

EFFECT OF LEARNER ATTRIBUTES, DIALOGUE AND COURSE STRUCTURE
ON STUDENTS' SATISFACTION AND PERFORMANCE IN ON-LINE COURSE
ENVIRONMENTS

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EFFECT OF LEARNER ATTRIBUTES, DIALOGUE AND COURSE STRUCTURE
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ABSTRACT

This investigation was guided by Moore's theory of transactional distance (1993). The purpose of this study was to assess the effect that student attributes such as learner autonomy (LA) as measured through its independent constructs of desire to learn (DL), learner resourcefulness (LR), learner initiative (LI) and learner persistence (LP); online technology self-efficacy (OTSE), as well as course structure and dialogue (CSD) have on student satisfaction (SS) and performance (SP) in online learning environments.

Students enrolled in asynchronous, distance learning courses offered through the Allied Health Program at a Midwestern university were surveyed to determine the effect of LA, OTSE, and CSD on students' satisfaction and performance in online course environments. Students' performance was measured using final course grades.

The learner characteristics and distance learning experience questionnaire and the short form of the learner autonomy profile (LAP-SF) (Confessore & Park, 2004) were used as survey instruments. The learner characteristics and distance learning experience (LCDLE) questionnaire included items to solicit information including demographics along with a number of items adapted from published research instruments including the online technologies self-efficacy scale (OTSES) by Miltiadou (2001), the survey of student experiences in online courses (SEOC), published by Lan, et al.(2003), items evaluating student satisfaction and level of interaction with faculty and students

(dialogue) adapted from the work of Swan (2001), and items evaluating students' perception of the course structure by Huang (2002).

General conclusions drawn from this investigation included the following:

1. Course structure-dialogue was a significant predictor of students' satisfaction with the online courses investigated.
2. Course structure-dialogue was negatively correlated with students' impact scores indicating that technology related problems had less effect on students' learning experience in these online courses when the course structure met students' needs and the amount of dialogue within the course was sufficient.
3. Neither course structure-dialogue, online technology self-efficacy, nor learner autonomy was found to be significant in predicting students' performance in the online courses.
4. Most of the students were satisfied with the online courses, although a significant negative relationship between students' age and student satisfaction with the online courses was identified in this investigation.

DEDICATION

Dedicated to my family for their love, inspiration, and support

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CHAPTER I

THE PROBLEM

Introduction

This section begins by discussing the problem, relating appropriate background information, and providing a theoretical frame of the problem. Assumptions underlying the study are then presented, followed by the general research questions, a discussion of the significance of the study, delimitations, and definitions and operational terms.

Distance learning is often thought of in terms of the physical distance that separates learners from the teacher or faculty member. Moore (1996) suggested that there is distance even in classes in which the students and teacher are within the same room. This distance is described as transactional distance. Transactional distance exists in educational environments whenever there is a student, a teacher, and a means for communication. The separation of teachers and learners that occurs with distance learning greatly affects teaching and learning (Moore & Kearsley, 1996). In discussing transactional distance within distance learning environments, Moore (1993) related that

with separation there is a psychological and communications space to be crossed, a space of potential misunderstanding between the inputs of the instructor and those of the learner. It is this psychological and communications space that is the transactional distance. (p. 22)

Special teaching and organizational behaviors are required when teaching at a distance because of the transactional distance involved (Moore & Kearsley, 1996).

The amount of transactional distance is determined by course structure and dialogue within the course. Dialogue consists of interactions between the teacher and learner and includes words, actions and ideas. Dialogue can be affected by the number of students enrolled in a course. It is more likely that the amount of dialogue in a course will be greater when the number of learners in the group is lower. The means of communication (computer-based communications vs. printed materials) and language (dialogue is found to be greater when students and instructor have the same native language) can also impact dialogue within a course (Moore & Kearsley, 1996). All things being equal, a course with no dialogue will have a higher transactional distance than a course where there is adequate dialogue between teacher and learners. Structure is determined by the flexibility or rigidity of instructional design elements such as, "...educational objectives, teaching strategies, and evaluation methods" (Moore, 1993, p.27). Structure relates how responsive and accommodating the course is to each learner's needs (Moore, 1993; Moore & Kearsley, 1996). A course that allows learners no ability to tailor assignments or evaluation methods to meet their individual needs is highly structured. A pre-recorded, instructional video program can be highly structured, and if no dialogue is available, the transactional distance will be high (Moore & Kearsley, 1996). An instructional program with little predetermined structure and a great deal of dialogue will offer little transactional distance (Moore, 1993).

Programs with little transactional distance offer students more flexible structure and increased dialogue. More transactional distance exists in a program where dialogue

is less (because dialogue is either not permitted, or not possible) and program structure is increased by the instructor, or course designer, to provide guidance and direction that the course instructor, or designer, expects the learners will require (Moore, 1993).

Moore suggests that students with greater autonomy are more likely to be content in courses with greater transactional distance than less autonomous learners. Moore also states that because more autonomous learners can make judgments and decisions about their study strategies, students with greater autonomy require less structure and dialogue in their course; whereas, a student with less autonomy will benefit from increased dialogue, structure, or both (Moore, 1993; Moore & Kearsley, 1996).

Students enrolled in online courses offered by the degree program participating in this investigation have varying degrees of distance learning experience upon entering the program and electing to enroll in online courses. Researchers indicate that course structure (D. Stein, 2004; Stein et al., 2005) and learner attributes such as learner autonomy (Bouchard & Kalman, 1988; Moore, 1991; Moore & Kearsley, 1996), self-efficacy (Bures et al., 2000; Lee & Witta, 2001; C. K. Lim, 2001; Lynch & Dembo, 2004; Miltiadou, 2000, 2001; Reinhart & Schneider, 2001; Wang & Newlin, 2002a, 2002b; Wyatt, 2005; Zimmerman, 2000), and distance learning experience (Arbaugh, 2004; Sonner, 1999) can affect student satisfaction and performance in distance learning courses. It is important to identify learner characteristics that affect student performance in these courses so that learning outcomes can be improved. It is also essential to determine the students' level of satisfaction with the online courses included in this program of study since this may affect attrition.

Reinhart and Schneider (2001) have identified a link between self-efficacy and satisfaction with distance learning courses using two-way audio/video conferencing and it is likely that the same relationship exists for distance learning courses delivered online. The authors stated that further research was necessary in this area, especially as this relationship between self-efficacy and satisfaction with courses applies to online distance learning environments. In an investigation of the effects of students' self-efficacy and cognitive style on student success in online distance education, DeTure (2004) found that neither student attribute was a significant predictor of students' success in undergraduate general education courses. It is interesting to note that 33% of the respondents in this study rated their online technologies self-efficacy as "very confident" with all items on the online technologies self-efficacy scale. DeTure (2004) questioned if those electing to participate in online courses were more confident than other students, in this community college population, in their ability to utilize online technologies.

Background

For several years the Allied Health Program at this Midwestern university offered distance learning courses to students using two-way, interactive video conferencing (IVC) and traditional face-to-face instruction. This Allied Health Program accepts students with either hospital-based diplomas (e.g., registered nurse, licensed practical nurse) or with undergraduate education in various health care specialties including such disciplines as nursing, respiratory care, dental hygiene, emergency medical technology, and medical assisting. In the early stages of this degree completion program, distance education was accomplished by faculty traveling to various locations and teaching

students in a traditional face-to-face manner. In 1999, the use of two-way IVC allowed instructors to simultaneously interact with students at multiple locations.

The use of WebCT (Web Course Tools), a web-based course management system, became more common at this university in the year 2000. Initially, WebCT was predominantly used to enhance courses taught face-to-face and then applied to classes taught over two-way, IVC systems. In 2001 and 2002 several instructors used WebCT to enhance courses taught on site or using two-way IVC. In 2002, one course in this University's Allied Health Program offered students the option of completing the course online or using a combination of online and IVC. A review of course records revealed that many students enrolled in this course began to complete the course predominantly using the asynchronous online learning environment.

In 2003, this program began to develop asynchronous, online versions of many courses that were previously offered via IVC or web-enhanced IVC. This rapid development of asynchronous, web-based courses was enabled in part due to funding provided by a grant.

As part of this grant, faculty and course developers were provided training in various aspects of instructional design and in the use of WebCT. Support for the faculty and course designers consisted of formal training, peer evaluation, discussion sessions, and online instructional modules which provided video and instructional handouts using images and text. Student Instructional Technology Specialists and one full-time Instructional Technology Specialist were also available to provide technical support and help with content creation for the courses being developed. Faculty members developing courses for this grant were paid a stipend; provided use of a laptop computer with

software capable of creating portable document files (PDF), images, video, and audio content; and given training and assistance in course design and developing instructional content.

What was a gradual process of adding online availability to courses offered at a distance had been rapidly accelerated. The courses required to complete this major as well as many elective courses were made available to students online. The Allied Health Program participating in this grant was interested in student satisfaction and learning within the developed online courses. This study was conducted in part to determine if students were satisfied with the online courses being offered.

Since students continue to have the option of taking courses in this program through asynchronous, online learning environments or by two-way IVC, the investigator sought to learn more about the characteristics of students who self-select into the online distance learning courses and what effect these characteristics may have on students' performance in and their satisfaction with these online courses.

Faculty members who also served as course designers were involved in developing and teaching the courses offered by the Allied Health Program. These faculty members underwent training (a) in using WebCT, (b) in developing courses that adhere to principles of good practice, and (c) in creating content that meets standards expressed in section 508 of the Rehabilitation Act as amended in 1988 ("Summary of Section 508 Standards").

Since course structure and dialogue are key components in transactional distance (Moore & Kearsley, 1996), training for faculty/course developers was an important consideration. Although not addressed in this investigation, faculty training and course

design are mentioned in this background information to make the reader aware that instructional design was not an afterthought in the training of the faculty who developed the courses included in this investigation.

Students enrolled in the courses included in this study were offered the opportunity to participate in a free course, WebCT Can Be Fun. This course provided students with an opportunity to explore and become familiar with the WebCT learning environment and the tools commonly used in online learning environments (e.g., mail, discussion, my grades, assignments) in a low-risk environment (i.e., not a course taken for a grade). Students were notified of the availability of this resource via a letter mailed to them prior to the start date of the online course they enrolled in. Few students enrolled in Allied Health courses considered for the investigation have self-enrolled in this online training course.

Statement of the Problem

This investigation was guided by Moore's theory of transactional distance (1993). This study was conducted to assess the effect that student attributes such as learner autonomy (LA) as measured through its independent constructs of desire to learn (DL), learner resourcefulness (LR), learner initiative (LI), and learner persistence (LP); online technology self-efficacy (OTSE), as well as course structure and dialogue (CSD) have on student satisfaction (SS) and student performance (SP) in online learning environments. Students enrolled in asynchronous, online distance learning courses were surveyed to determine the effects of learner autonomy, online technology self-efficacy, and course, structure-dialogue on their satisfaction and performance in online course environments.

Students enrolled in the courses included in this investigation were provided an opportunity to share their perception of the course structure and dialogue as well as their satisfaction with the individual courses.

Theoretical Frame

Moore's theory of transactional distance was used as a basis for this investigation. Moore suggested that students with greater autonomy are more likely to be content in courses with greater transactional distance than less autonomous learners. Moore also stated that because more autonomous learners can make judgments and decisions about their study strategies, students with greater autonomy require less structure and dialogue in their course; whereas, a student with less autonomy will benefit from increased dialogue, structure, or both (Moore, 1993; Moore & Kearsley, 1996).

Moore's theory of transactional distance does not specifically address the skills that learners need to successfully interact online with the teacher through the technology associated with the course (Huang, 2002). However, other researchers have indicated that these online learning skills are important for learners (Huang, 2002; Miltiadou, 2000; Wang & Newlin, 2002b).

Calvin (2005) suggested a model to predict learners' satisfaction with perceived knowledge gained in online courses based on Moore's theory of transactional distance. Calvin proposed that computer technology experience would affect learner autonomy and that learner autonomy would determine the level of course structure. Calvin concluded that the linear combination of learner autonomy and course structure would affect learners' satisfaction with perceived knowledge gained. The results of this investigation

revealed no significant relationship between course structure and learners' satisfaction with perceived learning, a significant moderate correlation between learner autonomy and learner satisfaction ($r = .36, p = .001$) and a significant positive correlation between learner autonomy and computer technology experience ($r = .39, p = .001$) (Calvin, 2005).

Interaction (dialogue) was found to be highly correlated to course structure and course structure was related to increased satisfaction with perceived learning in a study involving 201 students engaged in Web-supported (up to half the course delivered online) and Web-delivered (90% or more of the course delivered online) courses offered at three institutions of higher education (Stein et al., 2005). Arbaugh and Duray (2002) found that perceived flexibility of the delivery medium was associated with students' perception of learning and satisfaction.

In a study of 31 online learners in 3 different courses, Huang (2002) reported a significant correlation between interface and interaction, course structure, and learner autonomy. The items evaluating interface in Huang's study referred to computer-mediated communication with the course management system utilized to deliver the online courses as well as the components of the course such as online resources, instructional materials, and online academic and technology support (Huang, 2002). Huang (2002) found that interface had a strong positive relationship to interaction in the course, course structure, and learner autonomy (correlation coefficients were .92, .93, and .92 respectively). The findings of Huang appear to agree with those of Hillman, Willis, and Gunawardena (1994) that "learners need to possess the necessary skills to operate the mechanisms of the delivery system before they can successfully interact with the content, instructor or other learners" (p.32). It appears that much of what Huang referred to as

interface may be described by the impact score developed by Lan et al. (2003) which assessed students' perceptions of problems they encountered in an online course and the effect that these problems had on their learning experience.

Technology effects on students' learning in distance learning environments are described as a gap between the rate of learning and the rate of technological change (Hirschbuhl, Zachariah, & Bishop, 2002). The authors add that dealing with problems related to technology is important in narrowing this gap.

Learner autonomy as discussed by Confessore and Park (2004), “. . . is the relative capacity to productively participate in learning experiences” (p. 41). Confessore and Park also added that learner autonomy exists between two dysfunctional states: dysfunctional learner dependence (in which the learner requires a great deal of guidance and assistance) and dysfunctional learner independence (in which the learner does not accept guidance or assistance of any type). Research has shown that learner autonomy is a syndrome comprised of four constructs: desire to learn, learner resourcefulness, learner initiative, and learner persistence (Confessore & Park, 2004).

Self-efficacy refers to a person's belief that they are capable and can take action that will result in achieving or accomplishing something (Bandura, 1997). Research has shown teachers' beliefs in their abilities (self-efficacy) affect specific instructional activities and their interest in and acceptance of new technology. Bandura (1997) predicted that the increased use of electronic media for instructional purposes will place greater importance on teachers' efficacy for moving from rote instruction to training students to become evaluators of information, effective users of knowledge, and creative thinkers. Self efficacy for computer use was shown to affect learning outcomes in

research on computer skills training in studies by Gist, Schwoerer, and Rosen (1989) and Martocchio (1994). Self-efficacy for technology related to online learning has been useful in predicting students' satisfaction with online courses. C. K. Lim (2001) found that computer self-efficacy was a significant factor in predicting adult learners' ($n = 235$) satisfaction with online courses taken at 5 different institutions and also in predicting participants' intention to take future courses online. In a longitudinal study by Lee and Witta (2001), measures of self-efficacy for online learning technologies and self-efficacy for course content were found to be significant in predicting students' final level of course satisfaction. Researchers have noted significant relationships between students' self-efficacy for online technologies associated with distance learning, and online course performance (Lee & Witta, 2001; Miltiadou, 2000; Wang & Newlin, 2002b). Self-efficacy has also been found to influence learning application (Lim & Kim, 2002/2003).

The relationship of the constructs of course structure, dialogue, and learner autonomy described in Moore's theory of transactional distance, as well as the learner attributes of self-efficacy for online technologies and distance learning experience, to student performance and satisfaction with distance learning have been investigated with varying results. The effect of technology related problems on learner's evaluation of online courses has been reported. These technology problems may affect learners' performance in online courses. The constructs and learner attributes described here were assessed to determine their relationship to learners' satisfaction and performance in online courses.

Assumptions Underlying the Study

As with many research endeavors, assumptions were made that affect this study. The survey instruments (i.e., *Learner Characteristics and Distance Learning Experience Questionnaire* [LCDLE], *Learner Autonomy Profile-Short Form* [LAP-SF]) required self-reporting by the participants. It was assumed that participants would respond openly and honestly to these instruments and report their answers accurately. Faculty and students involved in this investigation were aware of their participation in the study. Another assumption was that faculty teaching the courses under investigation did not significantly alter their teaching and that learners did not significantly alter their behaviors (e.g., study habits, time on task) as a result of their participation in this investigation.

General Research Questions

Listed below are the general research questions used to guide this study.

1. What are the relationships among learner attributes including learner autonomy, self efficacy for online technologies and course structure and dialogue, that aid in predicting student satisfaction and performance within online course environments?
2. What are the relationships between learners' distance learning experience and their perceptions of the effect that technology related problems have on their learning, that aid in predicting student satisfaction?

Significance of the Study

Distance learning is often thought of in terms of the physical distance that separates learners from the teacher or faculty member. Moore (1996) suggested that there is distance even in classes in which the students and teacher are within the same room. This distance is described as transactional distance. Transactional distance exists in educational environments whenever there is a student, a teacher, and a means for communication. The separation of teachers and learners that occurs with distance learning greatly affects teaching and learning (Moore & Kearsley, 1996). In discussing transactional distance, Moore (1993) related that

with separation there is a psychological and communications space to be crossed, a space of potential misunderstanding between the inputs of instructor and those of the learner. It is this psychological and communications space that is the transactional distance. (p.22)

Special teaching and organizational behaviors are required when teaching at distance because of the transactional distance involved (Moore & Kearsley, 1996).

The amount of transactional distance is determined by course structure and dialogue within the course. Dialogue consists of interactions between the teacher and learner and includes words, actions, and ideas. All things being equal, a course with no dialogue will have a higher transactional distance than a course where there is adequate dialogue between teacher and learners. Structure is determined by the flexibility or rigidity of instructional design elements such as “. . .educational objectives, teaching strategies, and evaluation methods” (Moore, 1993, p. 26). Structure relates how responsive and accommodating the course is to each learner’s needs (Moore, 1993; Moore & Kearsley, 1996).

A course that allows learners no ability to tailor assignments or evaluation methods to meet their individual needs is highly structured. A pre-recorded, instructional video program can be highly structured, and if no dialogue is available, the transactional distance will be high (Moore & Kearsley, 1996). An instructional program with little predetermined structure and a great deal of dialogue will offer little transactional distance (Moore, 1993).

Programs with little transactional distance offer students more flexible structure and increased dialogue. More transactional distance exists in a program where dialogue is less (because dialogue is either not permitted, or not possible) and program structure is increased by the instructor, or course designer, to provide guidance and direction that the course instructor, or designer, expect the learners will require (Moore, 1993).

Moore suggests that students with greater autonomy are more likely to be content in courses with greater transactional distance than less autonomous learners. Moore also states that because more autonomous learners can make judgments and decisions about their study strategies, students with greater autonomy require less structure and dialogue in their course; whereas, a student with less autonomy will benefit from increased dialogue, structure, or both (Moore, 1993; Moore & Kearsley, 1996).

The need for course structure that allows for accommodating students' learning needs is expressed by Hirschbuhl, Zachariah, and Bishop (2002). Hirschbuhl et al. (2002) state that the tools provided by course management systems rely on fitting the instruction to the students' learning needs in order to close the gap caused by differences in the rate of technological change and the rate of learning.

Several studies have assessed the effects that students' academic self-efficacy (Joo, Bong, & Choi, 2000) and self-efficacy for various aspects of distance learning (Bures, et al., 2000; Lee & Witta, 2001; Miltiadou, 2000, 2001; Reinhart & Schneider, 2001; Wang & Newlin, 2002a, 2002b) can have on learning outcomes. This study sought to contribute to this knowledge and extend it by assessing the effects of self-efficacy on students' learning in courses using asynchronous, web-based instruction in courses offered to students as part of a major in Allied Health at a public, Midwestern university.

Student satisfaction with the online courses offered by the Allied Health Program is an important issue. As a major stakeholder in the academic program, student satisfaction with the courses and the learning environment in which they are offered is essential. Students who are dissatisfied with an online course offered in this degree program may elect to take future courses by other means (interactive video courses are offered as an alternative) or may elect to study elsewhere—an option the university participating in this study does not wish to see its students exercise.

The information obtained through this investigation will help the educational program studied to gain a better understanding of “who its learners are” and gain insight into the perceptions the learners have of the online course environments. Results of this study will further knowledge of how learners' online technologies self-efficacy, learner autonomy, course structure, and dialogue affect student satisfaction and performance in web-based distance learning environments.

Observations and anecdotal evidence provided by faculty members suggested that students enrolled in the online courses offered by this degree program have varying degrees of distance learning experience upon entering the Allied Health Program.

