaction type (LC, LX, LL, LM) by the IIOC process into the four predictors for the analysis (see Table 3.1). As noted in Chapter 3, simultaneous multiple regression was then used to predict the criterion variable of overall student satisfaction (SSIQ item 23). With simultaneous regression, all predictor variables were entered simultaneously (Field, 2000). Simultaneous multiple regression was chosen as the statistical method of analysis for this study as there were only four predictors, and no definitive research existed in the literature on the most important type of interaction in relation to student satisfaction in distance education courses.

The combination of the predictor variables significantly predicted overall student satisfaction in distance education courses with $F(4, 99) = 67.14, p < .001$. The beta coefficients are presented in Table 4.6. Note that the learner-content interaction (LC) and learner-instructor-interaction (LX) significantly predicted overall satisfaction when all

four predictors were included. The adjusted R^2 value was 0.72. This indicates that 72% of the variance in overall satisfaction was explained by the model (Field, 2000). According to Cohen (1988), this is a larger than typical effect size in terms of practical significance.

Table 4.6

Simultaneous Multiple Regression Analysis Summary for Interaction Type Predicting Overall Student Satisfaction in Distance Education Courses

Predictor Variable	B	SEB	B
Learner-Content Interaction (LC)	.47	.11	.36**
Learner-Instructor Interaction (LX)	.44	.10	.40**
Learner-Learner Interaction (LL)	.08	.09	.07
Learner-Multiple Interaction (LM)	.14	.11	.12
Constant	-.38	.50	

Note. $N = 104$; $R^2 = .73$; $\Delta R^2 = .72$; $F(4,99) = 67.14$, $p < .001$.

** $p < .001$.

Outliers and Residuals

To determine whether there were any specific cases that exerted a large influence on the model generated from the analysis, regression diagnostics were created for casewise diagnostics, Cook's distance, leverage, and the Durbin-Watson test (Field, 2000).

Casewise diagnostics displayed a summary of the residual statistics that were examined for extreme cases. In an ordinary sample, one would expect 95% of the cases to have standardized residuals between ± 2 (Field, 2000). This study included 104

participants, therefore, it was reasonable to expect about five cases to be outside these limits. Examination of the sample statistics revealed that there were seven cases outside these limits, so the sample was within 2% of normal expectations. There are no values with an absolute value greater than three for standardized residuals for the study. Ninety-nine percent of cases should lie within ± 3 , and this was the case for the sample. Therefore, the diagnostics show no real cause for concern, and the sample responses predict a fairly accurate model.

Cook's distance was also calculated to look at influential cases and outliers (Field, 2000). The mean Cook's distance was less than one and showed no cause for concern. Leverage was a third measure of influence of the observed value of the outcome variable over the predicted values that was reviewed in the study. The average leverage value is defined as $(k+1)/n$, in which k is the number of predictors in the model and n is the number of subjects. Leverage values can lie between 0 (indicating no influence) and 1 (indicating complete influence). If no cases exert undue influence over the model, the leverage value should be close to the average value, according to Field (2000). The leverage value for this study had a mean of 0.038, which is less than the calculated value of 0.05, indicating no cases exerted undue influence on the model.

As a final step in the analyses for influences, the Durbin-Watson test statistic was produced for the study. The value was 1.935, close to a value of two, confirming that the residuals were uncorrelated (Field, 2000). The normality of the residuals was confirmed by a normal distribution histogram and a normal probability plot. Therefore, no one case exerted influence on the data for this study, and the sample responses predicted a fairly accurate model.

Ranking

The regression analysis was supported by rank order of importance of type of interaction by the survey participants. Table 4.7 shows learner-content (LC) and learner-instruction (LX) as the most important types of interaction by rank, confirming the multiple regression model results.

Table 4.7

Importance of Type of Interaction in Distance Education Courses by Rank on a Scale from 1 (least important) to 4 (most important)

Predictor Variable	Average Rank
1. Learner-Content Interaction (LC)	2.94
2. Learner-Instructor Interaction (LX)	2.94
3. Learner-Multiple Interaction (LM)	2.57
4. Learner-Learner Interaction (LL)	2.30

Themes from Comments

NVivo 2.0 was used to systematically analyze and code the textual data from the “Comments/Feedback” question, item 33, on the SSIQ. The question item was constructed as the only open-ended question on the SSIQ, and was used to assess and compare the overall satisfaction ratings submitted by the participants (Thomas, 2004). Over seven pages of comments (single-spaced) were contributed to the Comment/Feedback question on the SSIQ. NVivo was chosen for the qualitative analysis as it provided for automated interpretation and theory emergence by allowing rich text records of the responses to be freely edited, coded and linked.

The main theme presented consistently from the comment data was that the distance MBA program was a “good program.” Five categories emerged from the data around the main theme including: (a) the distance learner; (b) interaction; (c) the instructor; (d) content; and (e) technologies.

The Distance Learner

The comments produced from the survey consistently discussed the flexibility of the distance program and how it accommodated work, travel, and family schedules. The distance MBA program was seen as balancing living and providing both a quality and convenient education. Many comments centered on the idea that the learner would not be able to attend courses or a MBA program unless it was offered in the multi-modal format. “This format allows for greater focus on the material and access to the latest developments...perfect for those individuals juggling graduate studies and a demanding career.” The asynchronicity of the format was stressed as an important factor in terms of flexibility.

Other feedback from the participants emphasized that the learner needed to be “diligent, motivated, committed and disciplined” for the MBA program, and that adjustments in lifestyle were needed to complete the program even with the great flexibility. Because of the multi-modal format, the distance learner felt part of the program even though they never attended courses on-campus. “Having the ability to see the professor interact with the on-campus class gives the distance student additional insight into the subject material along with the feeling of being involved.”

Interaction

The asynchronicity and multi-modal format of the program allowed for the learner to interact with other learners and instructors. Again, because of the format, the learner felt part of the program as the flexibility encouraged interactions. “Embanet has worked out great to collaborate with the class.” The interactions engaged the learners’ attention and motivated them to participate in the courses. In some cases, completion of the program was attributed to the interactions and multi-modal format of the program. “The overwhelming factor to me is that I never have to go to a physical classroom”

Most feedback discussed the benefits of distance interaction, yet there was still an emphasis that distance learning was not easy. For instance, there were suggestions on how to improve interactions in the distance education environment, such as a central conference call number, streaming video, or VoIP (voice-over-Internet Protocol). Apparently, the chat function was considered awkward and rarely used for discussions by the participants. “Real-time interaction would be better but difficult to do using what technology is available today.” Also, concerns regarding group projects conflicted with the idea of the flexibility of the program and the need for specific interaction amongst participants. Some participants wanted more classroom discussions and interactions with other learners and felt that the technologies did not allow for the type of interactions needed for group projects. “There is just far too much burden associated with the team logistics and is difficult for people like me who have heavy travel schedules.”

The Instructor

The learners indicated that they felt part of the program because of the format of courses, including the structure developed by the instructors. “The receipt of the class

DVDs makes a distance student feel part of the on-campus class.” Positive remarks from the participants included the professors and instructors having professional experience and knowledge which added to the excellence of the program. Some participants mentioned that the individual instructors for the sections were more responsive and gave better feedback than the professors.