Research indicates that course structure (D. Stein, 2004; Stein et al., 2005) and learner attributes such as learner autonomy (Beyth-Marom, Saporta, & Caspi, 2005), self-efficacy (Bures et al., 2000; Miltiadou, 2001; Reinhart & Schneider, 2001), and distance learning experience (Arbaugh, 2004) can affect student satisfaction and performance. It is important to identify learner characteristics that affect students' performance in these courses as well as their satisfaction with the online courses included in this program of study.

It is also important to investigate the effect that technology related problems may have on students' learning and satisfaction. Lan et al. (2003) found that there was a significant negative correlation between the impact of technology related problems on students' learning and the ratings these students provided on course evaluations ($r = -.24$, $P < .001$).

Although not a focus of this study, if learners' online technologies self-efficacy is found to be lacking and a relationship between this and performance or satisfaction with courses is noted, this research may be utilized to identify prerequisites for the online courses offered by this program, such as training or an orientation program. Others have identified a need for technology support and technology orientation for learners who choose to participate in online educational programs despite their self-reported lack of technology/computer skills (Dunning & Vijayaraman, 2000/2001).

Researchers have investigated the relationships addressed in Moore's theory of transactional distance (Calvin, 2005; Chen, 2001; Huang, 2002) with varying results. This investigation may help to clarify relationships among the constructs of course structure and dialogue, learner autonomy, and online technologies self-efficacy, and their

relationship to students' satisfaction and performance. This information should prove valuable to instructors seeking to improve the satisfaction and performance of learners in the online learning environments through application of instructional design, changes in their online teaching practices, or both, so faculty members, students, and instructional designers stand to benefit from this investigation. In addition, the director of the Allied Health Program and others involved in the administration of this program will learn more about the attributes of students who elect to enroll and study in the online courses this program offers.

Delimitations

Delimitations express the context or define the scope of the study (Newman, Benz, Weis, & McNeil, 1997). This study was limited to students age 18 or older, who were enrolled in the online courses taught during the summer and fall semesters of 2005 at a Midwestern university. Further testing using other populations would be necessary to confirm if the relationships reported here are similar in other populations and under other conditions. The predictor variables selected for this investigation to predict student satisfaction and performance are based on constructs of Moore's theory of transactional distance (Moore, 1993). It is possible and likely that other variables if included would produce different results. Fourth, the measures used to obtain the predictor variables were subjective and self-reported by the participants. The criterion variable of student satisfaction with the course is also a subjective variable.

Definitions and Operational Terms

A few definitions are presented here to clarify terms and provide operational definitions where appropriate. Definitions of the predictor and criterion variables used in this investigation are also presented in Chapter 3.

1. ***Asynchronous Distance Learning.*** Learning activities which do not require the instructor and learners to engage at a particular time (Wahlstrom, Williams, & Shea, 2003). Within time frames set for the course, learners and the instructor can engage in learning activities at times more suitable to their schedule or preferred study time. An example of an asynchronous activity common to distance learning would be discussions. All participants in the course can read messages posted to the discussions area and respond at a time of their choice.
2. ***Course Structure.*** Course structure consists of elements included in the design of a course such as learning objectives, content themes, exercises, projects, and tests (Moore & Kearsley, 1996). For this investigation students' perception of how well elements within the course (course structure) met their needs was assessed using the course structure items adapted from an instrument developed by H. M. Huang (2002).
3. ***Dialogue.*** According to Moore and Kearsley (1996), dialogue includes “. . .the interplay of words, actions, and ideas and any other interactions between teacher and learner when one gives instruction and the other responds” (p. 201). For this investigation dialogue was measured by items

assessing the level of interaction with faculty and students (dialogue) adapted from the work by Swan (2001).

4. ***Distance Learning.*** Instruction characterized by a physical separation of instructor and learner(s) (Wahlstrom et al., 2003). Learners may also be physically separated from one another. All of the courses considered for this investigation were offered online (Web-based) in an asynchronous format.
5. ***Distance Learning Experience.*** A measure of subject's reported experience in distance learning courses. For this investigation distance learning experience was self-reported by participants. For this investigation distance learning experience was determined by the number of online courses (courses in which 70% or more of the course was completed online) subjects' reported participating in.
6. ***Impact score.*** Students' perceptions of problems they had in a course and how these problems affected their learning. This investigation used the system developed by Lan et al. (2003), so that the higher the impact score, the greater the impact that technology problems had on the students' learning experience.
7. ***Learner Autonomy.*** According to Confessore and Park (2004), "learner autonomy is the relative capacity to productively participate in learning experiences" (p. 41). As described by Confessore learner autonomy consists of four constructs: desire, resourcefulness, initiative, and persistence (1991). The LAP-SF developed by Human Resource

Development Enterprise provides ratings of learner autonomy through each of its four constructs. For this investigation raw scores were obtained for each of the learner autonomy constructs using the LAP-SF (Confessore & Park, 2004).

8. ***Learner Autonomy Construct of Desire to Learn.*** As developed by Meyer (2001), this is a measurement of an individual's intentions as related to the desire to learn. For this investigation this construct was measured by participants' score on the desire to learn construct of the LAP-SF (Confessore & Park, 2004).
9. ***Learner Autonomy Construct of Initiative.*** As developed by Ponton (1999), this is a measurement of an individual's intentions to initiate learning activities. For this investigation, this construct was measured by participants' score on the initiative construct of the LAP-SF (Confessore & Park, 2004).
10. ***Learner Autonomy Construct of Persistence.*** As developed by Derrick (2001), this is a measurement of an individual's intentions to persist in autonomous learning. For this investigation this construct was measured by participants' score on the persistence construct of the LAP-SF (Confessore & Park, 2004).
11. ***Learner Autonomy Construct of Resourcefulness.*** As developed by Carr (1999), this is a measurement of an individual's intentions to exhibit resourcefulness in autonomous learning. For this investigation, this

construct was measured by participants' score on the resourcefulness construct of the LAP-SF (Confessore & Park, 2004).

12. ***Online Technology Self-Efficacy.*** One's perception of how confident one feels about performing various tasks associated with online learning. For this investigation scores from the *Online Technologies Self-Efficacy Scale* (OTSES) were used to measure subjects' perceived self-efficacy for various online technologies. The score obtained on the OTSES reflects subjects' perception of how confident they felt in performing various tasks associated with online learning. The OTSES items were adapted from the work of Miltiadou (2001).
13. ***Performance.*** An evaluation of one's performance in a specific course or courses. For this investigation participants' final course grades for each course included in this study were averaged to obtain a measure of performance. Performance was indicated using a traditional four point scale (A = 4, B = 3, C = 2, D = 1, F = 0).
14. ***Satisfaction.*** As defined by Kotler and Clarke (1987), “. . . a state felt by a person who has experienced a performance (or outcome) that has fulfilled his or her expectations” (p. 72).
15. ***Student satisfaction with the course or courses.*** Students' perception of their learning experience in relation to their expectations. If the learning experience exceeds expectations, then a person is highly satisfied, if expectations are met a person is satisfied, if the experience fails to meet expectations then a person is dissatisfied (Kotler & Clarke, 1987). For this

investigation student's satisfaction was indicated on a satisfaction item within the LCDLE for each course included in this study. For students rating multiple online courses an average of their ratings was calculated.

CHAPTER II

REVIEW OF THE LITERATURE

General Background Information

In this chapter the researcher provides a review of the literature pertinent to this investigation. General background information is followed by a review of the literature related to various aspects of this investigation including variables associated with the study.

Self-Efficacy

Self-efficacy refers to a person's belief that they are capable and can take action that will result in achieving or accomplishing something (Bandura, 1997). Zimmerman (2000) summarizes the findings of several key studies on self-efficacy concluding that students' perceived self-efficacy is distinct from associated motivational constructs because of the specificity and close association with performance. The author adds that research over 20 years has demonstrated that self-efficacy is a valid predictor of students' motivation and learning. Zimmerman (2000) adds that multiple regression analysis has shown self-efficacy to have discriminant validity in predicating various learner motivations such as persistence and effort, despite its correlation with other related constructs. Independent learning such as that in distance learning requires persistence.

Students with higher self-efficacy are more likely to persist when success is not easy to achieve while students with lower efficacy are likely to quit sooner (Bandura & Schunk, 1981). One of the conclusions drawn from a review of self-efficacy literature is that students with high academic self-efficacy contribute more to the learning environment as they are more capable of liberating behavior than are those with less efficacy and are not negatively effected by changes in the learning environment to the same degree as those with lower self-efficacy (Lorbach & Jinks, 1999). In a study of 70 graduate students, those who perceived they could learn to use computer conferencing were shown to contribute more to on-line discussion than those whose perceived self-efficacy was lower (Bures et al., 2000). Reinhart and Schneider (2001) found a positive relationship between students' self-efficacy for the technology associated with two-way audio video conferencing and their satisfaction with courses delivered in this manner. The authors offer that constructing exercises that are simple and allow students to have an early positive experience in the course may improve the students' self-efficacy and satisfaction with the course (Reinhart & Schneider, 2001).

Research has shown teachers' beliefs in their abilities (self-efficacy) affect specific instructional activities and their interest in and acceptance of new technology. Bandura (1997) offers that the increased use of electronic media for instructional purposes will place greater importance on teachers' efficacy for moving from rote instruction to training students to become evaluators of information, effective users of knowledge, and creative thinkers. Other research has shown that computer self-efficacy of faculty can play a significant role in a faculty member's decision to utilize or integrate technology in their teaching (Faseyitan, 1990; Hirschbuhl & Faseyitan, 1994; Kagima,

2000). Thompson and Lynch (2003) found that students with low Internet self-efficacy were likely to resist online learning. Self-efficacy for computer use was shown to affect learning outcomes in research on computer skills training (Gist et al., 1989; Martocchio, 1994).

Self-efficacy measurements center on performance and differ from one domain to another—one's self-efficacy for an examination in one area of study may differ from one's perceived efficacy for another area of study (Zimmerman, 2000). Joo et al. (2000) in an investigation involving 152 Korean junior high school students found that academic self-efficacy was not able to predict student's web-based instruction (WBI) performance, but was able to predict their performance on a written test and likewise the student's Internet self-efficacy was predictive of their WBI performance, but not their performance on a written test.

According to Bong and Hocevar (2002), self-efficacy measurements can be classified by two types of methods. The authors relate that the measurement method most commonly used for computer self-efficacy measurements utilizes written descriptions of specific tasks associated with the performance being measured. For instance, in assessing subjects' self-efficacy for distance learning, subjects might be asked to rate how confident they are that they will be successful at performing tasks associated with this, such as their ability to send and receive e-mail attachments. Computer self-efficacy specific to the application being utilized in a Web-based course has been shown to have a statistically significant relationship to students' ease of use in a course using Blackboard, a Web-based course management system (Yi & Hwang, 2003). The self efficacy measurement utilized by Yi and Hwang was specific to the course

management system (Blackboard). The researchers assessed students' belief that they had the skills to accomplish tasks such as downloading files, sending email, communicating with others, and using links to other Web sites (2003). This is in agreement with the findings of Wang and Newlin (2002a) who related that two types of self-efficacy have been shown to predict student performance in online learning environments: self-efficacy for the content of the course and self-efficacy for the technology associated with engaging in the course.

Learner Autonomy

Learner autonomy as discussed by Confessore and Park (2004), “. . . is the relative capacity to productively participate in learning experiences” (p. 41). Confessore continues that learner autonomy exists between two dysfunctional states: dysfunctional learner dependence (in which the learner requires a great deal of guidance and assistance) and dysfunctional learner independence (in which the learner does not accept guidance or assistance of any type). Research has shown that learner autonomy is a syndrome comprised of four constructs: desire to learn, learner resourcefulness, learner initiative, and learner persistence (Confessore & Park, 2004). Understanding learner autonomy is even more important in the distance learning environment than in traditional face-to-face synchronous instruction (Bouchard & Kalman, 1988).

Adults' persistence in autonomous learning was found to be more related to future rewards anticipated as result of present learning regardless of the influence of prioritizing learning activities over non-learning activities, than with the interceding effect of choosing learning activities over non-learning activities. Even though adult learners

value the rewards anticipated from learning activities and intend to involve themselves in learning activities, they may still choose to engage in non-learning activities because of the various responsibilities of their various roles (Ponton, Derrick, & Carr, 2005). Ponton et al. (2005) offer that adults may value and intend to engage in learning activities, but still prioritize and participate in non-learning activities (e.g., attending a child's sporting event) perceived as important or urgent, at the expense of learning activities.

Jung (2001) reviewed literature regarding the role of learner autonomy in online learning environments and observed that these environments seem to allow learners the opportunity to put autonomy into effect in their learning. Web-based learning environments are more flexible and provide learners more opportunity to use autonomy in making decisions regarding their learning (Jung, 2001). Researchers found that students who preferred asynchronous tutorials over those delivered in a synchronous fashion, revealed higher needs for autonomy than students whose preference was for synchronous tutorials (Beyth-Marom et al., 2005).

Gender

Students in distance learning courses requiring Internet use may be affected by gender differences which may impact on their use of the Internet and their course performance since use of the Internet is required to participate in the course. Research shows that women and men may use the Internet equally, but for different purposes according to a study of 630 Anglo American undergraduate students. In this study, females utilized the Web more for e-mail than did males, despite their lower (compared to males) computer self-efficacy scores. The authors of this study conclude that females'

motivation to communicate is apparently strong enough to overcome their lower self-efficacy allowing them to utilize e-mail more than males. This occurred even though the males in this study displayed stronger computer self-efficacy and greater technology experience than did female students (Jackson, Ervin, Gardner, & Schmitt, 2001). A study of learners' characteristics at Tsinghua University, by Zhang, Li, Duan, and Wu (2001), reveals significant difference in the distance learning self-efficacy expressed by female students as compared to male students involved in distance learning courses. In this study females reported a less positive self-efficacy for distance learning than their male colleagues. Males were also found to have higher Internet self-efficacy than females in a study involving 257 students enrolled in courses at a southeastern university (Thompson & Lynch, 2003).

Contrary to other earlier research, a longitudinal study of 75 manufacturing employees undergoing computer training found females to have more positive attitudes toward computers than males. The authors suggested that women's and men's attitudes towards computers may be changing (prior research studies found males to have more favorable computer attitudes) and caution that assuming that women dislike computers more than males may be inaccurate (Rozell & W. L. Gardner, 1999).

Although not specifically related to attitude or opinion about technology, demographic data suggest that women are using computer technology (specifically Internet use) in greater numbers (Pastore, 2001). This report indicates that more women than men are now using the Internet, a trend that has been continuing for about a year. Differences are seen in the amount of time that men and women spend using the Internet as men continue to use the Internet more often and for longer periods of time than women

(Pastore, 2001). Women also reported less computer use in a study of reactions to the Y2K computer problem. This investigation was conducted through an online research site and 1500 participants completed the instruments (Shottenbauer, Rodriguez, Glass, & Arnkoff, 2004). Shottenbauer, et al. (2004) also found that gender predicted computer anxiety in their study in which 47% of the participants were female.

Kagima (2000) found that male faculty members displayed higher computer self-efficacy than female faculty and that self-efficacy of faculty members was significant in predicting their use of computer technology in their teaching. That computer self-efficacy plays a role in predicting computer use in teaching is consistent with that of Faseyitan's study of 257 full-time faculty; however, gender was not found to be significant in predicting adoption of computers in this investigation (1990).

A survey of 147 undergraduate students which included slightly more female (52%) than male (48%) students indicated that female students felt less isolated in the Web-based learning environment and reported more positive experiences in communicating via email, and found online tutorials more useful than their male colleagues (Stokes, 2003). Female students reported higher frequency of interaction with other learners than did their male counterparts in an investigation of online learners by Kim and Moore (2005).

In a study involving 1,368 students attending European traditional and distance learning higher education institutions, researchers found that women had a statistically significant preference for traditional educational methods compared to men. The authors relate three variables that might influence participants' perceptions and preferences

regarding computer technology and cite that the most important of these is general computer experience (Proost, Elen, & Lowyck, 1997).

In relation to distance learning, an article entitled, *How Women Actually Perform in Distance Education*, Koch (1998) summarized results from several studies across multiple institutions which found that women actually perform better than men in distance learning courses. More research in this area is called for according to Koch. Koch (1998) does not specify what technology is used in these classes or how the instruction is being delivered, but concludes that women do not appear to be at a disadvantage in regards to distance learning. Marks, Sibley, and Arbaugh (2005) found that students' gender was not significant in predicting students' perceived learning in online Master of Business Administration (MBA) courses at a mid-western university. Findings by Zhang et al. (2001) suggest that male students reported higher attainment in distance learning than female students. This study also reports a marginally significant interaction which suggests that male students report higher distance learning attainment than female students among those who had one to two years of distance learning experience. J. Koch (2006) in a controlled study involving distance learners at Old Dominion University found a significant difference in performance related to gender. In this study, which included 20,428 students (about two-thirds of whom were female), female students were found to have earned a grade that was 0.169 higher than their male colleagues (J. Koch, 2006).

Distance Learning and Computer Experience

A review of the literature reveals research suggesting that distance learning experience (DLE) may have an effect on learning outcomes, at least in some distance learning courses. In a study involving business students, Sonner (1999) found that students who had at least one distance learning course (other than televised distance learning courses) prior to an online course performed better than those having no prior distance learning course experience. Interestingly, Sonner's (1999) study found little difference between students whose only distance learning experience was with interactive video and those receiving no prior distance learning experience as far as final grades earned. In a study involving 1,368 students attending European institutions of higher education offering traditional and distance learning courses, the researchers found that women had a statistically significant preference for traditional educational methods compared to men. The authors relate that a regression model reveals three variables that might influence participants' perceptions and preferences regarding computer technology and they cite that the most important of these is general computer experience (Proost et al., 1997). Marks et al. (2005) found that students' experience with online courses was not significant in predicting students' perceived learning in online Master of Business Administration (MBA) courses at an upper Midwestern university.

Student Satisfaction in Online Learning Environments

Researchers have identified a number of factors associated with students' satisfaction with distance learning and online learning in particular. These factors include course structure (Arbaugh & Duray, 2002; D. Stein, 2004; Stein et al., 2005),

class size (Arbaugh & Duray, 2001), interaction among students and between students and instructor (dialogue) (Kim & Moore, 2005; Stein et al., 2005), and learner characteristics such as self-efficacy (Lee & Witta, 2001; C. K. Lim, 2001; Miltiadou, 2000), age (Billings, Connors, & Skiba, 2001), learner autonomy (Calvin, 2005), gender (Stokes, 2003), Internet experience (Stokes, 2003), and distance learning experience (Arbaugh, 2004).

In a study involving 201 students enrolled in distance learning courses using formats ranging from face-to-face to completely online instruction at three different universities, D. Stein reports that course structure was the most important determinant of satisfaction reported by students. The results of this report suggested that common course elements such as objectives, deadlines, and promoting discussion were essential to student satisfaction (2004). Course structure was determined to lead to increased satisfaction with perceived learning in a study involving 201 students engaged in Web-supported courses (up to half the course delivered online) and Web-delivered courses (90% or more of the course delivered online) offered at three institutions of higher education (Stein et al., 2005).

A study of student satisfaction with distance learning courses offered primarily through use of IVC, but supported with online discussions and e-mail (elements of most online distance learning courses) found that nearly 70% of the respondents (who were predominantly undergraduate students) indicated that they were satisfied (Shirvani, 2002). Shirvani (2002) found a statistically significant number of seniors and graduate students reported they were satisfied with the courses studied as compared to freshmen, sophomores, and juniors ($n = 277$), even though students at the senior and graduate level

also indicated that they were less likely to interact or ask questions of the instructor. For these students it appeared that interaction as measured in this study did not weaken their satisfaction with the course (Shirvani, 2002). Student interaction with colleagues and the course instructor was found to be significantly related to the level of course satisfaction in a study of 82 graduate students who were enrolled in at least one Web-based course (Kim & Moore, 2005).

Self-efficacy for technology related to online learning has been useful in predicting students' satisfaction with online courses. Lim (2001) found that computer self-efficacy was a significant factor in predicting adult learners' ($n = 235$) satisfaction with online courses taken at five different institutions and also in predicting participants' intention to take future courses online. In a longitudinal study, by Lee and Witta (2001) measures of self-efficacy for online learning technologies and self-efficacy for course content were found to be significant in predicting students' final level of course satisfaction. This study also revealed that self-efficacy for online learning technologies and course content increased as the semester progressed and noted that a significant increase in self-efficacy occurred within the first three weeks of the course (Lee & Witta, 2001).

The level of Internet experience and gender differences have been identified as predictors of student satisfaction with learning in an online environment. Female students and students with higher levels of Internet experience reported significantly higher levels of satisfaction with learning (Stokes, 2003).

Arbaugh (2004) found that students' perceptions of the online learning environment including interaction with other learners, ease of use, and the usefulness of

course software changed as they participated in additional online courses. The most significant changes were noted between the first and second online course that learners participated in. Increases in the learners' satisfaction with the online course delivery medium and ease of use were noted with subsequent online course experience and the largest increase was seen after participants completed their first course online. These findings suggest that programs should encourage students to take more than a single online course before deciding if online learning is right for them (Arbaugh, 2004).

Class size is another factor that is associated with student satisfaction with courses offered online. Arbaugh and Duray (2001), relate that there is a negative association between larger class size ($T = -3.24, p = .001$) and student satisfaction with management courses offered online.

Although not specifically related to online learners, college self-efficacy was the most significant predictor of college satisfaction in a study of 312 undergraduate students. This investigation took place at a large Midwestern university (DeWitz & Walsh, 2002). In a study comparing students enrolled in online and traditional face-to-face versions of the same course taught by the same instructor, Johnson, Aragon, Shaik, and Palma-Rivas (2000) found that students in both courses were satisfied, but the students in the traditional face-to face course revealed slightly greater satisfaction with the instructor's performance. There were also significant differences in the reported level of interaction among students and between students and the instructor. The online learners rated the interaction lower than did students in the face-to-face course, but students in both learning environments rated interaction positively (Johnson et al., 2000).

Student Performance in Online Learning Environments

Researchers have noted significant relationships between students' self-efficacy for online technologies associated with distance learning and online course performance (Lee & Witta, 2001; Miltiadou, 2000; Wang & Newlin, 2002b) and self-efficacy has been found to influence learning application (Lim & Kim, 2002-2003). Interaction between the course instructor and students has been shown to have significant effects on learning outcomes (Chen, 2001; Chen & Willits, 1998; Gorsky & Caspi, 2005). Age, gender, and race are also student attributes related to the performance of distance learners as reflected by course grades (J. Koch, 2006).

In an investigation of students enrolled in an online course at a community college ($N = 30$), Miltiadou (2000) found that students' self efficacy for online technology was predictive of their achievement (defined as the percentage grade earned on a final project) ($F(3, 26) = 4.31, p = .04$). This investigation found that self-efficacy for online technology was negatively related to students' performance. Miltiadou (2000) suggested that this may have resulted from participants' overestimating or underestimating their confidence in using online technologies. Another explanation offered is that since the participants' self-efficacy was measured at the beginning of the course, it is possible that students' self-efficacy increased over the duration of the course and may have actually been higher than reflected by the initial measurement (Miltiadou, 2000). The 16 university students participating in a longitudinal study also demonstrated lower levels of performance associated with higher levels of online technologies self-efficacy measured at 12 weeks into the semester of an online course (Lee & Witta, 2001). Lee and Witta (2001) found no relationship between subjects' initial online technology

self-efficacy and final course grades. The authors suggested that participants' initial online technology self-efficacy may have failed to predict students' performance due to the small sample size, but offer that the negative relationship between subjects' online technology self-efficacy (measured later in the semester) and course grades could possibly be due to students with lower online technology self-efficacy being more cognitively engaged than students who rated their online technology self-efficacy higher (Lee & Witta, 2001).

Lynch and Dembo (2004) studied undergraduate business students enrolled in a blended course (75% of the content was delivered online and 25% offered in a traditional face-to-face format) and found no significant relationship between student performance and Internet self-efficacy. This may be partly due to the fact that one-fourth of the course was offered in a synchronous, face-to-face format, so students did not rely entirely on online systems as they would in a course offered completely online. This investigation did find a significant relationship between self-efficacy for learning and performance, and final course grades earned by students. Self-efficacy for learning and performance accounted for 7% of the variance in students' final course grades (Lynch & Dembo, 2004).

Pachnowski and Jurczyk (2000) found no significant correlation between self-directed learning as measured using the *Self-Directed Learning Readiness Scale* (SDLRS) and course grades earned by students.

A study of graduate students who completed courses in an online Master of Business Administration program from the summer semester of 1998 to the fall semester of 2001 found the flexibility and other advantages of online courses, instructor-student

interaction, and student-student interaction to be significant and positively related to students' perceived learning. Instructor-student interaction was the most significant factor in the model to explain student perceived learning in online courses (Marks et al., 2005). Marks et al. found that age, grade point average, gender, and student's experience with online courses were not significant in predicting students' perceived learning in online MBA courses at an upper Midwestern university. Gender (females earned significantly higher scores than males), age (older students earned higher scores), experience in higher education, and race were among the significant predictors of student performance as indicated by course grades in a study of distance learners at Old Dominion University (J. Koch, 2006).

Researchers have studied many of the constructs expressed in Moore's theory of transactional distance. Specifically, researchers have investigated the relationships of course structure, dialogue, learner autonomy, and transactional distance with varying results. Relationships between self-efficacy for technology associated with distance learning and students' performance and satisfaction with courses offered at a distance have also been described in the literature. The results of these investigations have shown self-efficacy for computer/distance learning technologies to have a positive relationship to students' satisfaction and performance in some studies and a negative relationship to students' performance in others. Table 1 presents a summary of several investigations related to the constructs studied in this investigation (see Table 1).

CHAPTER III

PROCEDURES

Research Design

This section describes the research design, research questions/hypotheses, instruments utilized, data collection, and analysis of the data in this investigation. Also discussed are the limitations of this study.

The design of this study is ex post facto with hypotheses. The predictor variables cannot be manipulated by the researcher. This design is limited by the fact that the variables under investigation cannot be manipulated by the researcher. This design is very low in internal validity, because the research design does not control for alternative explanations other than those tested. Because of this, causal relationships cannot be inferred from this investigation (Newman & Newman, 1994). Although low in internal validity, this type of research design has high external validity (Newman & Newman, 1994) in that there are no controls applied to the predictor variables.

Derivation of General Research Hypotheses and Specific Research Hypotheses

Constructs of Moore's theory of transactional distance were used as a basis for this investigation. Moore's theory of transactional distance suggests that course structure and dialogue within a course determine the amount of transactional distance. Moore suggests that students with greater autonomy are more likely to be content in courses with

greater transactional distance than less autonomous learners. Moore also states that because more autonomous learners can make judgments and decisions about their study strategies, students with greater autonomy require less structure and dialogue in their course; whereas, a student with less autonomy will benefit from increased dialogue, structure, or both (Moore, 1993; Moore & Kearsley, 1996).

Moore's theory of transactional distance does not specifically address the skills that learners need to interact successfully online with the teacher through the technology associated with the course (Huang, 2002). However, other researchers have indicated that these online learning skills are important for learners (Huang, 2002; Miltiadou, 2000; Wang & Newlin, 2002b). These findings suggest that learners need to be adequately prepared for their online learning experience. Since students enrolled in the online courses at this university are not required to undergo any specific orientation prior to taking an online course, it is important to assess their level of self-efficacy for online technology to determine if a relationship exists between students' self-efficacy for online learning and their satisfaction and performance in online courses. The OTSES (Miltiadou, 2001) provides an indication of participants' online technology self-efficacy.

In a study of 31 online learners in 3 different courses, Huang (2002) notes a significant correlation between interface and interaction, course structure, and learner autonomy. The items evaluating interface in Huang's study referred to computer-mediated communication with the course management system utilized to deliver the online courses as well as the components of the course such as online resources, instructional materials, and online academic/technology support (Huang, 2002). Huang (2002) found that interface had a strong correlation to interaction in the course, course

structure, and learner autonomy with correlation coefficients of .92, .93 and .92 respectively. The findings of Huang appear to agree with those of Hillman et al (1994), that “Learners need to possess the necessary skills to operate the mechanisms of the delivery system before they can successfully interact with the content, instructor or other learners” (p.32). It appears that much of what Huang refers to as interface may be described by the impact score developed by Lan et al. (2003) which assesses students’ perceptions of problems they encountered in an online course and the effect that these problems had on their learning experience. Lan et al. (2003) found that there was a significant negative correlation between the impact of technology related problems on students’ learning and the ratings these students provided on course evaluations ($r = -.24$, $P < .001$).

Learner autonomy as discussed by Confessore & Park, “. . .is the relative capacity to productively participate in learning experiences” (2004, p. 41). Confessore continues that learner autonomy exists between two dysfunctional states: dysfunctional learner dependence (in which the learner requires a great deal of guidance and assistance) and dysfunctional learner independence (in which the learner does not accept guidance or assistance of any type). Research has shown that learner autonomy is a syndrome comprised of four constructs: desire to learn, learner resourcefulness, learner initiative and learner persistence (Confessore & Park, 2004). Since learner autonomy by definition is a capacity for learning, a relationship such as that expressed in Moore’s theory of transactional distance appears reasonable. That is, if one has greater learner autonomy one should be able to learn in an environment where the course structure is more flexible and where there is less dialogue. Perhaps the capacity to learn isn’t always utilized.

Pachnowski & Jurczyk (2000) found no significant correlation between self-directed learning as measured using the SDLRS and course grades earned by students.

The implications of these theories and constructs and other literature reviewed in Chapter 2 lead to the general research hypotheses and the specific research questions that follow.

This study looked at the following general research statements:

General Research Hypothesis 1 (GH1). Relationships can be identified among learner attributes including learner autonomy, self efficacy for online technologies, and course structure and dialogue that aid in predicting student satisfaction and performance within online course environments.

- A. ***Specific Research Hypothesis 1 (RH1).*** Course structure-dialogue, online technology self efficacy, and the learner autonomy construct of desire to learn account for a significant amount of variance in predicting student satisfaction.
- B. ***Specific Research Hypothesis 2 (RH2).*** Course structure-dialogue, online technology self efficacy, and the learner autonomy construct of learner resourcefulness account for a significant amount of variance in predicting student satisfaction.
- C. ***Specific Research Hypothesis 3 (RH3).*** Course structure-dialogue, online technology self efficacy, and the learner autonomy construct of learner initiative account for a significant amount of variance in predicting student satisfaction.

- D. ***Specific Research Hypothesis 4 (RH4)***. Course structure-dialogue, online technology self efficacy, and the learner autonomy construct of learner persistence account for a significant amount of variance in predicting student satisfaction.
- E. ***Specific Research Hypothesis 5 (RH5)***. Course structure-dialogue, online technology self efficacy, and the learner autonomy construct of desire to learn account for a significant amount of variance in predicting student performance.
- F. ***Specific Research Hypothesis 6 (RH6)***. Course structure-dialogue, online technology self efficacy, and the learner autonomy construct of learner resourcefulness account for a significant amount of variance in predicting student performance.
- G. ***Specific Research Hypothesis 7 (RH7)***. Course structure-dialogue, online technology self efficacy, and the learner autonomy construct of learner initiative account for a significant amount of variance in predicting student performance.
- H. ***Specific Research Hypothesis 8 (RH8)***. Course structure-dialogue (CSD), online technology self efficacy, and the learner autonomy construct of learner persistence account for a significant amount of variance in predicting student performance.
2. ***General Research Hypothesis 2 (GH2)***. Relationships can be identified between learners' distance learning experience and their perceptions of the

effect that technology related problems have on their learning, that aid in predicting student satisfaction.

A. *Specific Research Hypothesis 9 (RH9)*. Impact score and distance learning experience account for a significant amount of variance in predicting student satisfaction.

An alpha level of .05 and power level of .80 were established prior to data analysis. The research question consisted of two criterion variables but they were addressed one at a time and independently of each other. The statistical analysis was conducted on models having one criterion variable and no more than three predictor variables. An effect size of .20 ($d = .20$) (which is between Cohen's medium and large effect size) was targeted. The minimum sample size required to satisfy these parameters was calculated to be 59.

All students enrolled in any of the 7 allied health courses offered completely online by this university during the summer and fall semester of 2005 were invited to participate in this research project. The data analysis was based on archival data obtained from students who completed online courses during the summer and fall semesters of 2005. A letter was sent via U.S. Mail to each of the 104 students who met the criteria for subjects in this study. All potential subjects were enrolled in a WebCT research site designed by the investigator for this study. The introduction and instructions mailed to each potential participant (see Appendix B) included a brief description of the research project along with instructions on how to access the research instruments and additional instructions and information. The instructions and research instruments were accessible from the homepage of the research site.

Of the 104 potential participants, it was anticipated that at least 59 students would complete the informed consent form indicating that they volunteered to participate in this investigation. Some subjects were enrolled in more than one online course. In addition some subjects were enrolled in courses being studied over both the summer and fall semesters, while others were enrolled in courses during only one of these semesters.

Sampling Procedures

All students enrolled in any of the 7 courses offered completely online by this university program during the summer and fall semester of 2005 were invited to participate in this research project. Participants self-selected to participate in this investigation. Participants were offered two incentives for their participation in this study. The first was entry into a drawing from which one person was selected to receive a \$100 gift certificate to the university bookstore. The second incentive was either extra credit or the substitution of a single course assignment. The extra credit or substitution of an assignment incentive was not offered to the students enrolled in the courses offered during the summer semester of 2005 as their course grades had already been determined.

Instruments

In this study the researcher evaluated demographics, student attributes, and course experience using the LCDLE (see Appendices F and G) and learner autonomy using the LAP-SF (see Appendix H). The LCDLE included items to solicit information including demographics (e.g., age, sex, education level) along with a number of items adapted from published research instruments. The section of this instrument dealing with student course experience, student satisfaction, and student perception of the dialogue and

structure of the course was repeated for each online course taken by students enrolled in multiple online courses included in this investigation.

The LCDLE was divided into two parts for ease of administration (see Appendix F, Part 1 and Appendix G, Part 2). It was determined that participants would need approximately 45 minutes to complete Part 1 and Part 2 of this instrument. All participants were requested to complete the first part which includes 14 items selected to assess demographics and learner characteristics and 29 items which assessed participant's online technology self efficacy using the OTSES adapted from the instrument published by Miltiadou (2001).

The OTSES was developed to measure student's confidence levels (self-efficacy) with online technologies. Construct validity and internal consistency of the OTSES was established by Miltiadou (2001). In developing the OTSES the instrument was administered to approximately 330 college students who were enrolled in several online courses at five educational institutions. This instrument has both content validity provided by a group of content experts and survey designers who reviewed and provided input during the development of the instrument and construct validity. Factor analysis on all items revealed that they load on a single construct. The reliability estimate of this instrument was found to be .95 (Cronbach's coefficient alpha) (Miltiadou, 2001). The OTSES consists of 29 items scored on a 4-point Likert scale. Students in this investigation rated their level of confidence for each item on a 4-point Likert scale ranging from Very Confident = 4, Somewhat Confident = 3, Not Very Confident = 2, and Not Confident at All = 1.

A focus group consisting of 8 volunteers, who were students in the Allied Health Program, met to review the items included in the OTSES. The focus group was convened to assess the items included in the OTSES for clarity and to determine if the technology changes that have occurred since the development of this instrument may have made some items obsolete. The focus group was provided a copy of the OTSES and was instructed to review the items and identify any items that seemed unclear or confusing to them. The group met two days later and discussed their findings with the investigator. Item 24 of the OTSES was confusing to 5 members of the group and therefore the results for this item were not included in the analysis of the results.

The second part of the LCDLE provided 16 items to evaluate students' course experience and their perception of how this experience affected their learning. These items were adapted from the *Survey of Student Experiences in Online Courses* (SEOC), published by Lan et al.(2003). One item evaluated student satisfaction, 2 items assessed the level of interaction with faculty and students (dialogue) adapted from the work of Swan (2001), and 6 items evaluated students' perception of the course structure adapted from an instrument developed by Huang (2002). Part 2 of the LCDLE was repeated for each online course included in the investigation. This allowed students who were enrolled in multiple online courses the opportunity to complete this instrument for each of the courses included in this investigation.

The SEOC was utilized in this investigation for its ability to measure technological problems students might face in an online course and to quantify the effects these problems have on students' learning. This instrument (Lan et al., 2003) was developed to study undergraduate students and demonstrated a reliability coefficient of

.94 for the frequency scale and .90 for the detrimental effect scale. The authors used these scales to create a variable, which they labeled, impact score (frequency x detrimental effect) for each of the activities assessed. The content validity of the SEOC was established through rating of items by distance learning faculty at the institution where the instrument was developed. The Cronbach's reliability coefficient reported for the SEOC was .90 for the impact score (Lan et al., 2003).

The 8 items of the SEOC instrument designed to measure the impact score were adapted for administration using the quiz tool in WebCT by creating two separate items for each of the experiences described in the original instrument. An item to measure the frequency that a problem occurred (the scale used was: N/A, Never = 1, Sometimes = 2, Often = 3, and Always = 4) was followed by an assessment of the detrimental effect that the same experience had on the student's learning (the scale used was: N/A, Not at All = 1, Very Little = 2, Sometimes = 3, and Very Much = 4) (Lan et al., 2003).

Three items were paraphrased from the work of Swan (2001). One item assessed student satisfaction using a scale ranging from Extremely Satisfied = 5 to Not Satisfied at All = 1 and 2 items assessed the level of interaction (dialogue) with faculty and students. The items assessing interaction were rated on a 4-point Likert scale ranging from More than Adequate = 4 to Non-Existent = 1. Validity and reliability estimates were not published for the instrument from which these 3 items were adapted. The items did appear to have content validity. Content validity for the version of these 3 items used in this investigation was established by the researcher through review of the items by a panel of three faculty members who have experience and expertise in research and teaching online.

An additional 7 items to evaluate student perception of course structure were adapted from an instrument developed by Huang (2002). The complete instrument originally consisted of 46 items. Pilot testing and examination for content validity resulted in a final instrument consisting of 27 items. The reliability of the course structure items of Huang's instrument from which these 7 items were adapted had an estimated reliability of .91 (Cronbach's alpha) (Huang, 2002). These items were rated on a 7-point scale from 1 = Strongly Disagree to 7 = Strongly Agree (Huang, 2002). In adapting the items to this investigation the scale was changed to a 4-point Likert scale ranging from Strongly Agree = 4 to Strongly Disagree = 1 to keep the scale similar to that used in other items of the LCDLE questionnaire.

A second instrument, the LAP-SF was provided by Human Resource Development Enterprises (Confessore & Park, 2004) to assess the autonomy of learners (See Appendix H). The time needed to complete this instrument was determined to be approximately 11 minutes. Participants were able to access this instrument online at: <http://www.hrdenprises.com/inventory.html>.

The LAP-SF was extracted from the Learner Autonomy Profile, Version 3 (LAP). The LAP has been reported to be both reliable and content and construct valid for adult learners (Confessore & Park, 2004; Derrick & Carr, 2003; Park & Confessore, 2002). Factor validation of Version 3 of the LAP found that the 164 item instrument provided respondent profiles for each of the four constructs of learner autonomy: desire to learn, learner resourcefulness, learner initiative, and learner persistence (Confessore & Park, 2004). Cronbach's Alpha's for each of the constructs measured were desire (.9376), resourcefulness (.9644), initiative (.9593) and persistence (.9677). Criterion validity was

established through correlations of each of these components of the short form with Version 3 of the LAP instrument. The correlations for each construct are as follows: desire (.988), resourcefulness (.976), initiative (.972) and persistence (.971). The short form was therefore seen as useful for making initial assessment of respondents' learner autonomy profile (Confessore & Park, 2004). The LAP-SF consists of 66 items to which subjects responded using a scale ranging from 0 = Will Never Perform the Behavior to 10 = Will Always Perform the Behavior (in increments of .25) (Confessore & Park, 2004).

Variable List

Predictor variables

Predictor variables in this study included the following:

1. ***Course Structure-Dialogue.*** Subjects' evaluation of the course structure and dialogue. For this investigation, students' ratings of course structure and dialogue items which were included as subscales in the LCDLE. Responses for the course structure and dialogue items were summed to arrive at the value for the course structure-dialogue variable. For students rating multiple online courses an average of their course structure-dialogue values was calculated.
2. ***Course Structure.*** Course structure consists of elements included in the design of a course such as learning objectives, content themes, exercises, projects, tests, etc. (Moore & Kearsley, 1996). For this investigation students' perception of how well elements within the course (course

structure) met their needs was assessed using the course structure items adapted from an instrument developed by H. M. Huang (2002).

3. ***Dialogue.*** According to Moore & Kearsley (1996) dialogue includes, “. . .the interplay of words, actions, and ideas and any other interactions between teacher and learner when one gives instruction and the other responds” (p. 201). For this investigation dialogue was measured by items assessing the level of interaction with faculty and students (dialogue) adapted from the work by Swan (2001).
4. ***Impact score.*** Students’ perceptions of problems they had in a course and how these problems affected their learning. For this investigation items developed by Lan et al. (2003) were adapted to create an impact score subscale of the LCDLE. The higher the impact score, the greater the impact technology problems had on the students’ learning experience. For students rating multiple online courses an average of their impact scores was calculated.
5. ***Distance Learning Experience.*** A quantitative measure of a subject’s reported experience in distance learning courses. For this investigation distance learning experience was assessed by subjects’ response to an item on the LCDLE.
6. ***Learner Autonomy.*** “Learner autonomy is the relative capacity to productively participate in learning experiences” (Confessore & Park, 2004, p. 41). As described by Confessore learner autonomy consists of four constructs: desire, resourcefulness, initiative, and persistence (1991).