Content

Participants remarked that the program offered an excellent education and that it should be nationally ranked. “[University’s] distance MBA program has exceeded my expectations and well worth the cost.” “The DVD interaction with the curriculum is what pushes [University’s] program to the top of the list.” Lectures were considered an important part of the course materials, along with the DVDs and other materials provided in the courses. Overall, the participants felt challenged by the course materials and felt they were comparable to on-campus courses. “Enjoyable” and “Recent” were terms found throughout the comments regarding the courses and materials in the distance program.

Some participants disliked the questions posed by the professors on the DVDs and observed that they did not allow for more critical thinking. Others felt the coursework was an overload of information and found it especially difficult when team assignments were involved. “Would prefer to have fewer group projects and more individual work.”

Technologies

The multi-modal format afforded asynchronicity and flexibility for the learners. Because the distance learner was able to view the on-campus lectures via DVD, they stated they were connected to the program. “The interaction with students and instructors

via DVD and Web has greatly added to a quality learning experience.” As stated earlier, the multimodal format contributed to both continuing motivation for the learner and completion of the program. “I do not think I would have stuck with the program without the combination of the contacts through the DVD (recording of the live classroom), chat with other students, and Internet contact with instructors and staff.”

In most cases, the DVDs were discussed as being of good quality, yet some participants mentioned that it was difficult to hear the student questions and responses. “While the DVD quality is improving, it remains difficult at times to hear student discussions.” As some participants wanted more discussion, the uses of newer technologies, such as voice over IP, were seen as a potential improvement to the program. “Found the chat feature unhelpful...difficulty contributing to the group. A VoIP feature would be extremely helpful.”

Summary of Comments

The diagram in Figure 4.6 displays the interconnectivity discussed in the comments from the participants in the SSIQ. The relationships among the themes from the comments are shown in the figure. The interaction types are shown linking with each other through the technologies. The figure is meant to represent the importance of the instructor and content to the context of distance learning. The instructor and content are mediated by and through the technologies in a distance education course. The better technologies and more interactions, the more likelihood of learning.

Ninety-seven percent of the participants who responded to the SSIQ recommended the distance MBA program. It appeared that the MBA program was chosen by participants because it was a distance program. “The convenience of distance

education is the distinguishing feature of this format and great care should be taken to guard this.” Participants indicated that the program was both an excellent education and a fulfilling experience for them. The multi-modal format of the program made it competitive with other distance MBA programs and valuable to their professional growth. “The high quality of the program, great convenience, and great school name recognition make the [University] program a clear choice for distance students interested in a high quality MBA from a well-recognized school.”

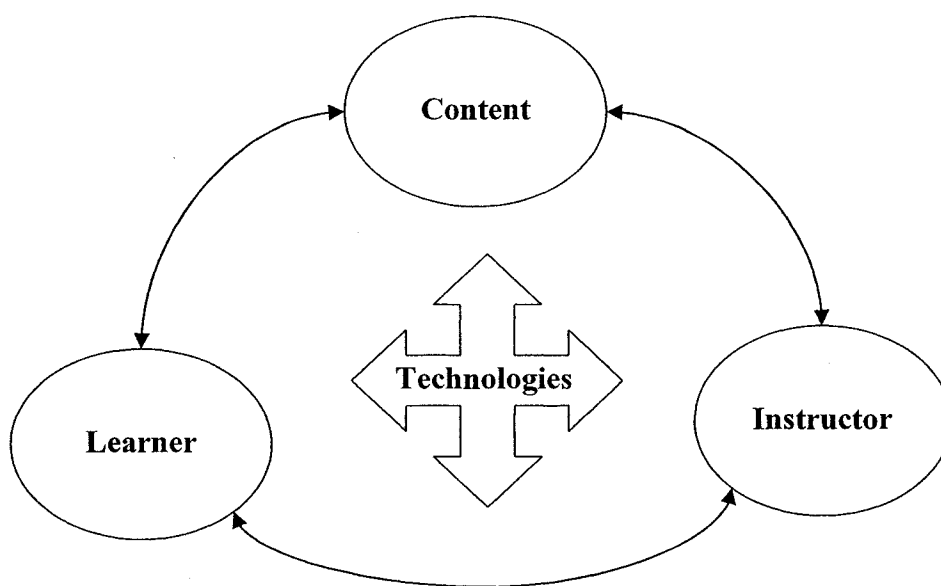


Figure 4.6. *Relationship of Themes from Participant Comments*

CHAPTER 5 – DISCUSSION

This chapter presents the findings, interpretation of the data, implications, and recommendations for practice. The chapter ends with a discussion regarding the need for future research in distance education and contributions of this study to the body of research.

Summary of the Findings

This study developed a survey instrument, the Student Satisfaction and Interaction Questionnaire (SSIQ) (Appendix A), which was placed on the World Wide Web (WWW) in Spring, 2005 for graduate students in a distance, Master of Business Administration (MBA) program at a large, Carnegie Classification Doctoral/Research Extensive, public university. For this study, the research methodology was a quantitative approach to determine the relationship between types of interaction and student satisfaction. The research approach was quantitative and qualitative in nature to build the empirical research base for distance education, as the research literature had been found to be lacking (Lesh & Rampp, 2000; Phipps & Merisotis, 1999, Russell, 1999).

The research design for this study had four predictor variables: (a) learner-content (LC) interaction; (b) learner-instructor (LX) interaction; (c) learner-learner (LL) interaction; and (d) learner-multiple (LM) interaction, and one criterion, interval variable: student satisfaction. These predictor variables were chosen as the research had shown their importance in a distance learning environment (Lesh & Rampp, 2000; Phipps & Merisotis, 1999, Russell, 1999).

Statistical Analysis

Simultaneous multiple regression was conducted to determine the best linear combination of interaction types for predicting overall student satisfaction in distance education courses using SPSS (Statistical Package for the Social Sciences)12.0. This combination of variables (interaction types – learner-content, learner-instructor, learner-learner, and learner-multiple) significantly predicted overall student satisfaction in distance education courses. Two of the predictor variables, learner-instructor and learner-content, significantly contributed to overall student satisfaction in a distance education course.

The findings suggest that learner-instructor interaction contributed the most to overall student satisfaction in distance education courses, with learner-content interaction also significant. Seventy-two percent of the variance in overall student satisfaction in distance education courses was explained by learner-instructor and learner-content interactions. According to Cohen (1988), this is a larger than typical effect in terms of practical significance.

These findings were further validated through the instrument question where students were asked to rank-order the survey constructs (learner-content, learner-instructor, learner-learner, and learner-multiple interaction types) according to most important to least important in a distance education course. The research results showed that both learner-content and learner-instructor interaction were the most important types of interaction to the participants.