The LAP-SF developed by Human Resource Development Enterprise provides ratings of learner autonomy for each of the four constructs. For this investigation raw scores were obtained for each of the learner autonomy constructs using the LAP-SF (Confessore & Park, 2004).

7. ***Learner Autonomy Construct of Desire to Learn.*** As developed by Meyer (2001), this is the measurement of an individual's intentions as related to the desire to learn. For this investigation this construct was measured by participants' score on the desire to learn construct of the LAP-SF (Confessore & Park, 2004).
8. ***Learner Autonomy Construct of Initiative.*** As developed by Ponton (1999), this measures an individual's intentions to initiate learning activities. For this investigation, this construct was measured by participants' score on the initiative construct of the LAP-SF (Confessore & Park, 2004).
9. ***Learner Autonomy Construct of Persistence.*** As developed by Derrick (2001), this is the measurement of an individual's intentions to persist in autonomous learning. For this investigation this construct was measured by participants' score on the persistence construct of the LAP-SF (Confessore & Park, 2004).
10. ***Learner Autonomy Construct of Resourcefulness.*** As developed by Carr (2001), this measures an individual's intentions to exhibit resourcefulness in autonomous learning. For this investigation, this construct was

measured by participants' score on the resourcefulness construct of the LAP-SF (Confessore & Park, 2004).

11. ***Online Technology Self-Efficacy.*** One's perception of how confident one feels about performing various tasks associated with online learning. For this investigation scores from the OTSES were used to measure participants' perceived self-efficacy for various online technologies common to distance learning and applicable to the courses investigated. The score obtained on the OTSES reflects subjects' perception of how confident they felt in performing various tasks associated with online learning. The OTSES items were adapted from the work of Miltiadou (2001) to create an online technology self-efficacy subscale of the LCDLE.

Demographic and other Variables

Demographic and other variables in this study included the following:

1. ***Age.*** The number of years each participant has been alive since birth. For this investigation the age of each participant was self-reported.
2. ***Computer experience.*** A quantitative measure of subjects' reported computer experience. For this investigation, participants' responses to computer experience items on the LCDLE were used to calculate computer experience. Computer experience was calculated as the number of years subjects reported using a computer multiplied by the reported average hours of use each week.

3. **Sex.** Biological classification of male or female. For this investigation, the sex of each participant was self-reported.

Criterion variables

Criterion variables in this study included the following:

1. **Performance.** An evaluation of one's performance in a specific course. In this investigation final course grades were used to indicate performance. Performance was measured by final grades earned using a traditional 4-point scale (A = 4, B = 3, C = 2, D = 1, F = 0). The grade point average for all allied health courses taken online during the summer and fall semesters of 2005 was calculated based on a sum of grades earned (using a standard 4-point scale)/number of courses completed.
2. **Student satisfaction with the course or courses.** Students' perception of their learning experience in relation to their expectations. If the learning experience exceeds expectations, then a person is highly satisfied, if expectations are met a person is satisfied, if the experience fails to meet expectations then a person is dissatisfied (Kotler & Clarke, 1987). For this investigation student's satisfaction was indicated on a satisfaction item within the LCDLE for each individual course. For students rating multiple online courses an average of their satisfaction ratings was calculated.

Data Collection

Data was collected through means of online survey instruments and through student database records. The WebCT course management system was selected to

administer this study because the environment is familiar to the subjects (all of the online courses investigated utilized WebCT). The WebCT course management system requires a user ID and password to authenticate each participant. The WebCT course management system which is secured by university computer administrators was already in use at this institution for other services that provide access to confidential information (e.g., grades, student information). To ensure privacy and confidentiality all data and identifiers associated with this study were removed from the server at the completion of this investigation.

The WebCT research site provided students with access to the informed consent form, part 1 and part 2 of the LCDLE, and a link to the Human Resource Development Enterprise's web site from which participants could access the LAP-SF. Participants' informed consent was obtained using an online form. Access to the survey instruments was designed so that the LCDLE and LAP-SF remained inaccessible to participants until they indicated that they were informed about the investigation and agreed to participate.

Data collection for this study was conducted in such a manner that subjects could be identified by the researchers having access to the server containing the identifying data. Subjects were made aware that data was being collected with identifiers. This was necessary to match subjects' responses on the LAP-SF with their responses on the LCDLE.

Because two of the courses investigated were taught by the researcher during the fall semester of 2005, a faculty member at the university where this investigation was conducted was employed to administer the research site once the second part of the LCDLE was administered for the fall semester courses. When data collection was

completed the research site administrator (faculty member) matched the LAP-SF data with that of the LCDLE. The combined data file with no identifying information was then provided to the researcher for analysis. This was done to keep student identities from all instructors (including the researcher) whose courses were evaluated.

The LAP-SF was administered online by Human Resource Development Enterprise. An agreement was established between company and the researcher for administration of the LAP-SF to subjects participating in this study. Subjects were referred to the LAP-SF through instructions and a link to the company's web site which were provided on the WebCT site created for this investigation.

In order to complete the LAP-SF, participants were required to sign an informed consent, complete registration forms, and create an ID Code which they used to access the LAP-SF. This code was used by the company to unite the results of the surveys that comprise the LAP-SF into a single profile. Subjects also provided a valid email address during registration so that they could be reached by the company for registration confirmation and receive a confidential learner autonomy profile report, if they desired one. This information was removed from the database as soon as participants submitted all responses to the survey. Each participant's email address was removed from the database once they submitted their responses to the LAP-SF and any requested confidential report was sent to them. Informed consent for LAP-SF was provided at the company's web site (see Appendix D).

The survey instruments were available to participants during the following dates and times:

- Step 1. Read the informed consent agreement and indicate if you wish to participate in this study.
Availability: October 10, 2005 12:05 a.m. through November 14, 2005 11:55 p.m.
- Step 2. Complete the Learner Characteristics and Distance Learning Experience Questionnaire (Part 1).
Availability: October 10, 2005 12:05 a.m. through December 18, 2005 11:55 p.m.
- Complete the Distance Learning Course Experience Survey (Part 2): Survey for each course in which participants are enrolled.
- Step 2. Summer 2005 Courses:
(cont'd) Availability: October 10, 2005 12:05 a.m. through November 14, 2005 11:55 p.m.
- Fall 2005 Courses:
Availability: November 14, 2005 12:05 a.m. through January 15, 2006 11:55 p.m.
- Step 3. Complete the Learner Autonomy Profile (LAP).
Availability: October 10, 2005 12:05 a.m. through January 12, 2006 11:55 p.m.

Two instruments were presented to volunteer participants who were (a) students 18-years of age or older and (b) enrolled in online courses offered by the Allied Health Program during the summer and fall semesters of 2005. These participants were advised that course grades for the online courses that they were enrolled in during the semesters under investigation would be utilized to determine if there was a relationship between student performance and the learner characteristics assessed by the survey instruments.

Statistical Treatment

Descriptions of the statistical procedures utilized in analyzing the data collected for this investigation are presented in this section. Data analysis was conducted using SPSS[®] version 12 statistical software (SPSS, 2003).

The statistical analysis included both descriptive statistics and inferential statistics. Descriptive statistics were provided to summarize the data and include measures of central tendency: mean, median, mode, and measures of variability (i.e., range, standard deviation) (Newman & Newman, 1994). Inferential statistics were based on the general linear model. Spearman correlation co-efficients, R^2 , and f statistics were obtained. An alpha level of .05 and power level .80 was established prior to data analysis.

Specific research hypotheses 1–4 suggest that learner's satisfaction in a course can be predicted or explained by knowledge about other variables which are measured through appropriate instruments. Specific research hypotheses 5–8 suggest that learners' performance in a course can be predicted or explained by knowledge about other variables which are measured through appropriate instruments. Specific research hypothesis 9 suggests that learners' satisfaction in a course can be predicted or explained by knowledge about other variables which are measured through appropriate instruments. For this type of analysis a regression equation is appropriate as it is used to express the linear relationship of more than one independent predictor variable and the role these variables play in the variance of a single dependent (or criterion) variable. The general linear model (GLM) supports the goal of predictability (McNeil, Newman, & Kelly, 1996) as expressed in the hypotheses stated here.

Demographics

Reported demographics include sex, age, and class rank (i.e., undergraduate student, graduate student). Descriptive information (i.e., average computer experience, average computer time in hours per week), and distance learning experienced were also assessed and reported.

Limitations

Limitations are those aspects of the study over which the researcher has no control. The limitations of the proposed investigation are reported here to aid the reader in understanding this study.

First, the response rate for participation in the study was a limitation. All of the participants who were eligible to participate in this investigation did not do so. The results would likely be different if all of the participants invited to participate did so. Second, there were subjects who completed some, but not all of the instruments proposed for this investigation. Third, since participants enrolled in the course(s) responded to surveys within a range of time, they may have developed skills online after they completed the assessment instrument for online self-efficacy and before they completed the individual ratings of satisfaction for each course. There is no accounting for the changes in online skills and self-efficacy that may have occurred during the gap between completion of part 1 of the LCDLE and the evaluation of individual courses. Fourth, class size varied among the courses investigated. Class size may have affected the level of dialogue within the courses.

CHAPTER IV

RESULTS OF THE STUDY

In this chapter the results of this study are offered in four parts. The first section introduces the demographic descriptive statistics. Next, the findings related to the instruments used in this investigation are described. The following segment provides the results related to assumptions that must be met to effectively utilize linear regression are provided. In the final section the results of testing the research hypotheses are presented.

Demographic Descriptive Statistics

Demographics reported include sex, age, and class rank. Descriptive statistics for other student attributes (e.g., average computer experience, distance learning experience, online technology self-efficacy, learner autonomy) were also assessed and reported (see Table 2).

Of the 104 potential participants for this study, 62 participants completed the informed consent form and one instrument associated with the research project. Only those participants who completed at least one of the courses involved in this study, and who completed part 1 and 2 of the LCDLE questionnaire as well as the LAP-SF were included in the data analysis.

Forty-seven ($N = 47$) students met this criteria resulting in an overall response rate of 45%. The number of participants who completed at least one online course as well as the instruments associated with this investigation was less than initially targeted. This resulted in a lower power for the statistical analysis performed in this investigation. Power reflects the ability of a test to detect significance if it exists (McNeil et al., 1996). Given the number of participants ($N = 47$) the power is estimated to be 59 for an effect size of .15, which is Cohen's medium effect size. The power is approximately 70 for an effect size of .20 which is between Cohen's medium and large effect sizes (Cohen, 1988).

There were 12 (25.5%) male and 35 (74.5%) female participants whose age ranged from 21 to 57 years with a mean age of 31 years. The participants were predominantly undergraduate students (87.2%). The undergraduate students consisted of 1 (2%) freshman, 1 (2%) sophomore, 13 (28%) juniors, and 26 (55%) seniors. Graduate and post-graduate students made up 9% and 4% of the participants respectively.

Computer experience reported by subjects ranged from a minimum of 2 years to a maximum of 20 years. Subjects reported using a computer approximately 3 to 55 hours each week. Three subjects failed to report the approximate number of hours they used a computer each week, so the weekly computer use reported reflects the responses of only 44 subjects. Subjects reported using a computer an average of 18 hours per week ($n = 44$) for an average of 10 years ($N = 47$).

The hour-years of computer experience was calculated by multiplying the average hours per week of computer use by the number of years of computer use. The average computer experience reported by subjects in this study was 206 hour-years ($n = 44$).

Distance learning experience (i.e., number of online courses in which 70% or more of the course was completed online) was self-reported by participants. Of the participants, 23% indicated that they had participated in 1–2 courses, 30% participated in 3–4 courses, 21% participated in 5–6 courses, 21% participated in 7–9 courses, and 4% participated in 10 or more courses.

Participants' online technology self-efficacy was determined from their responses on the online technologies self-efficacy scale items within the learner characteristics and distance learning experience questionnaire. The online technology self-efficacy for participants in this study ranged from 69 to 112 with a mean value of 100.8.

Participants rated their satisfaction with the online courses included in this study. Overall, students appeared to be satisfied with the online classes. A summary of their satisfaction ratings is as follows: extremely satisfied (25.5%), very satisfied (42.6%), satisfied (21.3%), somewhat satisfied (8.5%), and not satisfied at all (2.1%).

The impact score provides an indication of the negative impact that technology related problems had on students' learning experience. The lower the score the less impact problems associated with technology had on participants' learning experience. In this study the impact score ranged from 0–5.63, with a mean of 1.54.

Students' performance in the courses included in this investigation was calculated using final course grades on a standard 4 point grade scale. In this investigation the minimum student performance was 0 and the maximum was 4. The mean student performance was 3.5.

Instrument Related Findings

Learner Characteristics and Distance Learning Experience Questionnaire

The learner characteristics and distance learning experience questionnaire included (a) demographic related items; (b) one item to assess student's satisfaction with the online courses; and (c) four subscales—the online technologies self-efficacy scale, the course structure subscale, the dialogue subscale, and the impact score subscale. The questionnaire was administered in two parts.

The 28 items comprising the online technologies self-efficacy scale were included in part 1 of the learner characteristics and distance learning experience questionnaire. Reliability testing was conducted on the items comprising the online technologies self-efficacy scale subscale. The reliability for the online technologies self-efficacy scale subscale was estimated at .941 (Cronbach's alpha) for this investigation.

The 7 items comprising the course structure subscale were included in part 2 of the learner characteristics and distance learning experience questionnaire. Reliability testing was conducted on the items comprising the course structure subscale. The reliability for the course structure subscale was estimated at .884 (Cronbach's alpha) for this investigation.

The 2 items comprising the dialogue subscale were included in part 2 of the learner characteristics and distance learning experience questionnaire. Reliability testing was not conducted for these 2 items because, even though they both measured dialogue, they assessed dialogue from two different audiences—dialogue with colleagues and with the course instructor.

The 16 items comprising the impact score subscale were included in part 2 of the learner characteristics and distance learning experience questionnaire. Reliability testing was conducted on the items comprising the impact score subscale. The reliability for the impact score subscale was estimated at .832 (Cronbach's alpha) for this investigation.

Learner Autonomy Profile (LAP-SF)

Pearson correlation coefficients were obtained and a correlation matrix was generated for the predictor and criterion variables associated with specific research hypotheses to assess for collinearity (see Table 3). The results suggest that for the participants in this investigation the learner autonomy constructs of desire to learn, learner resourcefulness, learner initiative, and learner persistence are correlated with one another and not independent as described in the literature (Confessore & Park, 2004). Factor analysis using Varimax rotation with an Eigen value of 1 as a cutoff was run using the data for each of the subscale totals (item results for each construct were not available as the scoring of the instrument is proprietary). The results of this analysis clearly indicated a one factor solution. This result is contrary to the research related to this instrument (Confessore & Park, 2004). For the population studied the independence of the four autonomy constructs as measured by the LAP-SF cannot be confirmed.

Assumptions of Multiple Linear Regression

Linearity, normality, constant variance, and independence of observations are assumptions important to the use of regression analysis (Norusis, 2002). These assumptions and the actions taken to assess them are discussed.

To assess the linearity assumption a scatterplot of the data was performed plotting data associated with predictor and criterion variables. The plots showed varying degrees of linearity. A best fit line for each of the scatterplots was determined.

Pearson correlation coefficients were obtained and a correlation matrix was generated for the predictor and criterion variables associated with the specific research hypotheses to assess for collinearity (see Table 3). Significant correlations were identified among some of the predictor variables. Course structure-dialogue was significantly correlated with learner resourcefulness ($r = .30, p = .05$) and also with learner initiative ($r = .34, p = .05$). The variables course structure-dialogue and learner resourcefulness are predictors in the model for testing hypothesis RH2 and RH6. Course structure-dialogue and learner initiative are predictor variables included in the model to test hypothesis RH3 and RH7. Collinearity statistics obtained for the regression analysis of models that include these predictor variables suggested that these relationships would not significantly affect the results. The tolerance statistic reflects the proportion of a variable's variance that is not due to other predictor variables in the same model (SPSS, 2003). The tolerance statistic for analysis of the model to test RH2 and RH6 was .87 for course structure-dialogue and .91 for learner resourcefulness. Analysis of the model to test RH3 and RH7 produced a tolerance statistic of .85 for course structure-dialogue and .88 for learner initiative. These large tolerance statistics suggest that the collinearity of these variables should not be a concern in testing these models.

To assess the regression assumption that data are from a normal distribution the standardized residuals were plotted against the observed values for each model. If the data are from a normal distribution, the standardized residuals should fall approximately

on a straight line in a Q-Q plot (Norusis, 2002). In Figure 1 the standardized residuals for student satisfaction, online technology self-efficacy, course structure-dialogue, and desire to learn are plotted versus the observed values. The data points are clustered around a straight line with the exception of three data points indicating a mostly normal distribution. Figures 2–4 depict the plot of the standardized residuals for the variables associated with testing the models for RH2–RH4. The plots of the standardized residuals in these figures are similar to that of Figure 1 which suggests that the data appear to be normally distributed.

The plots of the standardized residuals for the models to test specific research hypotheses 5–9 are shown in Figures 5–9. These plots show the standardized residuals vary considerably from the straight line pattern that would indicate that the data are from a normal distribution. Figures 5–9 suggest that the data analyzed to test the specific research hypotheses RH5–RH9 are not normally distributed. Because this violates one of the assumptions of multiple linear regression, the results of testing of these hypotheses may be effected. Ramsey and Schafer (2002) state that violation of the normality assumption is usually not a problem as regression tests are robust to non-normal distributions. The authors caution that violating the normality assumption can be a concern with a moderate to small sample that has a long tailed distribution (due to outliers) (Ramsey & Schafer, 2002).

To determine if the assumption of equal or constant variance was met, the predicted values derived from each model were plotted against the criterion variables (i.e., student satisfaction, student performance). The range for the observed values of the criterion variables student satisfaction and student performance should be similar when

plotted in this manner if the assumption of equal variances is met (Norusis, 2002).

Scatterplots created for the models used to test RH1–RH9 can be seen in Figures 10–18.

In Figures 10–13, the range for the plots of predicted values for each observed value for student satisfaction is relatively uniform, so the assumption of equal variances seems not to be violated. In Figures 14–17 there appears to be a greater range of variability in the higher student performance values. This suggests that the assumption of equal variances is not likely in these models. This is likely influenced by the larger number of students who had high values for performance (final course grades of A or B) as compared to a very small number of participants with low performance values (final course grades of C, D, or F).

Finally, Figure 18 suggests that the assumption of equal variances may not be met for the model testing RH9, as there are some large variances noted in the predicted values associated with the lower values for student satisfaction and this occurs also with observed satisfaction ratings of 3.5.

To assess independence of the observations, the Durbin-Watson test was run for each model tested to determine if adjacent observations were correlated. Values for the Durbin-Watson test statistic for each of the models, ranged from 1.98 to 2.16. Norusis (2002) suggests that values for the Durbin-Watson test statistic should be close to 2 if there is no significant correlation between successive residuals, and that values between 1.5 and 2.5 should cause no concern. Since the values obtained are within these guidelines, the assumption of independence appears to be met.

Testing the Research Hypotheses

Predicting Student Course Satisfaction

Multiple linear regression was used to test specific research hypotheses 1–4 to determine if course structure-dialogue, online technology self efficacy, and the learner autonomy constructs of desire to learn, learner resourcefulness, learner initiative, and learner persistence account for a significant amount of variance in predicting student satisfaction. In testing the ninth research hypothesis, multiple linear regression was used to determine if impact score and distance learning experience account for a significant amount of variance in predicting student satisfaction.

Multiple linear regression was used to test the research hypothesis that course structure-dialogue, online technology self efficacy, and the learner autonomy construct of desire to learn account for a significant amount of variance in predicting student satisfaction. The full and restricted models used to test hypothesis (RH1) were:

$$\text{Full model: } Y_{(SS)} = a_0U + a_1\text{CSD} + a_2\text{OTSE} + a_3\text{DL} + E_1$$

$$\text{Restricted model: } Y_{(SS)} = a_0U + E_2$$

The results of the regression analysis of this model, displayed in Table 4, indicate that for this study, the only variable in the model that was significant for predicting student satisfaction was course structure-dialogue ($B = .22, p = .00$).

Multiple linear regression was used to test the research hypothesis that course structure-dialogue, online technology self efficacy, and the learner autonomy construct of learner resourcefulness account for a significant amount of variance in predicting student satisfaction. The full and restricted models used to test this hypothesis (RH2) were:

Full model: $Y_{(SS)} = a_0U + a_1CSD + a_2OTSE + a_3LR + E_1$

Restricted model: $Y_{(SS)} = a_0U + E_2$

The results of the regression analysis of this model, displayed in Table 5, indicate that for this study, the only variable in the model that was significant for predicting student satisfaction was course structure-dialogue ($B = .22, p = .00$).