Themes from Comments

NVivo 2.0 qualitative software was used to systematically analyze and code the textual data from the “Comments/Feedback” question on the SSIQ. This question, item 33 on the SSIQ, was the only qualitative, open-ended question on the instrument. This item was used to validate the individual survey responses by comparing overall student satisfaction ratings with comments from participants. The main theme presented consistently from the comment data was that the distance MBA program was a “good program.” Five categories emerged from the data around the main theme including: (a) the distance learner; (b) interaction; (c) the instructor; (d) content; and (e) technologies. The diagram in Figure 4.6 displays the interconnectivity between the five categories discussed in the comments by the participants. The relationships among the themes from the comments are shown in the figure, which illustrates the interaction between the learner, instructor and content being mediated by the technologies.

Ninety-seven percent of the participants recommended the distance MBA program. The participants indicated that the program was both an excellent education and a fulfilling experience for the participants. The multi-modal format of the program made it competitive with other distance MBA programs and valuable to their professional growth. “I think this is a sound MBA program that should be nationally ranked.”

Interpretation of the Data

The researcher had hypothesized that no one predictor type of variable would be the most important to overall satisfaction, which was found to be false in this study. Learner-content and learner-instructor interactions were found to be significant in relation to overall student satisfaction. The importance of the content and instructor in the

distance education courses were consistently supported in the comments by the participants. The participants expressed that they would recommend the quality program, that they received an excellent education, and that they were prepared for professional growth from the program. “Great program...and I would recommend it to my peers.”

The learner-multiple interaction type had been developed by the researcher as a new construct that could be measured based on the literature and development of the SSIQ. Yet, learner-multiple was found not to be significant in terms of overall satisfaction.

In the participant comments, there were complaints about needing the flexibility of time in conflict with the course requirements of team projects. The researcher believes that these constraints will be removed as the technologies improve in the future.

The findings from the themes from the comments indicate the importance of the interaction predictor variables as they seem to mimic the predictors (learner constructs) almost identically with interaction constructs. Therefore, both from the literature and the study it was validated that the predictor variables were vital to student satisfaction in distance education courses.

The regression analysis found that learner-instructor and learner-content were the most important predictors among the four predictors. Learner-instructor was found to be the most important predictor variable. This was further validated by the rank-order by participants with learner-instructor tied for ranking as the most important type of interaction in distance education with learner-content. Therefore, no matter the distance education context, the instructor is important to student satisfaction in learning and is a large influence in both student outcome and learning.

Learner-content and learner-multiple interactions were found not to be significant constructs predicting overall satisfaction. This was further validated by the rank-order questions, where learner-multiple and learner-learner questions were found to be ranked 3rd and 4th, respectively. The researcher hypothesized that none of the predictors would be more important to student satisfaction, but this was found not to be the case.

According to Sutton (2000), vicarious interaction takes place when a passive student actively observes, absorbs, and processes the ongoing interactions between students, and the instructor does not actively post any discussion threads in a intranet (online) course. Instead of actively being involved in learner-content and learner-instructor interactions, the student actively processes the discussion board information as a form of learner-content interaction. This would need to be further investigated to distinguish learner-multiple as more of learner-content interaction in the distance education context.

The themes from the comments support ideas about distance learning that have been in the research, including the flexibility and convenience for the adult learner. In the comments, a consistent theme was the ability to take courses in the distance education context. Several studies in the literature also pointed to this as being important, and therefore, the concept of flexibility along with distance learner characteristics should be further investigated (Bannan-Ritland, 2002; Latanich, Nonis, & Hudson, 2001; and Lim, 2001).

Interaction, no matter what format, was found to be important to the learner and confirmed previous studies in the literature. In this study, it seems as if the learner is asking for more interactions and modalities rather than less in the themes from the comments. The participants valued the asynchronicity of the distance learning

environment but also asked for the technologies to be improved for better quality interactions and additional interaction capabilities. They also wanted more reliable synchronous technologies and interactions in terms of Chat functions, VoIP, etc.

“Streaming video is something that the school needs to offer...as many students do not have access to the DVDs.” “The biggest frustration ...is the inability to interact in sort of live way in the classroom...”

This study found that student satisfaction is related to interaction in distance education courses, specifically, learner-instructor and learner-content interactions. This result is based on the specific respondents and the combination of interactions, including four types of interactions: learner-content, learner-instructor, learner-learner and learner-multiple interactions, though only learner-content and learner-instructor proved to be significant individually.

Recommendations for Practice

From the literature review and this research study, I believe that practitioners should concentrate on adult learning methods and focus on instructional design methods when developing and teaching in the distance education context. I believe understanding and using new technologies that incorporate different types of interactions into a distance education course will improve the distance education experience for the learner and therefore, improve the learner outcomes.

Multiple, varied, and consistent communication and interaction with the learner are key components in any distance education course. The motivation and excitement of the learner is both the job of the learner and the instructor in the distance education context. Chickering and Gamson’s principles for good teaching and learning (1987)

continue to be important in any educational context. The responsibilities for a good learning experience lie within both the educator and the learner.

This study found that learner-content interaction was an important predictor variable to overall satisfaction in a distance education course. Again, this result was based on the specific respondents and the combination of interactions. Therefore, institutions may need to have support systems for instructors that include instructional designers who have the expert knowledge on how to transform materials to a multi-modal distance learning environment. Then, instructors will be able to offer the technologies and interactivity that may be needed in a distance education course. The support for instructors should include creating a standard methodology and best practices to follow to provide for a consistent experience for the learner.

Technologies

Distance education courses may need to be enhanced with more effective communication methods that allow for better interactions. This recommendation would require institutions spend more dollars on quality communication tools such as VoIP, though, face-to-face communications may need to be a part of the multimodal format delivery in the distance education context to further enhance learner-instructor and learner-learner interactions and improve student satisfaction and learning. Learners value the asynchronicity of the distance education context, but call for the technologies to be improved and support better synchronous interactions.

Instructors may want to reconsider team projects or group assignments until the technologies are better and allow for the flexibility or convenience for the learner. In the meantime, instructors may be able to provide a conference call number for the teams to

communicate and interact with one another. This may be especially important in a distance MBA program as team projects are considered to be a large part of project management experience in a MBA program.

Needs for Future Research

This study moved the research in distance education from the comparison of traditional face-to-face courses and focused on distance education in the multi-modal format. The study should be replicated with the instrument using a graduate student population in a multimodal format at a large, public university to replicate the sample population in this study. Researchers may want to use a population at a four-year institution or two-year community college, to see if the results were unique to the graduate student, MBA population.

Another area of research would be to investigate if the instructor or faculty perceptions are similar to the learner and clarify whether the instructor and content are perceived as the most important factors to student satisfaction in a distance education course. This is evident to this researcher based on the SSIQ development, as the experts had difficulty separating the content constructs from the instructor constructs when using the Index of Item-Objective Congruence (IIOC). Three rounds of item analyses confirmed this for the researcher.

Future research should continue to define learner-multiple interactions and the multi-modal formats, and move away from learner-interface definitions. More studies are needed that are empirically-based and focus on distance education populations who experience multimodal delivery formats. Validating the use of Web surveys and

incentives, along with establishing survey methodologies is vital for research in distance education.

This study has established valid construct validities for the types of interaction in distance education and a reliable, initial instrument for measuring student satisfaction in relation to these constructs, the Student Satisfaction and Interaction Questionnaire (SSIQ). Learner-content and learner-instructor interaction significantly predicted overall student satisfaction in a distance education course. This was further supported by the rank ordering of the constructs, with learner-content and learner-instructor tied for the most important type of interaction in distance education courses. This was further validated by the themes from the comments in that content and instruction interactions were consistently mentioned as important to the distance education courses.