Multiple linear regression was used to test the specific research hypothesis that course structure-dialogue, online technology self efficacy, and the learner autonomy construct of learner initiative account for a significant amount of variance in predicting student satisfaction. The full and restricted models used to test this hypothesis (RH3) were:

Full model: $Y_{(SS)} = a_0U + a_1CSD + a_2OTSE + a_3LI + E_1$

Restricted model: $Y_{(SS)} = a_0U + E_2$

The results of the regression analysis of this model, displayed in Table 6, indicate that for this study, the only variable in the model that was significant for predicting student satisfaction was course structure-dialogue ($B = .21, p = .00$).

Multiple linear regression was used to test the research hypothesis that course structure-dialogue, online technology self efficacy, and the learner autonomy construct of learner persistence account for a significant amount of variance in predicting student satisfaction. The full and restricted models used to test this hypothesis (RH4) were:

Full model: $Y_{(SS)} = a_0U + a_1CSD + a_2OTSE + a_3LP + E_1$

Restricted model: $Y_{(SS)} = a_0U + E_2$

The results of the regression analysis of this model, displayed in Table 7, indicate that for this study, the only variable in the model that was significant for predicting student satisfaction was course structure-dialogue ($B = .21, p = .00$).

Multiple linear regression was used to test the research hypothesis that impact score and distance learning experience account for a significant amount of variance in predicting student satisfaction. The full and restricted models used to test this hypothesis (RH9) were:

$$\text{Full model: } Y_{(SS)} = a_0U + a_1IS + a_2DLE + E_1$$

$$\text{Restricted model: } Y_{(SS)} = a_0U + E_2$$

The results of the regression analysis of this model, displayed in Table 8, indicate that for this study, the model was not significant for predicting student satisfaction ($F(2, 44) = 1.28, p = .29$).

Predicting Student Performance

Multiple linear regression was also used to test specific research hypotheses 5–8 to determine if course structure-dialogue, online technology self efficacy, and the learner autonomy constructs of desire to learn, learner resourcefulness, learner initiative, and learner persistence account for a significant amount of variance in predicting student performance.

Multiple linear regression was used to test the research hypothesis that course structure-dialogue, online technology self efficacy, and the learner autonomy construct of desire to learn account for a significant amount of variance in predicting student performance. The full and restricted models used to test this hypothesis (RH5) were:

Full model: $Y_{(SP)} = a_0U + a_1CSD + a_2OTSE + a_3DL + E_1$

Restricted model: $Y_{(SP)} = a_0U + E_2$

The results of the regression analysis of this model, displayed in Table 9, indicate that for this study, the model was not significant for predicting student performance,

$$F(3, 43) = .57, p = .64.$$

Multiple linear regression was used to test the research hypothesis that course structure-dialogue, online technology self efficacy, and the learner autonomy construct of learner resourcefulness account for a significant amount of variance in predicting student performance. The full and restricted models used to test this hypothesis (RH 6) were:

Full model: $Y_{(SP)} = a_0U + a_1CSD + a_2OTSE + a_3LR + E_1$

Restricted model: $Y_{(SP)} = a_0U + E_2$

The results of the regression analysis of this model, displayed in Table 10, indicate that for this study, the model was not significant for predicting student performance,

$$F(3, 43) = .89, p = .45.$$

Multiple linear regression was used to test the research hypothesis that course structure-dialogue, online technology self efficacy, and the learner autonomy construct of learner initiative account for a significant amount of variance in predicting student performance. The full and restricted models used to test this hypothesis (RH7) were:

Full model: $Y_{(SP)} = a_0U + a_1CSD + a_2OTSE + a_3LI + E_1$

Restricted model: $Y_{(SP)} = a_0U + E_2$

The results of the regression analysis of this model, displayed in Table 11, indicate that for this study, the model was not significant for predicting student performance,

$$F(3, 43) = .57, p = .64.$$

Multiple linear regression was used to test the research hypothesis that course structure-dialogue, online technology self efficacy, and the learner autonomy construct of learner persistence account for a significant amount of variance in predicting student performance. The full and restricted models used to test this hypothesis (RH8) were:

$$\text{Full model: } Y_{(SP)} = a_0U + a_1CSD + a_2OTSE + a_3LP + E_1$$

$$\text{Restricted model: } Y_{(SP)} = a_0U + E_2$$

The results of the regression analysis of this model, displayed in Table 12, indicate that for this study, the model was not significant for predicting student performance, $F(3, 43) = .82, p = .49$.

Post Hoc Analysis

Multiple linear regression was conducted for each of the models previously described but with restricted models controlling for the each of the other predictor variables. This was conducted for the dependent variables of student satisfaction and student performance. This was done to determine if the amount of variance each variable accounted for was significant over and above that of the other predictor variables when predicting student satisfaction and student performance. Only course structure-dialogue was significant in predicting student satisfaction in each of the models when controlling for online technology self efficacy, desire to learn, learner resourcefulness, learner initiative, and learner persistence. None of the predictor variables reached significance in predicting student performance.

Dialogue in this investigation was assessed using items requesting students to rate the adequacy of dialogue with their course instructor and also with other students in each

online course. Pearson correlation coefficients were obtained to determine the relationship between student satisfaction and (a) students' perception of the adequacy of dialogue with the course instructor and (b) students' perception of the adequacy of dialogue with other students in the online courses studied. The results of this analysis reveal that a significant positive relationship exists between student satisfaction and dialogue ($r = .69, p = .01$). Further analysis revealed that the adequacy of dialogue with the course instructor ($r = .75, p = .01$) showed a stronger, positive relationship to students' satisfaction than dialogue with other students in the course ($r = .43, p = .01$) did, although both were statistically significant.

Pearson correlation coefficients were also obtained to determine the relationship between dialogue and student performance. There was no statistically significant relationship identified between dialogue and student performance in the online courses studied ($r = .05, p = .75$).

Additional analysis was conducted to determine what relationships exist among the student attributes of sex, age, computer experience, student satisfaction, and student performance. Pearson correlation coefficients were obtained and a correlation matrix of these variables was generated (see Table 13). A significant, moderate, negative correlation between age and student satisfaction was identified ($r = -.35, p = .05$).

CHAPTER V

SUMMARY, CONCLUSIONS, AND IMPLICATIONS

Summary of the Study

This section is organized into three parts: the summary of the study, conclusions, and implications. The summary of the study provides an overview of the research process including a synopsis of the problem, a brief discussion of the research procedures employed, and a review of the specific research hypotheses. The conclusions section emphasizes the key findings associated with the general and specific research hypotheses and their significance. The implications associated with the research findings and recommendations for further investigation are described in the implications section of this chapter.

Of the variables included in this investigation (i.e., course structure-dialogue, online technology self efficacy, desire to learn, learner resourcefulness, learner initiative, learner persistence) course structure-dialogue was a significant predictor of students' satisfaction (the correlation coefficient was positive) in this study. None of the variables included in this investigation (i.e., course structure-dialogue, online technology self efficacy, desire to learn, learner resourcefulness, learner initiative, learner persistence) was found to be a significant predictor of students' performance in this study.

Post hoc correlation analysis was conducted to determine what relationships exist among the student attributes of sex, age, computer experience, students' satisfaction,

and performance. A significant, moderate, negative correlation between age and student satisfaction was identified ($r = -.35, p = .05$).

Post hoc correlation analysis was also conducted to determine what relationships exist among dialogue and students' satisfaction and performance. The results of this analysis reveal a significant positive relationship between student satisfaction and dialogue ($r = .69, p = .01$). Further analysis revealed a more positive relationship between student satisfaction and the adequacy of dialogue with the course instructor ($r = .75, p = .01$) than with the level of dialogue with other students in the course ($r = .43, p = .01$); although both are statistically significant. There was no statistically significant relationship identified between dialogue and student performance in the online courses studied ($r = .05, p = .75$).

Statement of the Problem

This research investigated the effect that (a) student attributes such as learner autonomy as measured through its independent constructs of desire to learn, learner resourcefulness, learner initiative, and learner persistence; (b) online technology self-efficacy; as well as (c) course structure-dialogue have on student satisfaction and student performance in online learning environments. The effect of technology related problems on students' learning experience, as measured by impact score, and students' distance learning experience was also investigated to determine if these constructs were significant in predicting students' satisfaction in online learning environments. Analysis using quantitative methods was conducted to investigate the general research questions through the specific research hypotheses associated with this study.

Statement of the Procedures

Students who were enrolled in any of seven online courses offered by the Allied Health Program at this Midwestern university during the summer and fall semesters of 2005 were invited to participate in this study. There were 104 potential participants for this study who were invited to complete two online survey instruments. The results of this investigation reflect the data obtained from the 47 ($N = 47$) students who completed at least one course associated with this study and completed the instruments associated with this investigation.

The predictor variables (i.e., online technology self efficacy, course structure-dialogue, distance learning experience, impact score) and the criterion variable of student satisfaction were measured by items included in the learner characteristics and distance learning experience questionnaire. Learner autonomy as determined by the constructs of desire to learn, learner resourcefulness, learner initiative, and learner persistence was measured by the LAP-SF. The criterion variable of student performance was determined through final course grades retrieved from a student data base.

Specific Research Hypotheses

There were nine specific research hypotheses associated with this investigation. The nine specific research hypotheses are:

1. **Specific Research Hypothesis 1 (RH1).** Course structure-dialogue, online technology self efficacy, and the learner autonomy construct of desire to learn account for a significant amount of variance in predicting student satisfaction.

2. **Specific Research Hypothesis 2 (RH2).** Course structure-dialogue, online technology self efficacy, and the learner autonomy construct of learner resourcefulness account for a significant amount of variance in predicting student satisfaction.
3. **Specific Research Hypothesis 3 (RH3).** Course structure-dialogue, online technology self efficacy, and the learner autonomy construct of learner initiative account for a significant amount of variance in predicting student satisfaction.
4. **Specific Research Hypothesis 4 (RH4).** Course structure-dialogue, online technology self efficacy, and the learner autonomy construct of learner persistence account for a significant amount of variance in predicting student satisfaction.
5. **Specific Research Hypothesis 5 (RH5).** Course structure-dialogue, online technology self efficacy, and the learner autonomy construct of desire to learn account for a significant amount of variance in predicting student performance.
6. **Specific Research Hypothesis 6 (RH6).** Course structure-dialogue, online technology self efficacy, and the learner autonomy construct of learner resourcefulness account for a significant amount of variance in predicting student performance.
7. **Specific Research Hypothesis 7 (RH7).** Course structure-dialogue, online technology self efficacy, and the learner autonomy construct of

learner initiative account for a significant amount of variance in predicting student performance.

8. **Specific Research Hypothesis 8 (RH8).** Course structure-dialogue, online technology self efficacy, and the learner autonomy construct of learner persistence account for a significant amount of variance in predicting student performance.
9. **Specific Research Hypothesis 9 (RH9).** Impact score and distance learning experience account for a significant amount of variance in predicting student satisfaction.

Conclusions

This section discusses the conclusions related to the general hypotheses followed by a discussion of the conclusions related to the specific research hypotheses. This section concludes with a general discussion of the conclusions as they relate to the specific research hypotheses. Conclusions related to the two general hypotheses and the nine specific research hypotheses associated with them follow.

The first general hypothesis was formulated based on a review of the literature to answer the following research question:

What are the relationships among learner attributes including learner autonomy, self efficacy for online technology, and course structure and dialogue, that aid in predicting student satisfaction and performance within online course environments?

For this investigation the answer to this question is that course structure-dialogue predicted student satisfaction in the online courses studied. Course structure-dialogue did not predict student performance in the online courses involved in this investigation. Learner autonomy and self-efficacy for online technology did not predict student satisfaction or performance in the online courses studied.

The first general research hypothesis stated that relationships can be identified among learner attributes including learner autonomy, self efficacy for online technology, and course structure-dialogue, that aid in predicting student satisfaction and performance within online course environments. The specific research hypotheses generated to test this hypothesis were analyzed using multiple linear regression.

The first four specific research hypotheses (RH1–RH4) stated that relationships could be identified among course structure-dialogue, online technology self efficacy, and the learner autonomy constructs of desire to learn, learner resourcefulness, learner initiative, and learner persistence that would aid in predicting students' satisfaction with the online courses involved in this investigation. Each of the four hypotheses included online technology self-efficacy and course structure-dialogue along with one of four constructs of learner autonomy.

Multiple linear regression was utilized to analyze each of the models used to test these hypotheses and each of the four models was found to be significant ($p < .05$) and accounted for approximately 70% of the variance in students' satisfaction. Although the models were found to be statistically significant, the only variable in any of the models that was statistically significant in predicting students' satisfaction in this investigation was course structure-dialogue. The unstandardized beta coefficients for course structure-

dialogue in the models including desire to learn, learner resourcefulness, learner initiative, and learner persistence were .22, .22, .21, and .21 respectively ($p < .05$).

These findings are in agreement with those of D.S. Stein et al. (2005) who found course structure and dialogue predicted students' satisfaction with perceived learning. Since the course structure-dialogue variable includes both course structure and dialogue this finding is also in agreement with that of Arbaugh and Duray (2002) who found a significant relationship between course structure and student satisfaction. These findings also support the importance of course structure and dialogue in online courses. Both course structure and dialogue are key components in Moore's theory of transactional distance (Moore, 1993; Moore & Kearsley, 1996). The student attributes of online technology self-efficacy and learner autonomy as measured through its constructs of desire to learn, learner resourcefulness, learner initiative, and learner persistence were not found to be significant predictors of students' satisfaction in this investigation. This is not in agreement with the findings reported by Lim (2001) who found a significant positive relationship between self-efficacy and student satisfaction and the findings of Calvin (2005) who reported a significant positive correlation between learner autonomy and student satisfaction with perceived learning. It is possible that the relationships existed, but that they were not detected due to the small sample size in this study. Another consideration is that students in this study completed the instruments measuring online technology self-efficacy and the learner autonomy constructs during a range of time that was after the summer semester and at least part of the fall semester had been completed. One of the limitations of this study is that students' self-efficacy for online technology may have actually been lower during the time they participated in the summer

semester courses and their confidence with the online technologies may have improved by the time they completed the survey instruments. Likewise learner autonomy was measured over a similar range of time and changes in this construct that may have occurred over time are not accounted for and may have affected the results.

Specific research hypotheses (RH5–RH8) stated that relationships could be identified among course structure-dialogue, online technology self efficacy, and the learner autonomy constructs of desire to learn, learner resourcefulness, learner initiative, and learner persistence that would aid in predicting students' performance in the online courses involved in this investigation. Each of the four hypotheses included online technology self efficacy and course structure-dialogue along with one of the constructs of learner autonomy.

Multiple linear regression was utilized in analyzing each of the models used to test these hypotheses and none of the models was significant in predicting students' performance. Regarding the models to predict student performance using the predictor variables of online technology self efficacy and course structure-dialogue along with desire to learn, learner resourcefulness, learner initiative, and learner persistence, none of these attributes reached the specified .05 level of significance, $F(3, 43) = .57, p = .64$; $F(3, 43) = .89, p = .45$; $F(3, 43) = .57, p = .64$; and $F(3, 43) = .82, p = .49$ respectively, so these specific research hypotheses were not accepted.

The student attributes of course structure-dialogue, online technology self efficacy, and learner autonomy as measured through its constructs of desire to learn, learner resourcefulness, learner initiative, and learner persistence were not found to be significant predictors of students' performance in this investigation. It is possible that the

relationships tested existed, but that they were not detected due to the small sample size in this study. As stated earlier another consideration is that students in this study completed the instruments measuring online technology self efficacy and the learner autonomy constructs during a range of time that was after the summer semester and at least part of the fall semester had been completed. One of the limitations of this study is that students' self-efficacy for online technology may have actually been lower during the time they participated in the summer semester courses and their confidence with the online technologies may have improved by the time they completed the courses earning their final grades. Likewise learner autonomy was measured over a similar range of time and changes in this construct that may have occurred over time are not accounted for and may have affected the results.

The second general hypothesis was formulated based on a review of the literature to answer the following research question:

What are the relationships between learners' distance learning experience and their perceptions of the effect that technology related problems have on their learning, that aid in predicting student satisfaction?

For this investigation the answer to this question is that the relationship between learners' distance learning experience and the effect that technology related problems had on students' learning did not predict students' satisfaction with the online courses studied.

The second general research hypothesis (RH2) stated that relationships can be identified between learners' distance learning experience and their perceptions of the effect that technology related problems have on their learning, that aid in predicting

student satisfaction. The specific research hypothesis generated to test this hypothesis was analyzed using multiple linear regression.

The specific research hypothesis stated that impact score and distance learning experience account for a significant amount of variance in predicting students' satisfaction. Multiple linear regression was utilized to analyze the model used to test this hypothesis and the model was not significant in predicting students' satisfaction, $F(2, 44) = 1.28, p = .29$, so this hypothesis was not accepted.

Lan, et al. (2003), found that impact scores showed a negative correlation with course evaluations provided by students. The higher the detrimental impact score, the lower the evaluation of teaching. The impact score accounted for more than 5% of the variance in the course evaluation scores (Lan et al., 2003).

In this study the impact score did not account for a significant amount of variance in predicting student satisfaction with the online courses. Given the small sample size it could be that the relationship existed, but was not detected. Another consideration here is the low impact scores reported by students in this investigation. In the study conducted by Lan, et al. (2003) the mean impact score was 3.87 ($SD = 2.48$) while in this investigation the mean impact score was 1.54 ($SD = 1.18$). The lower values indicate that students in this investigation reported less frequent technology problems and that when technology problems were encountered they had less effect on their learning experience than those students in the investigation by Lan, et al. (2003).

Looking into this further, in the study conducted by Lan, et al. (2003) the mean frequency of technical problems was 1.73 ($SD = 0.53$) and the mean impact of these problems on students' learning was reported as 1.92 ($SD = 0.75$) indicating that students

reported experiencing problems between “never” and “sometimes” and that these technology problems impeded their learning between “very little” and “sometimes”(Lan et al., 2003). In this investigation, the mean frequency of technology problems was 1.16 ($SD = .28$) and the mean impact of these problems on students’ learning was reported as .93 ($SD = 0.54$) indicating that students reported experiencing problems between “never” and “sometimes” and that these technology problems impeded their learning between “not at all” and “very little.”

This investigation also found a significant correlation between course structure-dialogue and impact score ($r = -.37, p = .05$). The correlation was negative suggesting that technology related problems had less effect on students’ learning experiences when course structure (including organization of the course and flexibility of delivery) met students’ needs and there was sufficient dialogue.

Distance learning experience was not significant in predicting student satisfaction in this investigation. This finding agrees with that of Thurmond, Wambach, Connors, and Frey (2002) who found that the number of previous web-based courses was not significantly related to students’ satisfaction with web-based nursing courses.

Arbaugh (2004) found that the most significant gains in student satisfaction with various aspects of online learning, but not the course content, occurred between the first and second course taken by students. In this investigation, students’ mean reported distance learning experience was 3.53 ($SD = 1.20$). In this investigation, students’ reported distance learning experience ranged from “1–2 courses” to “10 or more courses.” Only 23% of the respondents in this investigation were within the experience level where the most significant gains in satisfaction were found by Arbaugh (2004).

Post-hoc analysis revealed that for this investigation there was a significant negative correlation between age and student satisfaction ($r = -.35, p = .05$). This finding differs from that of Billings et al. (2001) who found older students (between 40–49 and more than 50 years of age) were more satisfied with online nursing courses than were younger students (20–29 years of age) and Wyatt (2005) who found that older students rated the quality of online instruction higher than younger students, yet the older students expressed no significant difference from younger students when rating how satisfied they were with the online courses they had taken. In this investigation there was no significant relationship identified between gender, computer experience, and participants' satisfaction with, or performance in the online courses studied.

Overall students in this investigation indicated that they were satisfied with the online courses. Approximately 89% of the participants indicated that they were satisfied to extremely satisfied, while 11% of participants indicated that they were less than satisfied. The satisfaction ratings may be affected by a non-response bias. It could be that some students who were not satisfied with the courses choose not to participate in the study. Another consideration is that only students who completed at least one of the courses involved in the study were surveyed; although high attrition rates did not appear to be contributing factor in this study. The average rate of attrition for the online courses investigated was 10%.

General conclusions related to the specific hypotheses tested in this investigation are that course structure-dialogue was a significant predictor of students' satisfaction with the online courses investigated, course structure-dialogue was negatively correlated with students' impact scores indicating that technology related problems had less effect on

students' learning experiences in these online courses when the course structure met students' needs and the amount of dialogue within the course was sufficient. Other findings of significance indicate that most of the students were satisfied with the online courses, although a significant negative correlation between students' age and satisfaction was identified in this investigation.

Implications

This section contains the implications of the research. This study has important implications for faculty teaching courses online, instructional designers, and for the Allied Health Program involved in this investigation.

Course structure-dialogue was found to be a significant predictor of students' satisfaction in the online courses involved in this investigation. Course structure-dialogue was also found to have an inverse relationship to impact score. These findings have implications for instructors who teach online courses and who may also serve as instructional designers. Attention needs to be paid to course structure to ensure that it is appropriate, well-organized, and flexible enough to meet learners' needs.