Learner-learner and learner-multiple interaction were not significant but were considered as important to the overall contribution to student satisfaction in the model. This study adds to the body of research in distance education as it focuses on empirically measuring the constructs of interaction in relation to student satisfaction. Although student satisfaction is only one type of assessment, it is a critical component in the evaluation process. Student satisfaction can be considered as a benchmark for quality in a distance education course.

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APPENDIX A - STUDENT SATISFACTION AND INTERACTION
QUESTIONNAIRE (SSIQ)



Student Satisfaction and Interaction Questionnaire (SSIQ)

This survey explores how interaction in distance education courses affects student satisfaction. The survey will take approximately 10 minutes to complete.

Please consider all your distance education experiences in the MBA program, not just this course. This is NOT your final course evaluation.

Please submit the survey only one time. There are 32 total questions on the survey.

The instructor:

1. motivated individual student learning

Strongly Disagree 1 2 3 4 5 6 7 8 9 10 Strongly Agree

☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐

2. was available for extra help on issues unrelated to the course

Strongly Disagree 1 2 3 4 5 6 7 8 9 10 Strongly Agree

☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐

3. acted as a facilitator by modeling desirable behaviors in the course

Strongly Disagree 1 2 3 4 5 6 7 8 9 10 Strongly Agree

☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐

4. made content delivery accommodations for individual student learning differences

Strongly Disagree 1 2 3 4 5 6 7 8 9 10 Strongly Agree

☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐

5. in general, gave timely feedback

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As a group, the students:

6. responded appropriately to other students' opinions

Strongly Disagree	1	2	3	4	5	6	7	8	9	10	Strongly Agree
	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	

7. created electronic friendships by exchanging personal information

Strongly Disagree	1	2	3	4	5	6	7	8	9	10	Strongly Agree
	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	

8. used chat

Strongly Disagree	1	2	3	4	5	6	7	8	9	10	Strongly Agree
	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	

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The content (textbooks, web sites, study guides):

9. involved the use of my critical thinking skills

Strongly Disagree	1	2	3	4	5	6	7	8	9	10	Strongly Agree
	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	

10. added to my understanding of the overall subject

Strongly Disagree	1	2	3	4	5	6	7	8	9	10	Strongly Agree
	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	

11. was well-written

Strongly Disagree	1	2	3	4	5	6	7	8	9	10	Strongly Agree
	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	

12. stimulated student-to-student discussion

Strongly Disagree	1	2	3	4	5	6	7	8	9	10	Strongly Agree
	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	

13. fit the course description

Strongly Disagree	1	2	3	4	5	6	7	8	9	10	Strongly Agree
	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	

14. stimulated student-to-student collaboration

Strongly Disagree	1	2	3	4	5	6	7	8	9	10	Strongly Agree
	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	

15. stimulated my interest in the course

Strongly Disagree	1	2	3	4	5	6	7	8	9	10	Strongly Agree
	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	

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The multimodal delivery format (more than one type of format -ex. Internet and videotape):

16. Added to the overall learning experience in the course

Strongly Disagree	1	2	3	4	5	6	7	8	9	10	Strongly Agree
	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	

17. promoted student-to-student communications

Strongly Disagree	1	2	3	4	5	6	7	8	9	10	Strongly Agree
	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	

I was satisfied:

18. with my understanding of the content

Strongly Disagree 1 2 3 4 5 6 7 8 9 10 Strongly Agree
☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐

19. applying the information from the content (textbooks, web sites, study guides)

Strongly Disagree 1 2 3 4 5 6 7 8 9 10 Strongly Agree
☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐

20. using the delivery format to communicate with other students in the course

Strongly Disagree 1 2 3 4 5 6 7 8 9 10 Strongly Agree
☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐

21. with the amount of student-to-student collaboration

Strongly Disagree 1 2 3 4 5 6 7 8 9 10 Strongly Agree
☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐

22. with the amount of instructor contact

Strongly Disagree 1 2 3 4 5 6 7 8 9 10 Strongly Agree
☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐

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23. Overall, I am satisfied with distance education courses:

Strongly Disagree 1 2 3 4 5 6 7 8 9 10 Strongly Agree
☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐

24. Rank the interaction types from the most important to least important with **4 being most important** and **1 being least important**

content instructor learners multiple types of interactions

25. To date, I have earned a grade of :

A ☐ B ☐ C ☐ D ☐ F ☐

26. Gender Male ☐ Female ☐

27. Number of previous distance education courses in the MBA program (NOT counting this course or semester):

0 ☐ 1-2 ☐ 3-4 ☐ 5+ ☐

28. Number of previous distance education courses other than in the MBA program:

0 ☐ 1-2 ☐ 3-4 ☐ 5+ ☐

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29. Please check the distance MBA course(s) and section(s) your are enrolled in:

BG620 section 1 ☐ section 2 ☐ section 3 ☐

BG630 section 1 ☐ section 2 ☐ section 3 ☐

BG645 section 1 ☐ section 2 ☐ section 3 ☐

BG665 section 1 ☐ section 2 ☐ section 3 ☐

Other Course(s)

30. Age

31. Would you recommend enrolling in a distance education degree program?

Yes ☐ No ☐

32. Comments/Feedback:

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Thank you for taking this survey. All information is confidential. If you have any questions, please contact Leslie Keeler at (303) 526-3832 or email at lkeeler@colostate.edu.

**APPENDIX B - DEFINITIONS AND INDEX OF ITEM-OBJECTIVE
CONGRUENCE (HOC) INSTRUMENTS**

Initial Definitions for Completing the Index of Item Congruence Tally Sheet

Interaction

- A mutual or reciprocal action or influence (Wagner, 1994).

Multimodal Delivery Format

- A distance education course involving an online course platform, two-way interactive video, audio conferencing, one-way communications and face-to-face interactions, or a combination of two or more of these interface components in a course.

Learner-Content Interaction (Self-Directed Learning)

- According to Moore (1993), the definition of learner-content interaction is “the process of intellectually interacting with the content that results in changes to the learner’s understanding, the learner’s perspective, or the cognition of the learner.”
- Learning programs with only learner-content interaction consist mostly of one-way communications and learning is self-directed
- Examples would include reading textbooks and using text documents on a Web page

Learner-Instructor Interaction (Learner is Guided & Assisted)

- Two-way communication between the learner and the instructor
- Application of the learner’s knowledge is guided by the educator through activities and assessments
- Educators assist the learner by stimulating their interest and motivation (Moore, 1993)
- Examples include lecture, course syllabi, assignments and instructor feedback

Learner-Learner Interaction (Group Discussion & Collaboration)

- This type of interaction can occur with or without the real-time presence of an instructor and can be one learner with another learner or one learner to a group of learners
- Learner-learner interaction involves application and evaluation of learning
- Examples include peer discussion and group assignments

Learner-Interface Interaction (Learner-Controlled & Dynamic)

- Any type of communication medium or technology device that allows for collaboration, conversation, discussions, exchange and/or communication of ideas can be considered a learner-interface (Hillman, 1999)
- Examples include search engines, course management platforms, WebCams, and accessing library resources from remote sites

Multiple Interaction Types (Combinations)

- Interactions may be of more than one type; for instance, there may be learner-learner and learner-content interactions that occur at the same time; an example of this would be structured discussions on the bulletin board according to topics set by the instructor
- Another combination example would be learner-learner and learner-interface interactions that occur at the same time; an example of this would be a group discussion using the chat tool in a course management platform

Definitions for Completing the Index of Item Congruence Tally Sheet (Round 2)

Interaction

- A mutual or reciprocal action or influence (Wagner, 1994)
- A shared or combined effect or impression

Distance Education Course

- A distance education course involving an online course platform, two-way interactive video, audio conferencing, one-way communications and face-to-face interactions, or a combination of two or more of these interface components in a course (multimodal)

Learner-Content Interaction (LC)

- According to Moore (1993), the definition of learner-content interaction is “the process of intellectually interacting with the content that results in changes to the learner’s understanding, the learner’s perspective, or the cognition of the learner”
- Consists of one-way communication
- Learning is self-directed and independent
- Examples would include reading of textbooks, listening to audio files, using a CDROM, visiting web sites, reviewing content modules and tutorials

Learner-Instructor Interaction (LX)

- Two-way communications between the learner and the instructor that are either synchronous or asynchronous
- Application of the learner’s knowledge is guided by the instructor through activities and/or assessments
- Instructors assist the learner by stimulating their interest and motivation (Moore, 1993)
- Examples include assignments, instructor feedback, online office hours

Learner-Learner Interaction (LL)

- This type of interaction can occur without the instructor
- One learner with another learner or one learner to a group of learners
- Learner-learner interaction involves application, collaboration and evaluation of learning
- Examples include peer discussion, group assignments, case studies, student only topics on the discussion board and peer review of assignments

Multiple Interaction Types (Combinations)

- Interactions may be of more than one type
- An example would be learner-learner (LL) and learner-instructor (LX) interactions that occur at the same time; an example of this would be a group discussion using the chat tool in a course management platform with the instructor participating as the facilitator; a rating of ‘1’ would be marked in the LL cell AND the LX cell

Definitions for Completing the Index of Item Congruence Tally Sheet (Round 3)

Interaction

- A mutual or reciprocal action or influence (Wagner, 1994)
- A shared or combined effect or impression

Distance Education Course (DEC)

- A distance education course involving an online course platform, two-way interactive video, audio conferencing, one-way communications and face-to-face interactions, or a combination of two or more of these interface components in a course (multimodal format)

Learner-Content Interaction (LC)

- Learner-content interaction is where there is an active intellectual participation between the learner (alone) and the subject matter.
- Learning is self-directed and independent using any form of instructional media
- The learner constructs his or her own knowledge from the interaction with the content by critical thinking, problem-solving and/or application of the information (Moore, 1993)
- Learner-content interaction may not include the instructor; for instance, the instructor may be responsible for preparing the learner-content interaction in terms of the design of the course and materials; yet, without feedback, teaching generalized, and therefore, success is dependent upon the learner, only
- Examples would include reading of textbooks, listening to audio files, using a CDROM, visiting web sites, reviewing content modules, tutorials and study guides, assignments and self-tests

Learner-Instructor Interaction (LX)

- Two-way communications between the learner and the instructor that are either synchronous or asynchronous
- One of the *human* components of interaction in the learning process that allows the learner to gain accurate knowledge by discussion and evaluation
- Application of the learner's knowledge is clarified and guided by the instructor through questioning, assessment, and or feedback
- The instructor assists the learner by stimulating their interest and motivation (Moore, 1993)
- Examples include instructor feedback, questioning and assessment

Learner-Learner Interaction (LL)

- This type of human interaction can occur with or without the instructor (Moore, 1993)
- One learner with another learner or one learner to a group of learners
- Learner-learner interaction involves group application, collaboration, and/or evaluation of learning
- Examples include peer discussion, group projects, case studies, and peer review of assignments

Multiple Interaction Types (Combinations)

- Interactions may be of more than one type
- An example would be learner-learner (LL) and learner-content (LC) interactions that occur at the same time; an example of this would be a group discussion about a course topic using the chat tool in a course management platform; the instructor is NOT present in this example; a rating of '1' would be marked in the LC cell AND the LL cell; 1 (LC), -1 (LX), 1 (LL) would be the ratings marked in the cells on the tally sheet

Initial Index of Item Congruence Tally Sheet – Expert _____

After you are familiar with the different types of interactions, and feel confident in your ability to distinguish them, please fill out the tally sheet. Use a “1” in each box for each interaction you are sure that is clearly represented, a “0” for each interaction that you are unsure of or that is partially indicated, and a “-1” for each interaction that you are sure is clearly not represented. **Some items may describe more than one type of interaction.** By completing the tally sheet, you will be validating the types of interactions. **Please make sure to put a response in each box for all items.** There are a total of 65 items on the congruence tally sheet, along with a section to write-in comments/activities (5 pages total).

Key for Rating Items: 1 = sure; 0 = unsure; -1 = not

Comment/Activity	Learner-Content	Learner-Instructor	Learner-Learner	Learner-Interface
1. The instructor gave quality feedback				
2. As a group, the students used the online discussion board				
3. The content included a variety of topics				
4. The multimodal delivery format added to the learning experience				
5. The instructor contributed to student learning				
6. As a group, the students valued other students' opinions				
7. The content was valuable				
8. The multimodal delivery format promoted student participation				
9. The instructor gave timely feedback				
10. As a group, the students used chat				

Key for Rating Items: 1 = sure; 0 = unsure; - 1 = not				
Comment/Activity	Learner-Content	Learner-Instructor	Learner-Learner	Learner-Interface
11. The multimodal delivery format added workload to the course				
12. As a group, the students created electronic friendships				
13. The instructor encouraged students to participate in the course				
14. The content activities were relevant				
15. As a group, the students created discussion topics unrelated to the course content				
16. As a group, the students utilized the course discussion topics				
17. The instructor was available for extra help outside of class				
18. The multimodal delivery format technical requirements were clear				
19. The students shared personal information with others in the course				
20. The multimodal delivery format was easy to use				
21. The content was comparable to a traditional delivery content				
22. The instructor responded appropriately to student questions				
23. The multimodal delivery format had synchronous interactions				

Key for Rating Items: 1 = sure; 0 = unsure; - 1 = not				
Comment/Activity	Learner-Content	Learner-Instructor	Learner-Learner	Learner-Interface
24. The content assignments were relevant				
25. As a group, the students asked others in the course for assistance				
26. The instructor acted as a discussion facilitator				
27. The content activities were applicable				
28. The multimodal delivery format permitted questions to be asked				
29. The instructor encouraged students to participate in course discussions				
30. The content was interesting				
31. The instructor seemed interested in student comments				
32. The multimodal delivery format created positive student experiences				
33. The instructor was prepared for class				
34. The content fit the course objectives				
35. The instructor made accommodations for student learning differences				
36. The multimodal delivery format created a sense of community				