A positive, statistically significant relationship was identified between students' satisfaction and their perception of the level of dialogue with the course instructor and with other students in the course. This finding suggests that dialogue with the instructor and with other students was an important consideration in students' satisfaction with the online courses studied. This study did not differentiate between planned dialogue (as Calvin (2005) did) and unplanned dialogue; rather it evaluated students' perception of the adequacy of the dialogue within their online courses. The results of this study suggest

that dialogue is positively related to student satisfaction, so planning opportunities for dialogue seems appropriate.

Course structure-dialogue was inversely related to students' impact scores indicating that technology related problems had less effect on students' learning experience in these online courses when the course structure met students' needs and the level of dialogue within the course was sufficient. Designing courses with appropriate structure and adequate dialogue may help to minimize the detrimental effect of technology related problems on students' learning and also increase student satisfaction.

In reviewing the student attributes (i.e., learner autonomy, self-efficacy for online technology, distance learning experience) that were not found to be significant in predicting student satisfaction in this investigation, it is important to note that students' satisfaction was largely predicted not by what the students brought to the courses in terms of learner attributes, but by variables influenced by faculty/instructional designers. These findings suggest that faculty and instructional designers play an important role in the online learning environment through instructional design and dialogue in online courses.

Suggested Further Research

The sample size of this study ($N = 47$) was a limiting factor. Future investigations should include multiple programs at a single institution or multiple institutions increasing the likelihood of obtaining a larger sample. This will increase the power of the statistical tests. Increasing the power of the statistical tests may result in detection of relationships not identified in this investigation.

In this investigation several students completed some, but not all of the instruments included in this study. Only 62 participants completed at least one of the research instruments associated with this study and the informed consent form. A number of participants completed the informed consent and LCDLE questionnaire but failed to complete the LAP-SF instrument. Several students involved in this investigation reported that they experienced technical difficulty accessing with the LAP-SF instrument. Those who sought technical assistance were helped by Human Resource Development Enterprise technical support staff, but there may have been others who never sought a solution once a problem occurred. Some students also stopped participating at various steps in the LAP-SF registration process. Students were required to access the Human Resource Development Enterprise's web site with an initial password and then after completing their initial registration, information was sent to them via email, so that they could then return to the site to complete the LAP-SF. This multi-step process, although common to many online survey sites, may have contributed to the lower response rate for the LAP-SF. Future research might explore the possibility of having all research instruments utilize single login access.

Measurement of online technology self efficacy and the learner autonomy constructs only once over a varying period of time may have affected the results of this study. To account for changes in these learner attributes, future investigations could measure these attributes prior to the start of the courses being investigated and then again near the end of the courses.

Gorsky and Caspi (2005), after a review of empirical research on transactional distance, state that dialogue is the only important factor affecting transactional distance—

that increasing dialogue decreases transactional distance and decreasing dialogue increases transactional distance. This investigation did not measure transactional distance, but did find a relationship between course structure-dialogue and student satisfaction. Further research is necessary to determine if course structure as well as dialogue is an important factor in determining transactional distance.

This study found a significant negative relationship between age and student satisfaction in the online courses studied. Further research is necessary to determine if this relationship between age and student satisfaction is noted in additional courses within this Allied Health Program, or in other online courses and programs. An investigation including a larger sample would be useful to determine if the negative relationship between age and satisfaction with the online courses is characteristic of students within a particular age group and to see if this relationship exists independent of students' distance learning experience.

This investigation also identified a significant negative correlation between the detrimental effects of technology related problems on students' learning experience and course structure-dialogue in the online courses. Further research is needed to see if this relationship exists with other student populations enrolled in other online courses.

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APPENDICES

APPENDIX A

HUMAN SUBJECTS APPROVAL



Office of Research Services and Sponsored Programs

Akron, OH 44325-2102
(330) 972-7666 Office
(330) 972-6281 Fax

January 2, 2006

Salvatore Sanders
Department of Health Professions
Youngstown State University
1 University Plaza
Youngstown, Ohio 44555

Mr. Sanders:

The University of Akron's Institutional Review Board for the Protection of Human Subjects (IRB) completed a review of the protocol entitled "*Effect of Self-Efficacy, Prior Distance Learning Experience and Course Structure on Student Performance and Satisfaction in On-Line Environments*". The IRB application number assigned to this project is **20051220**.

The protocol was reviewed on December 21, 2005 and qualified for exemption from continuing IRB review. The protocol represents minimal risk to subjects and matches the following federal category for exemption:

(2) Research involving the use of educational tests (cognitive, diagnostic, aptitude, achievement), survey procedures, interview procedures or observation of public behavior, unless: (i) information is recorded in such a manner that subjects can be identified, directly or through identifiers linked to subjects; AND (ii) any disclosure of responses outside the research could reasonably place the subjects at risk of civil or criminal liability or be damaging to subjects' financial standing, employability or reputation

Enclosed is a copy of the informed consent document, which the IRB has approved for your use in this research. In addition, your request for a waiver of documentation of informed consent for some subjects, as permitted under 45 CFR 46.117(c), is also approved.

Annual continuation applications are not required for exempt projects. If you make any changes or modifications to the study's design or procedures that either increase the risk to subjects or include activities that do not fall within one of the categories exempted from the regulations, please contact the IRB first, to discuss whether or not a request for change must be submitted. Any such changes or modifications must be reviewed and approved by the IRB prior to their implementation.

Please retain this letter for your files. If the research is being conducted for a master's thesis or doctoral dissertation, the student must file a copy of this letter with the thesis or dissertation.

Sincerely,

Sharon McWhorter
Associate Director

Cc: John Hirschbuhl, Advisor
Phil Allen, IRB Chair

APPENDIX B

INTRODUCTION AND INSTRUCTIONS

Introduction and Instructions

I am interested in exploring the role that learner characteristics (such as self-efficacy: indicated by your level of confidence in performing certain tasks; autonomy and online learning experience), and course structure play in your performance and satisfaction with online courses at Youngstown State University.

Participants wishing to participate in this study will be given the opportunity to complete two surveys. [The Learner Characteristics and Distance Learning Questionnaire](#) and the [Learner Autonomy Profile \(LAP\)](#).

- The Learner Characteristics and Distance Learning Experience Questionnaire, will request information related to the learner characteristics I described above as well as demographic information such as age, sex, class rank, etc. This survey will take most participants approximately 40 minutes to complete. The Distance Learning Experience items of this questionnaire will be repeated for each course included in this study. So you will be requested to repeat this portion of the questionnaire multiple times if you participated in more than one course involved in this study.
- The Learner Autonomy Profile (LAP) provided by Human Resource Development Enterprises (HRDE) is a 66 item survey that will take most participants approximately 11 minutes to complete.

Getting Started:

Step 1.	<p>Read the informed consent agreement and indicate if you wish to participate in this study.</p> <p>Availability: October 10, 2005 12:05am - October 30, 2005 11:55pm</p>
Step 2.	<p>Complete the Learner Characteristics and Distance Learning Experience Questionnaire.</p> <p>Availability: October 10, 2005 12:05am - October 30, 2005 11:55pm</p>
Step 2. Continued	<p>Complete the Distance Learning Course Experience Survey for each course you participated in.</p> <p>Summer 2005 Courses: Availability: October 10, 2005 12:05am - October 30, 2005 11:55pm</p> <p>Fall 2005 Courses: Availability: November 28, 2005 12:05am - December 18, 2005 11:55pm</p>
Step 3.	<p>Complete the Learner Autonomy Profile (LAP). A link to this online instrument will be provided from this Web site.</p> <p>Availability: October 10, 2005 12:05am - January, 12, 2006 11:55pm</p>

Please go to <http://webcourses.yosu.edu> and login to myWebCT. From here you can click on the link, **Instructional_Technology_Survey_Sanders**, to enter the site designed for this research project.

Thank you for taking the time and making the effort to help me with this research project. As an incentive and a way of thanking those participating in this study all participants who complete the survey instruments described above by December 18, 2005 will be entered into a drawing from which one (1) randomly selected participant will receive a YSU Bookstore Gift Card (Gift card valued at \$100). Your participation and willingness to share your experiences in an online learning environment will help to further our knowledge about the students we serve and our knowledge of online learning at Youngstown State University.

Thank you for your time and your participation in this research project.

Sal Sanders

If you have questions regarding the surveys or any aspect of this research project please contact:

Sal Sanders, Principle Investigator

Phone: 330.941.7157

e-Mail: [sasanders@ysu.edu](mailto:sanders@ysu.edu)

Youngstown State University

1 University Plaza

Youngstown, OH 44555

or

Dr. Edward Orona, Director

Grants and Sponsored Programs

Phone: 330.941.2377

e-Mail: eorona@ysu.edu

Youngstown State University

1 University Plaza

Youngstown, OH 44555

APPENDIX C
INFORMED CONSENT

Step 1 - Informed Consent - Please read and respond to this information to gain access to the surveys.

Name: [Salvatore Sanders \(Preview\)](#)
Start time: [January 14, 2006 5:35pm](#)
Number of questions: 1

[Finish](#) [Help](#)

Question 1 ⋮ (1 point)

Informed Consent for Learners

I am interested in exploring the role that learner characteristics (such as self-efficacy: indicated by your level of confidence in performing certain tasks; autonomy and online learning experience), and course structure play in your performance and satisfaction with online courses at Youngstown State University. Participants wishing to participate in this study will be given the opportunity to complete two survey instruments.
The Learner Characteristics and Distance Learning Experience Questionnaire will request information related to the learner characteristics and distance learning experience. This survey will take most participants approximately 40 minutes to complete. Participants will be asked to complete the student course experience section (16 items) of this questionnaire for each online course taken. This section will take most participants approximately 12 minutes to complete.
The Learner Autonomy Profile (LAP) provided by Human Resource Development Enterprises (HRDE) is available online at: (http://www.hrden enterprises.com/inventory.html). This survey will take most participants approximately 11 minutes to complete.
Participant's grades for allied health courses taken online during the spring, summer and fall semesters will be utilized to determine if there is a relationship among student performance in the course(s), learner characteristics and the structure of the course. Individual student grades will not be revealed in the results.

Your participation in this study is totally voluntary and you may withdraw at any time without negative consequences. If you wish to withdraw at any time during the study, simply provide a written request to withdraw from the study to Sal Sanders. The results of the survey instruments are linked to identifiers. Procedures will be followed to ensure that your results and information related to this research remain confidential. Faculty members teaching the courses evaluated will not have access to individual student responses or identifying information. Results of this study will be reported without identifying information, so that individual participants remain anonymous.

Thank you for taking the time and making the effort to help me with this research project. As an incentive and a way of thanking those participating in this study, all participants who complete the two survey instruments described above by December 18, 2005 will be entered into a drawing from which one (1) randomly selected participant will receive a \$100 YSU Bookstore Gift Card.

Your participation and willingness to share your online learning experience will help to further our knowledge about the students we serve and our knowledge of online learning at Youngstown State University.

If you have questions regarding the surveys or any aspect of this research project please contact: Sal Sanders - Principle Investigator Phone: 330.941.7157 e-Mail: sasanders@ysu.edu Youngstown State University 1 University Plaza Youngstown, OH 44555

OR

Dr. Edward Orona, Director Grants and Sponsored Programs Phone: 330.941.2377 e-Mail: eorona@ysu.edu Youngstown State University 1 University Plaza Youngstown, OH 44555

Links to the survey instruments will be available to participants who click on the radio button below indicating that they have read this informed consent and agree to participate in this study. Please print a copy of this informed consent form for your records.

- a. I have read the above informed consent form and agree to voluntarily participate in the research study described. I am 18 years of age or older. Note: Proceeding to complete the survey instrument(s) indicates implied consent with the above statement.
- b. I have read the above informed consent form and do not agree to voluntarily participate in the research study described. Note: Proceeding to complete the survey instrument(s) indicates implied consent with the above statement.

[Save answer](#)

APPENDIX D

INFORMED CONSENT FOR LEARNER AUTONOMY PROFILE-SHORT FORM (LAP-SF)

LAP-SF Informed Consent

Please read and acknowledge the following Statement of Informed Consent

1. I understand that the responses I will provide when I complete this survey will only be used/reported in summary form. After completion of the research study that directed me to the LAP, no part of the data will be attributed to me in any form except as a confidential Learner Autonomy Profile report that will be sent to me only if I request it.
2. I understand that I am not required to participate in this study and that I may decide not to complete the survey at any time.
3. I understand that if I do not complete the entire survey, none of the responses I have submitted will be used for any purpose by the researchers.
4. I understand that I am providing my e-mail address so the researchers can notify me that this registration has been properly completed and so I may receive a confidential Learner Autonomy Profile report, if I request one. This information will be removed from the database as soon as and the research study that directed me to the LAP is completed.
5. I understand that once I have submitted my responses to the LAP, and the research study that directed me to the LAP is completed, my e-mail address will be removed from the HRDE database.

Please indicate that you have read and understand the above statements by **checking the box to the right**

Submit

Clear

APPENDIX E

COMMUNICATIONS WITH RESEARCHERS

From: Sal Sanders [sasander@cc.yzu.edu]
Sent: Wednesday, August 03, 2005 12:12 PM
To: 'william.lan@ttu.edu'
Subject: Request for permission
Attachments: Sal Sanders (sasanders@ysu.edu).vcf

Dr. Lan,

I am conducting research on factors related to student satisfaction in online learning environments. I have read your article entitled: An examination of the relationship between technology problems and teaching evaluation of online instruction which appeared in The Internet and Higher Education 6 (2003). I would like your permission to adapt your survey items in part II of your survey for use in my study.

Please let me know if I may have your permission to do so.

Sal Sanders
Assistant Professor
Director, BSAS in Allied Health Program
Director, Distance Learning - Bitonte College of Health & Human Services
Youngstown State University
<http://bchhs.yzu.edu/dhp/ahlth/>

From: Lan, William [WILLIAM.LAN@ttu.edu]
Sent: Wednesday, August 03, 2005 12:18 PM
To: sasanders@ysu.edu
Subject: RE: Request for permission

You have my permission to use the instrument. Thank you.
Wm

From: Gary Confessore [garyc@hrdenterprises.com]
Sent: Wednesday, August 10, 2005 8:08 AM
To: sasanders@ysu.edu
Subject: RE: Research request
Page 1 of 4
12/11/2005

Sal:

As you move along in your studies, don't hesitate to stay in touch. If the LAP turns out to be right for your work, we'll be delighted. If not, try to keep us in the loop regarding your work with adult learners in distance learning environments.

Be well,
Don Gary

From: Sal Sanders [sasander@cc.yzu.edu]
Sent: Thursday, October 06, 2005 11:54 AM
To: 'kswan@kent.edu'
Subject: Request to paraphrase

Dr. Swan,

I truly enjoyed speaking with you this morning. As I mentioned I am a doctoral student at The University of Akron in Akron, Ohio. I am interested in the effect of various learner attributes, and course structure on learner performance and satisfaction in online courses. I am writing to request your permission to create items similar to those you used to evaluate satisfaction in the article you published: Swan, K. (2001). Virtual interaction: Design factors affecting student satisfaction and perceived learning in asynchronous online courses. *Distance Education*, 22(2), 306-331.

Specifically I want to create similar items to those you used to evaluate student satisfaction with the course, the instructor and classmates. I plan to deliver the items online and they would be along the lines of the three items that follow.

17. Overall how satisfied are you with the online course specified above? [Click the radio button that best represents your choice].

Extremely satisfied
Very satisfied
Satisfied
Somewhat satisfied
Not satisfied at all

18. How would you rate the level of interaction/dialogue you had with the instructor of the online course specified above? [Click the radio button that best represents your choice].

More than adequate
Adequate
Less than adequate
Non-existent

19. How would you rate the level of interaction/dialogue you had with other students in the online course specified above? [Click the radio button that best represents your choice].

More than adequate

Adequate

Less than adequate

Non-existent

I appreciate your suggestions on other resources to include in my study.

Thank you for your consideration.

Enjoy the day!

Sal Sanders

Assistant Professor

Director, BSAS in Allied Health Program

Director, Distance Learning - Bitonte College of Health & Human Services

Youngstown State University

Phone: 330.941.7157

Fax: 330.941.2921

<http://bchhs.ysu.edu/dhp/ahlth/>

From: kswan@kent.edu
Sent: Thursday, October 06, 2005 12:12 PM
To: sasanders@ysu.edu
Subject: Re: Request to paraphrase

Hi Sal,

It was great talking with you too.

You definitely have my permission to paraphrase the items you mention from the SLN surveys. I look forward to your work in this area. Good luck with the research.

Karen Swan
201 Moulton Hall
Research Center for Educational Technology
Kent State University
Kent, OH 44242
330-672-3317; FAX 330-672-5834

From: Sal Sanders [sasander@cc.yzu.edu]
Sent: Friday, August 12, 2005 4:06 PM
To: 'hmhuang@ntit.edu.tw'
Subject: Permission to use

Dr. Huang,

I am a doctoral student at The University of Akron in Akron, Ohio. I am interested in the role of course structure and learner autonomy in online learning environments. I am working on my dissertation and plan to investigate the relationship of learners' self-efficacy for online learning, autonomy for learning and course structure. I am writing to request your permission to use the course structure items you published in the International Journal of Instructional Media Vol. 29(4), 2002.

Thank you for your consideration.

Enjoy the day!

Sal Sanders

Assistant Professor

Director, BSAS in Allied Health Program

Director, Distance Learning - Bitonte College of Health & Human Services

Youngstown State University

Phone: 330.941.7157

Fax: 330.941.2921

<http://bchhs.yzu.edu/dhp/ahlth/>

From: hmhuang [hmhuang@ntit.edu.tw]
Sent: Thursday, September 01, 2005 11:42 PM
To: sasanders@ysu.edu
Subject: Re: Permission to use

Dear Dr. Sanders,

I am so pleased that you are interested in my paper. Of course, if you think that the questionnaire is helpful for your research, you can use it.

Sincerely yours,

黃秀美(Hsiu-Mei Huang)

教授(Professor)

管理科學系(Department of Management Science)

臺中技術學院(National Taichung Institute of Technology)

台中市三民路三段129號

Tel: 04-22196322

Fax:04-22196321

e-Mail:hmhuang@ntit.edu.tw

====Mailed via NTIT(台中技術學院)====

APPENDIX F

LEARNER CHARACTERISTICS AND DISTANCE LEARNING EXPERIENCE QUESTIONNAIRE—PART 1

Learner Characteristics and Distance Learning Experience Questionnaire - Part 1

Question 1

Gender: Select only one. [Click the radio button that best represents your choice].

a. Female

b. Male

Question 2

Age: Please enter your age (in years) in the field provided.

Question 3

Education: Please enter the number of years completed in the field provided

Question 4 ⋮

What is your class rank? [Click the radio button that best represents your choice].

- a. Freshman
- b. Sophomore
- c. Junior
- d. Senior
- e. Graduate Student
- f. Post Graduate

Question 5 ⋮

What is your major? [Please enter your major in the field provided].

Question 6 ⋮

How many online (Web-based) distance learning courses have you participated in that utilize online (Web-based) tools such as email, discussions, quizzes, grade reporting, etc. Consider all courses using Web-based tools (e.g. WebCT) in which 70% or more of the course was completed online. [Click the radio button that best represents your choice].

- a. 0
- b. 1-2
- c. 3-4
- d. 5-6
- e. 7-9
- f. 10 or more courses

Question 7 ⋮

How many courses have you participated in that utilize online (Web-based) tools such as email, discussions, quizzes, grade reporting, etc. Consider all courses using Web-based tools (for example WebCT) to supplement class sessions delivered face to

face or using interactive video as well as completely online courses. [Click the radio button that best represents your choice].

- a. 0
- b. 1-2
- c. 3-4
- d. 5-6
- e. 7-9
- f. 10 or more courses

Question 8 ⋮

What is your main reason for taking online (Web-based) courses? [Please enter your response in the field provided]

Question 9 ⋮

What is important to your satisfaction in a course being offered online? [Please enter your response in the field provided].

Question 10 ⋮

Computer experience: How many years have you used a computer? [Please enter your response in the field provided].

Question 11 ⋮

Computer experience: Approximately how many hours each week do you typically use a computer? [Please enter your response in the field provided].

Question 12 ⋮

Internet Experience: How many years have you accessed/used the Internet or World Wide Web? [Please enter your response in the field provided].

Question 13 ⋮

Internet experience: Approximately how many hours each week do you typically access/use the Internet or World Wide Web? [Please enter your response in the field provided].

Question 14 ⋮

Overall how satisfied are you with the Allied Health online courses you have taken during the summer and fall semester(s) of 2005? [Click the radio button that best represents your choice].