Key for Rating Items: 1 = sure; 0 = unsure; - 1 = not				
Comment/Activity	Comment /Activity	Comment /Activity	Comment /Activity	Comment /Activity
37. The instructor assisted in collaborative learning				
38. The multimodal delivery format created positive student experiences				
39. The instructor was knowledgeable about the content				
40. The multimodal delivery format allowed for student learning differences				
41. The instructor provided assessment criteria for assignments				
42. The multimodal delivery format had asynchronous interactions				
43. The instructor stimulated interest in the content				
44. The content added to my understanding of the topics				
45. The multimodal delivery format improved my communication skills				
46. The multimodal delivery format made learning active				
47. The instructor structured the course in a logical manner				
48. The multimodal delivery format allowed flexibility in my schedule				
49. The instructor was fair and unbiased				

Key for Rating Items: 1 = sure; 0 = unsure; - 1 = not				
Comment/Activity	Comment /Activity	Comment /Activity	Comment /Activity	Comment /Activity
50. The multimodal delivery format allowed access to multiple learning resources				
51. I would prefer to take a course via this delivery format than a traditional format				
52. I was satisfied using the delivery format to communicate with the instructor				
53. I was satisfied participating asynchronously in the course				
54. I was satisfied participating synchronously in the course				
55. I was satisfied using the delivery format to communicate with other students in the course				
56. I was satisfied taking a course via this technology format				
57. I was satisfied having the instructor in a remote location				
58. I was satisfied with the assessment procedures				
59. I was satisfied with the amount of group collaboration				
60. I was satisfied with the learning I achieved in this course				
61. I was satisfied with the amount of instructor contact				
62. I was satisfied with the overall quality of instruction				

Key for Rating Items: 1 = sure; 0 = unsure; - 1 = not				
Comment/Activity	Comment /Activity	Comment /Activity	Comment /Activity	Comment /Activity
63. I was satisfied with the amount of student-to-student contact				
64. I was satisfied with the amount of student participation				
65. Overall, I was satisfied with this course				

Comments:

Index of Item Congruence Tally Sheet (Round 2) – Expert

After you are familiar distinguishing the types of interactions, please fill out the tally sheet. By completing the tally sheet, you will be validating the types of interactions in distance education courses.

- Use a “1” in each box for each interaction you are sure that is clearly represented
- Use a “0” for each interaction that you are unsure of or that is partially indicated
- Use a “-1” for each interaction that you are sure is clearly not represented.
- **Some items may describe more than one type of interaction.** You may mark all cells that apply with the appropriate rating; for instance, you may have a rating for an item as -1, -1, and 0.
- **Please make sure to put a response in each box for all items.** There are a total of 33 items on the congruence tally sheet, along with a section to write-in comments (3 pages total).

Key for Rating Items:

1 = clearly represented; 0 = unsure if represented; - 1 = not represented

Comment/Activity	Learner-Content	Learner-Instructor	Learner-Learner
1. The content in the textbooks, modules and web sites included a variety of topics			
2. The multimodal delivery format added to the overall learning experience in the course			
3. The instructor motivated individual student learning			
4. As a group, the students responded appropriately to other students' opinions			
5. The content in the textbooks, modules and web sites stimulated group collaboration			
6. The multimodal delivery format promoted student-to-student communications			
7. In general, the instructor gave timely feedback			
8. As a group, the students used chat			
9. As a group, the students created electronic friendships by exchanging personal information			

Comment/Activity	Learner-Content	Learner-Instructor	Learner-Learner
10. The instructor required students to participate in the course discussion topics			
11. The content assignments were relevant to the course objectives			
12. As a group, the students created discussion topics related to the course content			
13. As a group, the students utilized the course discussion topics set by the instructor			
14. The instructor was available for extra help on issues unrelated to the course			
15. The content was comparable to a traditional delivery content			
16. As a group, the students asked other students for assistance with assignments			
17. The instructor acted as a facilitator by giving guidance and protocols on how students should conduct themselves in the course			
18. The multimodal delivery format permitted two-way communications			
19. The content in the textbooks and other resources materials was interesting			
20. The instructor made content delivery accommodations for individual student learning differences			
21. The multimodal delivery format created a sense of community for all members in the course			
22. The multimodal delivery format assisted in collaborative group learning			

Comment/Activity	Learner-Content	Learner-Instructor	Learner-Learner
23. The instructor was knowledgeable about the course content and topics			
24. The instructor provided assessment criteria for assignments related to course content and objectives.			
25. The content in the textbooks added to my understanding of the overall subject			
26. The multimodal delivery format improved my communication skills with all members of the course			
27. The instructor was fair in the treatment of students			
28. The multimodal delivery format allowed access to multiple learning resources including content, the instructor and peer resources			
29. I was satisfied learning the content via the multimodal delivery format in the course			
30. I was satisfied using the delivery format to communicate with other students in the course			
31. I was satisfied with the amount of student-to-student collaboration			
32. I was satisfied with the amount of instructor contact			
33. Overall, I was satisfied with this course			

Comments:

Index of Item Congruence Tally Sheet (Round 3) – Expert

After you are familiar distinguishing the types of interactions, please fill out the tally sheet. By completing the tally sheet, you will be validating the types of interactions in distance education courses.

- Use a “1” in each box for each interaction you are sure that is clearly represented
- Use a “0” for each interaction that you are unsure of or that is partially indicated
- Use a “-1” for each interaction that you are sure is clearly not represented.
- **Some items may describe more than one type of interaction.** You should mark all cells that apply with the appropriate rating; for instance, you may have a rating for an item as 1, 1, and -1.
- **Please make sure to put a response in each box for all items. Do not leave any items blank.** There are a total of 22 items on the congruence tally sheet, along with a section to write-in comments (2 pages total).

Key for Rating Items:

1 = clearly represented; 0 = unsure if represented; - 1 = not represented

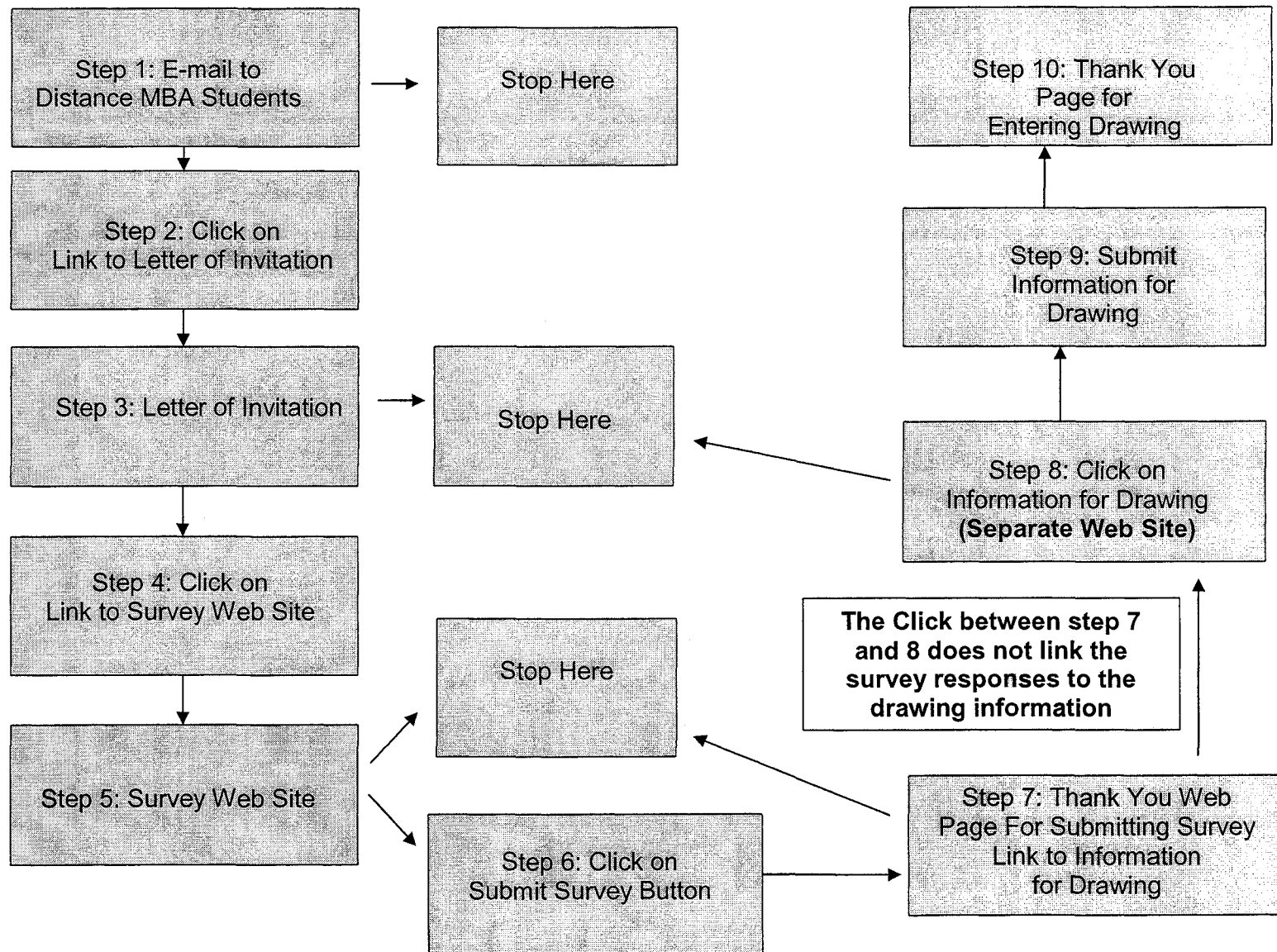
Comment/Activity	Learner-Content (LC)	Learner-Instructor (LX)	Learner-Learner (LL)
1.The instructor maintained group harmony in the course.			
2.The content (textbooks, web sites, study guides, etc.) involved the use of my critical thinking skills.			
3.The instructor used probing questions to clarify and promote my understanding of the content.			
4.The content (textbooks, web sites, study guides, etc.) stimulated student-to-student collaboration.			
5.The instructor created opportunities for social interactivity in the course.			
6.As a group, the students applied their knowledge in the course discussion board.			
7.The instructor formed group assignments in the course.			
8.The content (textbooks, web sites, study guides, etc.) fit the course description.			

Comment/Activity	Learner-Content (LC)	Learner-Instructor (LX)	Learner-Learner (LL)
9.The instructor structured and organized the course content.			
10. The content (textbooks, web sites, study guides, etc.) was well-written.			
11. The instructor defined the objectives for the course.			
12. I was able to apply the information from the content (textbooks, web sites, study guides, etc.).			
13. Instructor feedback on assignments and questions was constructive for me.			
14. As a group, the students asked other students for clarification and feedback on assignments.			
15. The instructor provided evaluation of student progress in the course.			
16. The content (textbooks, web sites, study guides, etc.) stimulated student-to-student discussions.			
17. The instructor acted as a facilitator by modeling desirable behaviors in the course.			
18. The content assignments improved my written communication skills			
19. The instructor managed communications in the course.			
20. The content (textbooks, web sites, study guides, etc.) stimulated my interest in the course.			
21. The instructor was knowledgeable about the course content.			

Comment/Activity	Learner-Content (LC)	Learner-Instructor (LX)	Learner-Learner (LL)
22. I was satisfied with my understanding of the content.			

Comments:

**APPENDIX C - STEPS IN THE ADMINISTRATION OF THE STUDENT
SATISFACTION AND INTERACTION QUESTIONNAIRE (SSIQ)**



**APPENDIX D - E-MAIL RECRUITMENT TO STUDENTS IN THE COLLEGE
OF BUSINESS (COB) DISTANCE MASTER OF BUSINESS ADMINISTRATION
(MBA) PROGRAM**

E-mail Messages

1) The initial e-mail from the administrative contact for the distance MBA program will read as follows:

“You have been selected to participate in a brief online survey. The study hopes to find the relationship of interactions to student satisfaction in distance education courses. You have been chosen to participate in the study as you represent an important segment of the population that takes distance education courses – Master’s level students. This survey is from a Colorado State University PhD student who has obtained the cooperation of the College of Business.

Drawings will be held for 3 gift certificates (\$100, \$50 and \$25 denominations). They are being offered as incentives for you to participate in the research!!!

Your participation is completely voluntary, and your decision whether or not to participate will not affect your status in the Distance MBA program. Confidentiality and anonymity are ensured. You will not be individually identified with your questionnaire or responses.

The survey should take approximately 10-15 minutes to complete. To respect your time commitment, an incentive is being offered for you to complete the survey. To learn more about the survey and participate, please click on the following link:

<http://soegrad.colostate.edu/students/keeler>.

If the link does not work from this page, please copy and paste the link into a new browser window. If you have questions or problems, contact Leslie Keeler at leslie.keeler@colostate.edu or (970) 491-2965.”

As noted, the link will take them to the letter. After reading the letter, they can click on the link in the letter which will take them to the survey.

2) Then, as noted, 8 days after the initial message sent by the administrative contact in the MBA program, a follow-up message will be sent as a reminder notice to all the students in the distance program.

“This message is a reminder of your selection to participate in the web survey of interaction and student satisfaction in a virtual environment. The study explores the relationship of interaction to student satisfaction in distance education courses. This survey is from a Colorado State University PhD student with the cooperation of the College of Business. Thank you for your involvement if you have already participated in the survey response. You may only participate once.

Drawings will be held for 2 gift certificates (\$50 and \$25 denominations). They are being offered as incentives for you to participate in the research!!!

For those who have not participated, your participation is completely voluntary, and your decision whether to participate will not affect your status in the Master’s degree program or any courses you are currently enrolled.

The survey should take approximately 10-15 minutes to complete. An incentive is being offered for you to complete the survey. Please click on the following link to learn more and to participate: <http://soegrad.colostate.edu/students/keeler>.

If the link does not work from this page, please copy and paste the link into a new browser window. If you have questions or problems, contact Leslie Keeler at leslie.keeler@colostate.edu or (970) 491-2965.