- a. Extremely satisfied
- b. Very satisfied
- c. Satisfied
- d. Somewhat satisfied
- e. Not satisfied at all

Online Technologies Self- Efficacy Scale

The following questions ask how confident you feel with using online technologies (such as Internet, email, etc.) in order to succeed in an online course. If you do not have computer experience, just complete the questionnaire to the best of your knowledge. DO NOT WORRY! Remember that each question begins with the statement "I feel confident..." performing an activity, and not "I have done it before." It does not matter whether you have had experience with the activity described. We would like to find out what your perceptions are performing the activities described. There are no right or wrong answers, just answer the questions as accurately as possible.

For each of the following items please indicate your level of confidence with the statements below by clicking the radio button from "Very Confident" to Not Confident At All". If you do not know what a statement means, choose "Not Confident At All".

Items 15-43 are adapted from M. Miltiadou. Computer-Mediated Communication in the Online Classroom, 7(4) (2001) 407–419. Used with permission of the author.

A) (Items 15-23) Questions about using the Internet (Internet Competencies)

Question 15

I would feel confident opening a web browser (e.g. Netscape or Explorer)

- a. Very Confident
- b. Somewhat Confident
- c. Not Very Confident
- d. Not Confident At All

Question 16 ⋮

I would feel confident reading text from a web site

- a. Very Confident
- b. Somewhat Confident
- c. Not Very Confident
- d. Not Confident At All

Question 17 ⋮

I would feel confident clicking on a link to visit a specific web site

- a. Very Confident
- b. Somewhat Confident
- c. Not Very Confident
- d. Not Confident At All

Question 18 ⋮

I would feel confident accessing a specific web site by typing the address (URL)

- a. Very Confident
- b. Somewhat Confident
- c. Not Very Confident
- d. Not Confident At All

Question 19 ⋮

I would feel confident bookmarking a web site

- a. Very Confident
- b. Somewhat Confident
- c. Not Very Confident
- d. Not Confident At All

Question 20 ⋮

I would feel confident printing a web site

- a. Very Confident
- b. Somewhat Confident
- c. Not Very Confident
- d. Not Confident At All

Question 21 ⋮

I would feel confident conducting an Internet search using one or more key words

- a. Very Confident
- b. Somewhat Confident
- c. Not Very Confident
- d. Not Confident At All

Question 22 ⋮

I would feel confident downloading (saving) an image from a web site to a disk

- a. Very Confident
- b. Somewhat Confident
- c. Not Very Confident
- d. Not Confident At All

Question 23 ⋮

I would feel confident copying a block of text from a web site and pasting it to a document in a word processor

- a. Very Confident
- b. Somewhat Confident
- c. Not Very Confident
- d. Not Confident At All

B) (Items 24-27) Questions about chatting “live” via a synchronous chat system such as Chat within WebCT (some people call it Synchronous Interaction).

Question 24 I would feel confident providing a nickname within a synchronous chat system (if necessary)

- a. Very Confident
- b. Somewhat Confident

- c. Not Very Confident
- d. Not Confident At All

Question 25 ⋮

I would feel confident reading messages from one or more members of the synchronous chat system

- a. Very Confident
- b. Somewhat Confident
- c. Not Very Confident
- d. Not Confident At All

Question 26 ⋮

I would feel confident answering a message or providing my own message in a synchronous chat system (one-to-many interaction)

- a. Very Confident
- b. Somewhat Confident
- c. Not Very Confident
- d. Not Confident At All

Question 27 ⋮

I would feel confident interacting privately with one member of the synchronous chat system (one-to-one interaction)

- a. Very Confident
- b. Somewhat Confident
- c. Not Very Confident
- d. Not Confident At All

C) (Items 28-36) Questions about using an e-mail system such as YSU CUE Mail, or e-mail within WebCT to communicate with friends, instructors, or other students who are not online at the same time (Asynchronous Interaction I).

Question 28

I would feel confident logging on and off an email system.

- a. Very Confident
- b. Somewhat Confident
- c. Not Very Confident
- d. Not Confident At All

Question 29 ⋮

I would feel confident sending an email message to a specific person (one-to-one interaction)

- a. Very Confident
- b. Somewhat Confident
- c. Not Very Confident
- d. Not Confident At All

Question 30 ⋮

I would feel confident sending an e-mail message to more than one person at the same time (Courtesy copy or one-to-many interaction)

- a. Very Confident
- b. Somewhat Confident
- c. Not Very Confident
- d. Not Confident At All

Question 31 ⋮

I would feel confident replying to an e-mail message

- a. Very Confident
- b. Somewhat Confident
- c. Not Very Confident
- d. Not Confident At All

Question 32 ⋮

I would feel confident forwarding an e-mail message

- a. Very Confident
- b. Somewhat Confident
- c. Not Very Confident
- d. Not Confident At All

Question 33 ⋮

I would feel confident deleting messages received via e-mail

- a. Very Confident
- b. Somewhat Confident
- c. Not Very Confident
- d. Not Confident At All

Question 34 ⋮

I would feel confident creating an address book

- a. Very Confident
- b. Somewhat Confident
- c. Not Very Confident
- d. Not Confident At All

Question 35 ⋮

I would feel confident saving a file attached to an email message to a local disk and then viewing the contents of that file.

- a. Very Confident
- b. Somewhat Confident
- c. Not Very Confident
- d. Not Confident At All

Question 36 ⋮

I would feel confident attaching a file (image or text) to an email message and then sending it off

- a. Very Confident
- b. Somewhat Confident
- c. Not Very Confident
- d. Not Confident At All

D) (Items 37-43) Questions about posting a message to a newsgroup, a bulletin board or the discussion board of a conferencing system (such as WebCT) where participants are not online at the same time (Asynchronous Interaction II)

Question 37

I would feel confident signing on and off an asynchronous conferencing system

- a. Very Confident
- b. Somewhat Confident
- c. Not Very Confident
- d. Not Confident At All

Question 38 ⋮

I would feel confident posting a new message to an asynchronous conferencing system (creating a new thread)

- a. Very Confident
- b. Somewhat Confident
- c. Not Very Confident
- d. Not Confident At All

Question 39 ⋮

I would feel confident reading a message posted to an asynchronous conferencing system

- a. Very Confident

- b. Somewhat Confident
- c. Not Very Confident
- d. Not Confident At All

Question 40 ⋮

I would feel confident replying to a message posted to an asynchronous conferencing system so that all members can view it (reply to all)

- a. Very Confident
- b. Somewhat Confident
- c. Not Very Confident
- d. Not Confident At All

Question 41 ⋮

I would feel confident replying to a message posted to an asynchronous conferencing system so that only one member can view it (reply privately or reply to sender)

- a. Very Confident
- b. Somewhat Confident
- c. Not Very Confident
- d. Not Confident At All

Question 42 ⋮

I would feel confident downloading (saving) a file from an asynchronous conferencing system to a local disk

- a. Very Confident
- b. Somewhat Confident
- c. Not Very Confident
- d. Not Confident At All

Question 43 ⋮

I would feel confident uploading (sending/posting an attachment) a file to an asynchronous conferencing system

- a. Very Confident
- b. Somewhat Confident
- c. Not Very Confident
- d. Not Confident At All

APPENDIX G

LEARNER CHARACTERISTICS AND DISTANCE LEARNING EXPERIENCE QUESTIONNAIRE—PART 2

Learner Characteristics and Distance Learning Experience Questionnaire - Part 2

.....

Please share your learning experience in the following online course:
Course Department and Catalog Number - Course Code XXXX – Course Title- Fall
2005

Note: If you participated in multiple online courses during the summer and fall
semesters of 2005 you will have the opportunity to complete this survey for each
course. For each of the following items click the radio button that best represents
your choice.

Items 1-16 are adapted from W. Lan et al. Internet and Higher Education. 6 (2003)
365-375. Used with permission of the author.

Question 1

I experienced problems with e-mailing the instructor or other students

- a. Always
- b. Often
- c. Sometimes
- d. Never
- e. Not applicable

Question 2

Problems I encountered e-mailing the instructor or other students hindered my
learning

- a. Very much
- b. Sometimes
- c. Very little
- d. Not at all
- e. Not applicable

Question 3 ⋮

I experienced problems accessing web sites

- a. Always
- b. Often
- c. Sometimes
- d. Never
- e. Not applicable

Question 4 ⋮

Problems I encountered accessing web sites hindered my learning

- a. Very much
- b. Sometimes
- c. Very little
- d. Not at all
- e. Not applicable

Question 5 ⋮

I experienced problems using chat rooms (synchronous time)

- a. Always
- b. Often
- c. Sometimes

- d. Never
- e. Not applicable

Question 6 ⋮

Problems I encountered using chat rooms (synchronous time) hindered my learning

- a. Very much
- b. Sometimes
- c. Very little
- d. Not at all
- e. Not applicable

Question 7 ⋮

I experienced problems discussing (asynchronous time)

- a. Always
- b. Often
- c. Sometimes
- d. Never
- e. Not applicable

Question 8 ⋮

Problems I encountered discussing (asynchronous time) hindered my learning

- a. Very much
- b. Sometimes
- c. Very little
- d. Not at all
- e. Not applicable

Question 9 ⋮

I experienced problems taking tests or quizzes

- a. Always
- b. Often
- c. Sometimes
- d. Never
- e. Not applicable

Question 10 ⋮

Problems I encountered taking tests or quizzes hindered my learning

- a. Very much
- b. Sometimes
- c. Very little
- d. Not at all
- e. Not applicable

Question 11 ⋮

I experienced problems submitting homework/assignments

- a. Always
- b. Often
- c. Sometimes
- d. Never
- e. Not applicable

Question 12 ⋮

Problems I encountered submitting homework/assignments hindered my learning

- a. Very much
- b. Sometimes

- c. Very little
- d. Not at all
- e. Not applicable

Question 13 ⋮

I experienced problems accessing other course resources

- a. Always
- b. Often
- c. Sometimes
- d. Never
- e. Not applicable

Question 14 ⋮

Problems I encountered accessing other course resources hindered my learning

- a. Very much
- b. Sometimes
- c. Very little
- d. Not at all
- e. Not applicable

Question 15 ⋮

I experienced problems getting technology support when I had problems

- a. Always
- b. Often
- c. Sometimes
- d. Never
- e. Not applicable

Question 16 ⋮

Problems I encountered getting technology support when I had problems hindered my learning

- a. Very much
- b. Sometimes
- c. Very little
- d. Not at all
- e. Not applicable

Items 17-19 are adapted from Swan, Karen. Virtual Interaction: design factors affecting student satisfaction and perceived learning in asynchronous online courses. Vol. 22, issue 2. (2001) 306-331.

Question 17

Overall how satisfied are you with the online course specified above? [Click the radio button that best represents your choice].

- a. Extremely satisfied
- b. Very satisfied
- c. Satisfied
- d. Somewhat satisfied
- e. Not satisfied at all

Question 18 ⋮

How would you rate the level of interaction/dialogue you had with the instructor of the online course specified above? [Click the radio button that best represents your choice].

- a. More than adequate
- b. Adequate
- c. Less than adequate
- d. Non-existent

Question 19 ⋮

How would you rate the level of interaction/dialogue you had with other students in the online course specified above? [Click the radio button that best represents your choice].

- a. More than adequate
- b. Adequate
- c. Less than adequate
- d. Non-existent

Please rate your perception of the online course by rating each of the following items using the scale below. Items 20-26 are adapted from H. M. Huang. Student perceptions in an online mediated environment, 29(4) (2003) 405–421.

Course Organization

Question 20

I believe the online course syllabus is well presented.

- a. Strongly Agree
- b. Agree
- c. Disagree
- d. Strongly Disagree
- e. Not Applicable

Question 21

I believe the assignments are reasonable.

- a. Strongly Agree
- b. Agree
- c. Disagree
- d. Strongly Disagree
- e. Not Applicable

Question 22

I believe the grading criteria are clear.

- a. Strongly Agree
- b. Agree
- c. Disagree
- d. Strongly Disagree
- e. Not Applicable

Please rate your perception of the online course by rating each of the following items using the following scale.

Course Delivery ⋮

Question 23

I am able to access course materials at any time.

- a. Strongly Agree
- b. Agree
- c. Disagree
- d. Strongly Disagree
- e. Not Applicable

Question 24

I can actively participate in the learning process.

- a. Strongly Agree
- b. Agree
- c. Disagree
- d. Strongly Disagree
- e. Not Applicable

Question 25

I believe the course materials meet my needs.

- a. Strongly Agree
- b. Agree
- c. Disagree
- d. Strongly Disagree
- e. Not Applicable

Question 26

I believe the course meets my needs.

- a. Strongly Agree
- b. Agree
- c. Disagree
- d. Strongly Disagree
- e. Not Applicable

⋮

APPENDIX H

LEARNER AUTONOMY PROFILE-SHORT FORM

LAP Short Form 66 items, estimated time to complete: 11 minutes

Instructions: Please read each question and mark on the slidebars a score that reflects **how often the item applies to you**. Your score can be any number on the scale from 0 to 10 including decimals (example, 2.75). A score of 0 means you will never perform the behavior. A score of 10 means you will always perform the behavior.

1. I will continue to participate in my learning activity even if a family problem interferes with the activity.
2. I will continue to learn because my past learning experiences are valuable to me.
3. When I have difficulty concentrating during a learning activity, I will concentrate harder because I anticipate the future reward.
4. When I am learning something that is not enjoyable, I will think of the eventual reward.
5. When faced with a difficult learning endeavor, I will structure my environment to make learning easier.
6. I see what needs to be done to make my plans work.
7. I will often choose to learn something when I am not involved in a structured learning project such as a class.
8. Even if it interferes with my social life, I will choose to learn something because I enjoy learning.
9. I will be successful in my learning endeavors because I assess my progress.
10. Before I begin a learning activity, I will try to anticipate problems that might interfere with my learning.
11. If a family problem interferes with my learning progress, then I will develop a solution to this problem so that I may continue with my learning.
12. If I want to learn something, I will plan how to get the required resources.

13. If I do not think that I have the resources to participate in my desired learning activity, then I will find a way to gather the resources for my learning activity.
14. I will engage in learning now if I anticipate a future reward from the learning.
15. I get help from my family when I need it.
16. If given the choice of learning something or playing, then I will choose to play in spite of the future reward.
17. I will usually choose other activities over learning.
18. If I want to learn something, then I will quickly translate this desire into action and not think too much about this desire before I act.
19. When I have difficulties learning something, I will carefully examine the consequences of my actions.
20. When I want to learn something, I will think about the possible results of my actions before making decisions.
21. If I establish a long range learning goal, then I will also establish intermediate sub-goals that, if accomplished, will support my ultimate learning goal.
22. I ask detailed questions before I begin any kind of task.
23. I get along with other people.
24. I feel valued.
25. If I take a break from participating in a learning activity, then I will motivate myself to resume the activity as soon as possible.
26. When I am faced with problems while learning something, I will find a solution in a systematic way.
27. If I do not feel like learning something new, then I think about the consequences of not learning.
28. I will discontinue participating in my learning activity if I think that I do not have the resources to successfully complete the activity.
29. When I become frustrated during a learning activity, I will remind myself of the consequences of quitting.
30. If I intend to learn something, then I will quickly translate this intention into action.
31. If there is more to be learned in a longer activity, then I will spend more time because I value learning.
32. My family encouraged me to find outside interests.

33. If I intend on learning something, then I will go to or create an environment that supports that learning.
34. I remain optimistic in the middle of difficult situations.
35. If I am required to learn something, then I will establish a learning goal to satisfy that requirement.
36. I can express my emotions to any family member.
37. I will persist with my primary learning goal although I have additional learning goals to achieve.
38. I can meet my goals by channeling my emotions.
39. I was encouraged to defend myself.
40. I will keep my learning goal my top priority although I have other important things to do.
41. I am generous.
42. If I desire to learn something, then I will wait for someone else to help me develop a plan to satisfy this desire before I begin a learning activity.
43. I am persistent in my efforts to succeed.
44. I was not criticized for having my own opinion about a family matter.
45. My family lived by a set of beliefs that made life very pleasant.
46. If I want to learn something, then I will motivate myself to create my own plan concerning how to satisfy this learning desire.
47. I will apply continued effort towards my learning goal when I know I am responsible for my learning.
48. I will maintain the effort needed to accomplish additional tasks related to my learning goal.
49. I will persist in participating in my learning activity even if I do not think that I have the time to participate.
50. I make choices that allow me to control my life.
51. I will usually choose other activities over learning if I am not required to learn something.
52. I will participate in learning difficult things because I believe that learning will improve my ability to learn other difficult things.
53. I will devise a plan to accomplish my learning goal.

54. Even if a learning activity is extremely difficult, I will endure because quitting is not an alternative for me.
55. I am willing to compromise.
56. I am organized.
57. If I do not think that my desired learning activity is as important as another non-learning activity, then I will figure out a way to prioritize my learning activity above the other non-learning activity.
58. I will manage my schedule to achieve my learning goal.
59. I will spend most of my time doing other things rather than learning.
60. I will continue to value learning that I do on my own.
61. I get plenty of what I need and want.
62. I will set a very specific learning goal to achieve.
63. If I desire to learn something, then I will establish a clear goal that represents specifically what I want to accomplish.
64. My family had traditions that we practiced.
65. My family gives me security and strength.
66. To reach a solution, I can separate my emotions from my problems.

APPENDIX I

TABLES

Table 1. Summary of Selected Research Involving Variables of Interest

(Author, Year)	INT	LA	SE	CS	D	Dependent or Criterion Variable
(Arbaugh & Duray, 2002)	-	-	-	S (+)	-	Perceived Satisfaction
	-	-	-	S (+)	-	Perceived Learning
(Calvin, 2005)	-	S (+)	-	N	*	Satisfaction with perceived learning
(Chen, 2001)	-	-	-	-	S (-)	Transactional Distance
(DeTure, 2004)	-	-	N	-	-	Final course grade
(Huang, 2002)	S (+)	-	-	-	-	LA, CS and D
(Lee & Witta, 2001)	-	-	S (-)	-	-	Final course grade
(C. K. Lim, 2001)	-	-	S (+)	-	-	Student Satisfaction
(Miltiadou, 2000)	-	-	S (-)	-	-	Grade on final project
(D. S. Stein et al., 2005)	-	-	-	S (+)	S (+)	Satisfaction with perceived knowledge gained
(Wang & Newlin, 2002b)	-	-	S (+)	-	-	Performance on final examination

Note. Learner Autonomy (LA), Self-Efficacy for technology/distance learning (SE), Course Structure/Flexibility (CS), Dialogue/Interaction (D) Interface (INT) Not Applicable (N/A)
 Not significant (N) Significant (S) Positive Relationship (+) Negative Relationship (-)
 *Planned interaction was evaluated as part of course structure

Table 2. Descriptive Statistics

Variable	<i>N</i>	Mean	Standard deviation	Skewness	Kurtosis
Age	47	31.02	9.15	1.34	1.50
Computer Experience (CE)	44	205.91	246.31	2.46	6.07
Online Technology Self-Efficacy (OTSE)	47	100.77	12.23	-1.13	.34
Course Structure Dialogue (CSD)	47	28.92	4.16	-.13	-.66
Desire to Learn (DL)	47	163.43	20.71	-1.14	2.91
Learner Resourcefulness (LR)	47	155.98	25.05	-.26	-.32
Learner Initiative (LI)	47	113.87	18.78	-.29	.23
Learner Persistence (LP)	47	76.09	11.11	-.88	.37
Impact Score (IS)	47	1.54	1.18	1.31	2.53
Distance Learning Experience (DLE)	47	3.53	1.20	.28	-.99
Student Performance (SP)	47	3.51	.92	-2.24	4.89
Student Satisfaction (SS)	47	3.72	1.02	-.53	-.30

Table 3. Intercorrelations Between Predictor and Criterion Variables

Variable	1	2	3	4	5	6	7	8	9	10
Participants ($N = 47$)										
1. OTSE	--	.23	-.03	.03	.17	.00	-.18	-.01	-.07	.08
2. CSD		--	.26	.30*	.34*	.22	-.37*	.04	.16	.83**
3. DL			--	.41**	.48**	.52**	-.33*	-.07	.03	.12
4. LR				--	.80**	.89**	-.14	.08	-.09	.16
5. LI					--	.83**	-.29*	.13	.06	.23
6. LP						--	-.15	.06	-.09	.12
7. IS							--	.00	-.08	-.23
8. DLE								--	.08	.05
9. SP									--	.17
10. SS										--

*Correlation is significant at the 0.05 level (2-tailed)

**Correlation is significant at the 0.01 level (2-tailed)

Table 4. Summary of Linear Regression for Variables Predicting Student Satisfaction – RH1 (N = 47)

Variable	B	SE B	β	p
Online Technology Self Efficacy (OTSE)	-.01	.01	-.13	.15
Course Structure Dialogue (CSD)	.22	.02	.89	.00*
Desire to Learn (DL)	-.01	.00	-.12	.16

Note. $R^2 = .71$ for the full model.