The same link will be provided that takes them to the letter. If they choose to participate, they then click on the link in the letter that will take them to the survey.

3) As noted, after another 8 days has passed, one last follow-up message will be sent by the administrative contact in the MBA program, to the students in the distance program.

“This message is one last reminder of your selection to participate in the web survey of interaction and student satisfaction in a virtual environment. For those who have already participated in the survey, you may disregard this message, and the Colorado State University PhD student thanks you.

A drawing will be held for a gift certificate (\$25 denomination). It is being offered as an incentive for you to participate in the research!!!

If you have not participated as of yet, your participation is completely voluntary, and your decision whether or not to participate will not in any affect your status in the Master’s degree program. It should take approximately 10-15 minutes to complete. Please click on the following link to learn more and to participate: <http://soegrad.colostate.edu/students/keeler>.

If the link does not work from this page, please copy and paste the link into a new browser window. If you have questions or problems, contact Leslie Keeler at leslie.keeler@colostate.edu or (970) 491-2965.”

APPENDIX E - LETTER OF INVITATION TO PARTICIPATE IN THE SSIQ



Knowledge to Go Places

230 Education Building
Fort Collins, CO 80523

DATE: February, 2005

TO: All Students in the [university's] Distance MBA Program

RE: An Invitation to Participate in Research on Interaction and Student Satisfaction

Dear Distance MBA Student:

I need YOUR help in completing a survey. You have been selected to participate as research has found that Master's students take the most distance education courses, either online or in a blended (hybrid) format. Your help is important to learning about distance education courses as they are becoming the norm in higher education. Yet, little is known about the variables that contribute to their effectiveness. Your response can greatly enhance our understanding.

I am a Ph.D. student in the Interdisciplinary program of the School of Education (SOE) at Colorado State University (CSU). The survey is being conducted via a secure web site and will take approximately 10-15 minutes for you to complete. Your participation in this research is voluntary and your confidentiality and anonymity are ensured. You will not be individually identified by your questionnaire or responses. The administrators, professors or instructors in the MBA distance education program will NOT have access to your individual responses.

To respect your time commitment, I am offering an incentive to complete the survey. You will be able to participate in one of three drawings for gift certificates to a major retailer for \$100, \$50, or \$25, depending on when you complete the survey. You will need to complete the survey and then go to a separate site to enter the drawing. There will be no connection between your responses and the information you enter for the drawing. You do not need to enter the drawing after completing the survey. You may only participate once in the survey and drawing.

There are no known risks to participating in this study. Although there are no known benefits for your participation, your responses add to the understanding of factors that contribute to the effectiveness of distance education. This may in turn help in the development and standardization of distance education programs. The overall findings will be shared with [the university's] Distance MBA Program and Instructors. If you have any questions or comments about this study, you can contact us using the information below. Questions about participants' rights may be directed to the Regulatory Compliance Office at 970-491-1563.

Thank you for your interest and participation. If you would like a copy of the results of this study, a separate link will be made available at the end of the survey web site after the data has been collected and analyzed, later on 2005.

To participate, please click on the following link: <http://soegrad.colostate.edu/students/keeler>.

If the link does not work from this page, please copy and paste the link into a new browser window. If you have questions or problems, contact us the information below.

Ph.D. Student, SOE	Assistant Graduate Faculty, SOE	MBA Graduate Program Operations, COB
Leslie A. Keeler	Dr. Laurie Carlson, Advisor	Elisa Lilly
(303) 526-3832	(970) 491- 6826	(970) 491 - 2865
Leslie.Keeler@colostate.edu	Laurie.Carlson@colostate.edu	elisa.lilly@colostate.edu

APPENDIX F - LETTER OF RECRUITMENT TO PANEL OF EXPERTS

Colorado State University
School of Education
Room 237 Education Building
Fort Collins, CO 80523-1588
(970) 491-2965

October, 2004

Dear Dr. (name):

Distance education courses are becoming the norm in higher education. Yet, little is known about the variables that contribute to the effectiveness of distance education. As you know, I am working on my dissertation at Colorado State University (CSU) in the School of Education. My doctoral study focuses on the different types of interaction in a distance education course. The types of interaction include learner-content, learner-learner, learner-instructor, and learner-interface. I am hoping to find the relation of these types of interaction to student satisfaction in distance education courses.

The title of my study is "Multimodal Distance Education Courses and Student Satisfaction: The Development and Validation of an Instrument for Analyzing Student Satisfaction and Types of Interaction in Distance Education Courses. This research is for my dissertation under the guidance of Dr. Laurie Carlson and Dr. Don Quick. I need your help to categorize the types of interactions in a distance education course. I would genuinely appreciate your time and expertise. If you have any questions, please contact me at 303-526-3832 or leslie.keeler@colostate.edu.

My population includes graduate students in a distance Master's program. The chosen population for this research is based on the Sloan survey (The Quality and Extent of Online Education in the United States, 2002 and 2003) that found that Master's degree students take the most distance education courses, either online or in a blended (hybrid) format in distance education (see report at <http://www.sloan-c.org/resources/survey.asp>).

My study hopes to develop a valid survey instrument that can measure student attitudes which could be used in all distance education courses. As distance education courses are becoming the norm in higher education, we still do not know about the variables that contribute to the effectiveness of distance education. Your response to this questionnaire may greatly enhance our understanding of the importance of interaction in a distance education course. This may help in designing better curriculum for future distance education courses and to meet accreditation standards for distance education programs.

To establish validity of my survey, I am using the Index of Item Congruence method that was developed by Rovenelli and Hambleton (1977) and further revised by Turner & Carlson (2003) that uses content experts to validate items within instruments. In this study, the procedure is used to assure that each item represents the construct (type of interaction). By agreeing to help, you will be validating the types of interactions in a distance education course as a content expert.

I would greatly appreciate your participation in this research. It will take you less than 30 minutes to complete the Item Congruence sheets. In the enclosed packet you will find this instruction sheet, definitions of the four types of interactions, and 65 items on the congruence tally sheet, along with a section to write-in comments/activities. Please begin by reading the definitions and examples for the interaction types being studied.

After you are familiar with the different types of interactions, and feel confident in your ability to distinguish them, please fill out the tally sheet. Use a "1" in each box for each interaction you are sure that is clearly represented, a "0" for each interaction that you are unsure of or that is partially indicated, and a "-1" for each interaction that you are sure is clearly not represented. Some items may describe more than one type of interaction. By completing the tally sheet, you will be validating and categorizing the types of interactions. Please make sure to put a response in each box for all items.

When you have completed the tally sheet, please return all items to the envelope provided with the return label/postage and send it in the post mail. Or, if you wish, you can fax the information back to me at 303-526-1568. If you have any questions, please contact me at 303-526-3832 or leslie.keeler@colostate.edu.

Again, thank you for your time, expertise and consideration!! Thank you for your participation in my research.

Sincerely,

Leslie A. Keeler
Ph.D. Candidate
(970) 491-2965
Leslie.Keeler@colostate.edu

Dr. Laurie Carlson
Advisor
(970) 491-6826
Laurie.Carlson@colostate.edu

Dr. Don Quick
Advisor
(970) 491- 4683
Don.Quick@colostate.edu