*p < .05

Table 5. Summary of Linear Regression for Variables Predicting Student Satisfaction—RH2 (N = 47)

Variable	B	SE B	β	p
Online Technology Self Efficacy (OTSE)	-.01	.01	-.12	.18
Course Structure Dialogue (CSD)	.22	.02	.88	.00*
Learner Resourcefulness (LR)	-.00	.00	-.09	.29

Note. $R^2 = .70$ for the full model.
* $p < .05$

Table 6. Summary of Linear Regression for Variables Predicting Student Satisfaction—RH3 (N = 47)

Variable	B	SE B	β	p
Online Technology Self Efficacy (OTSE)	-.01	.01	-.11	.21
Course Structure Dialogue (CSD)	.21	.02	.87	.00*
Learner Initiative (LI)	-.00	.01	-.05	.58

Note. $R^2 = .70$ for the full model.

* $p < .05$

Table 7. Summary of Linear Regression for Variables Predicting Student Satisfaction—RH4 (N = 47)

Variable	B	SE B	β	p
Online Technology Self Efficacy (OTSE)	-.01	.01	-.12	.18
Course Structure Dialogue (CSD)	.21	.02	.87	.00*
Learner Persistence (LP)	-.01	.01	-.08	.38

Note. $R^2 = .70$ for the full model.

* $p < .05$

Table 8. Summary of Linear Regression for Variables Predicting Student Satisfaction—RH9 (N = 47)

Variable	B	SE B	β	p
Distance Learning Experience (DLE)	.04	.13	.05	.74
Impact Score (IS)	-.20	.13	-.23	.13

Note. $R^2 = .06$ for the full model.
* $p < .05$

Table 9. Summary of Linear Regression for Variables Predicting Student Performance — RH5 (N = 47)

Variable	B	SE B	β	p
Online Technology Self Efficacy (OTSE)	-.01	.01	-.12	.45
Course Structure Dialogue (CSD)	.04	.04	.19	.24
Desire to Learn (DL)	-.00	.01	-.03	.87

Note. $R^2 = .04$ for the full model.

*p < .05

Table 10. Summary of Linear Regression for Variables Predicting Student Performance—RH6 (N = 47)

Variable	B	SE B	β	p
Online Technology Self Efficacy (OTSE)	-.01	.01	-.12	.43
Course Structure Dialogue (CSD)	.05	.04	.23	.15
Learner Resourcefulness (LR)	-.01	.01	-.15	.34

Note. $R^2 = .06$ for the full model.

* $p < .05$

Table 11. Summary of Linear Regression for Variables Predicting Student Performance—RH7 (N = 47)

Variable	B	SE B	β	p
Online Technology Self Efficacy (OTSE)	-.01	.01	-.12	.45
Course Structure Dialogue (CSD)	.04	.04	.18	.27
Learner Initiative (LI)	.00	.01	.02	.91

Note. $R^2 = .04$ for the full model.

* $p < .05$

Table 12. Summary of Linear Regression for Variables Predicting Student Performance—RH8 (N = 47)

Variable	B	SE B	β	p
Online Technology Self Efficacy (OTSE)	-.01	.01	-.12	.43
Course Structure Dialogue (CSD)	.05	.03	.22	.17
Learner Persistence (LP)	-.01	.01	-.13	.39

Note. $R^2 = .05$ for the full model.

* $p < .05$

Table 13. Intercorrelations Between Student Attributes and Criterion Variables

Variable	1	2	3	4	5
Participants (<i>N</i> = 47)					
Sex	--	.16	.01	.10	-.21
AGE		--	.11	-.02	-.35*
CE			--	.16	-.08
SP				--	.17
SS					--

*Correlation is significant at the 0.05 level (2-tailed)

APPENDIX J

FIGURES

Normal Q-Q Plot of Standardized Residuals

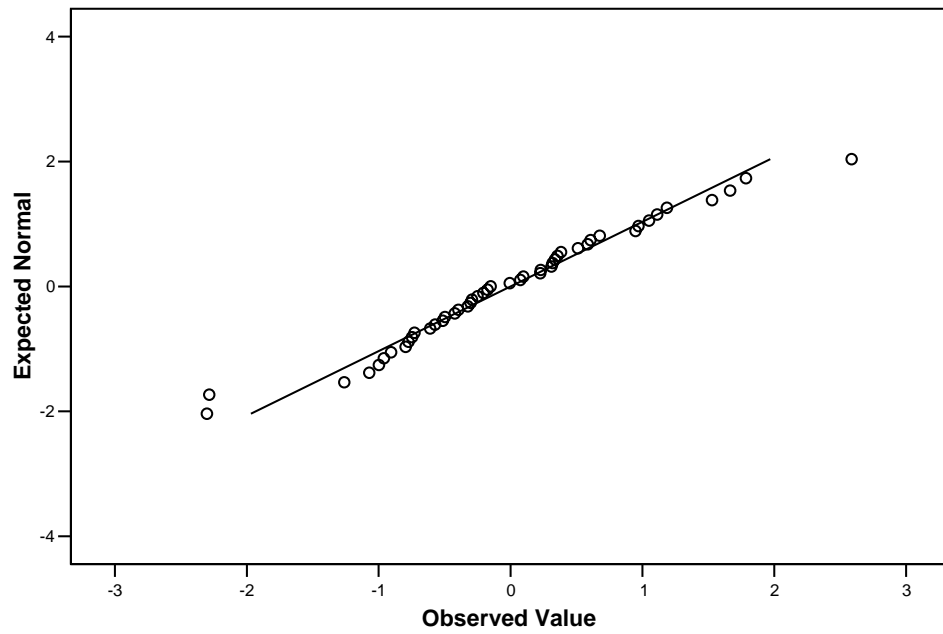


Figure 1. Q-Q Plot of the standardized residuals to check distribution of sample variables in the model for RH1

Normal Q-Q Plot of Standardized Residual

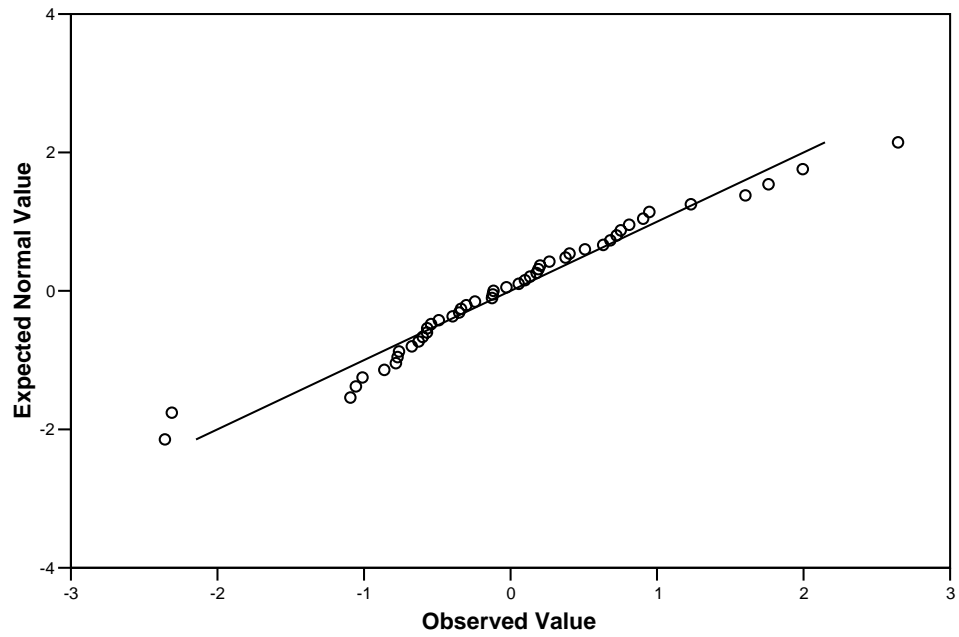


Figure 2. Q-Q Plot of the standardized residuals to check distribution of sample variables in the model for RH2

Normal Q-Q Plot of Standardized Residual

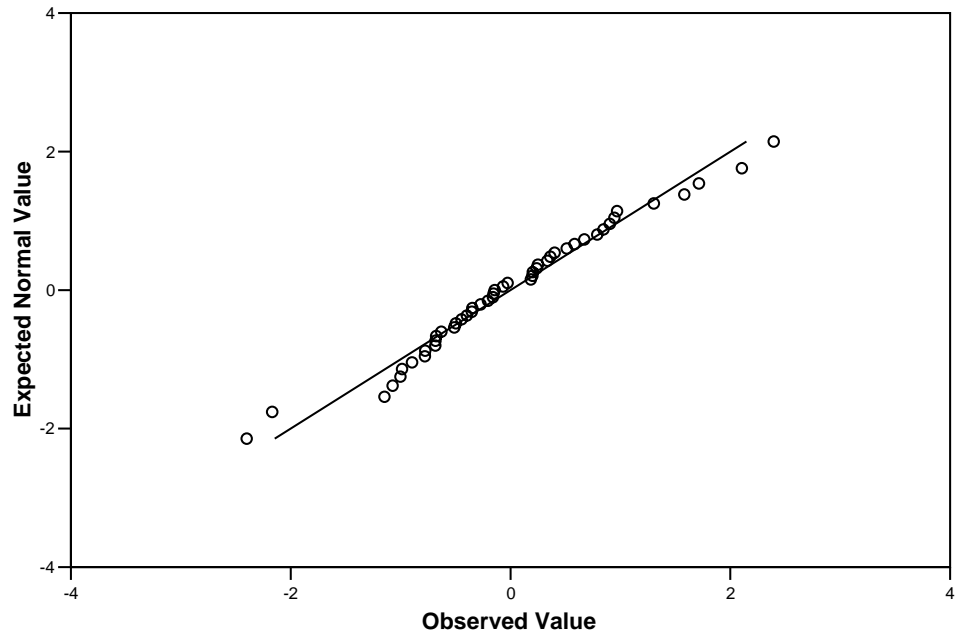


Figure 3. Q-Q Plot of the standardized residuals to check distribution of sample variables in the model for RH3

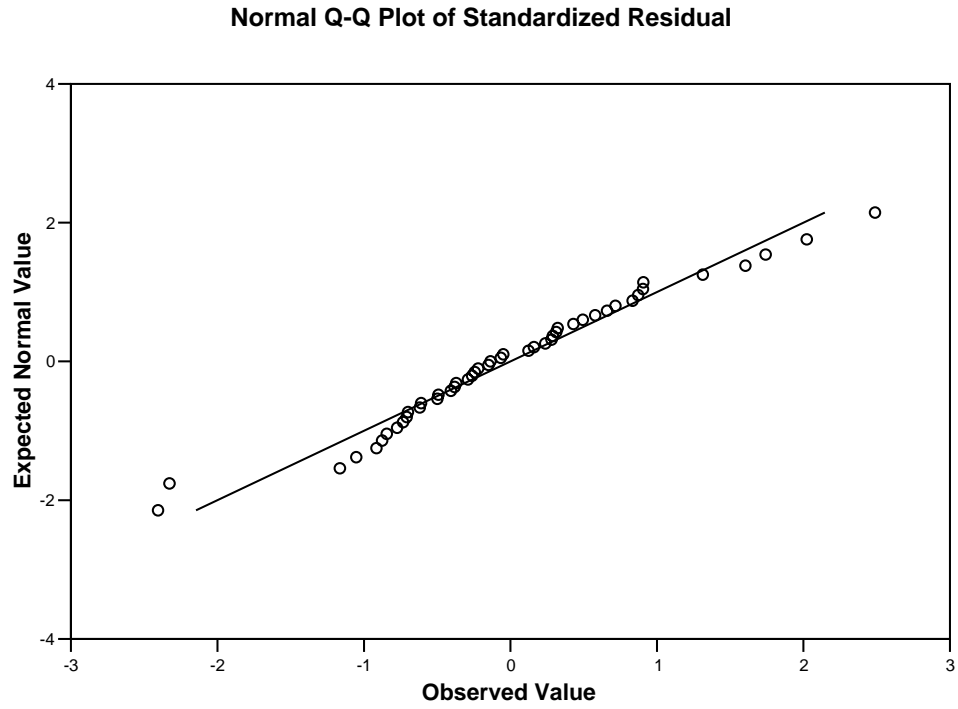


Figure 4. Q-Q Plot of the standardized residuals to check distribution of sample variables in the model for RH4

Normal Q-Q Plot of Standardized Residual

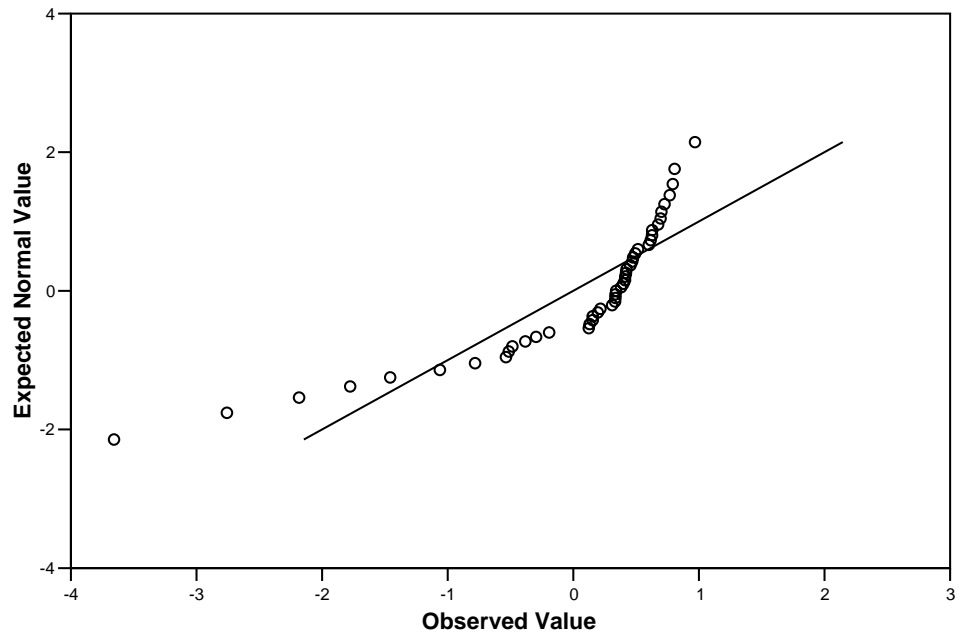


Figure 5. Q-Q Plot of the standardized residuals to check distribution of sample variables in the model for RH5

Normal Q-Q Plot of Standardized Residual

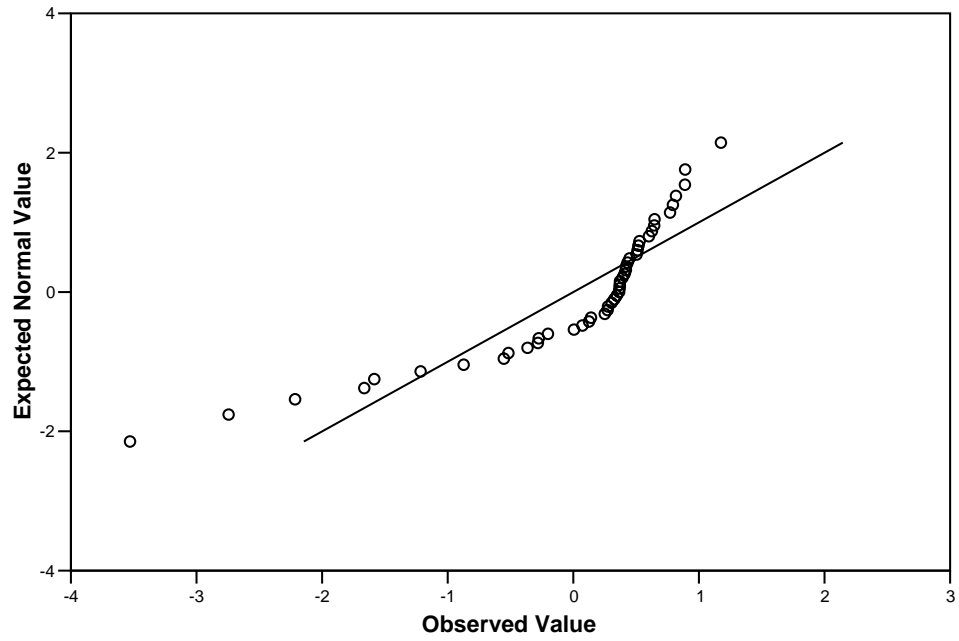


Figure 6. Q-Q Plot of the standardized residuals to check distribution of sample variables in the model for RH6

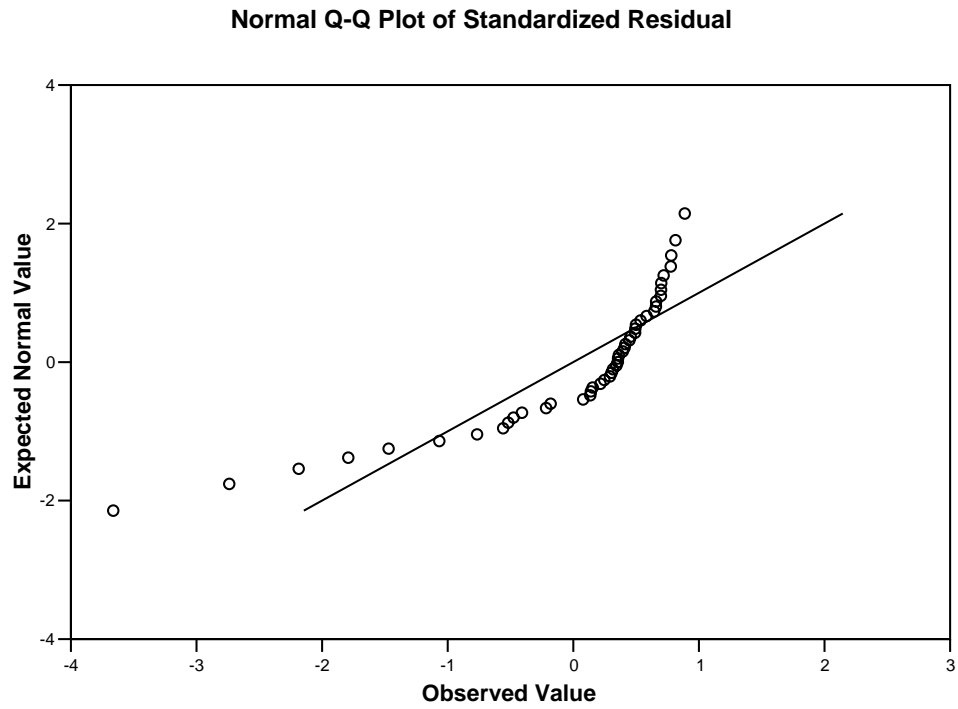


Figure 7. Q-Q Plot of the standardized residuals to check distribution of sample variables in the model for RH7

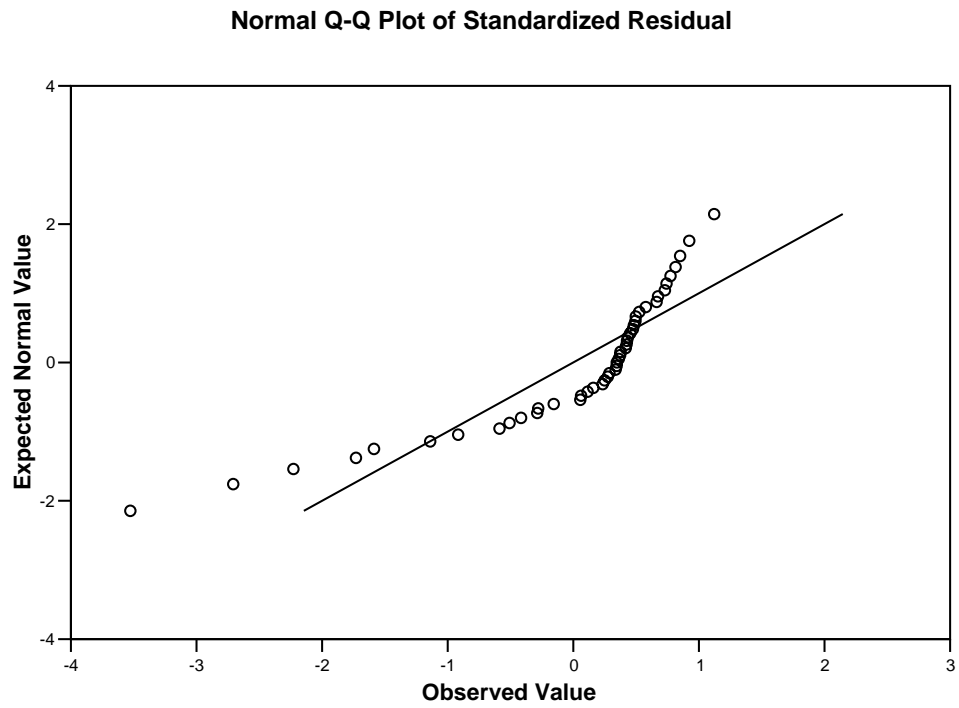


Figure 8. Q-Q Plot of the standardized residuals to check distribution of sample variables in the model for RH8

Normal Q-Q Plot of Standardized Residual

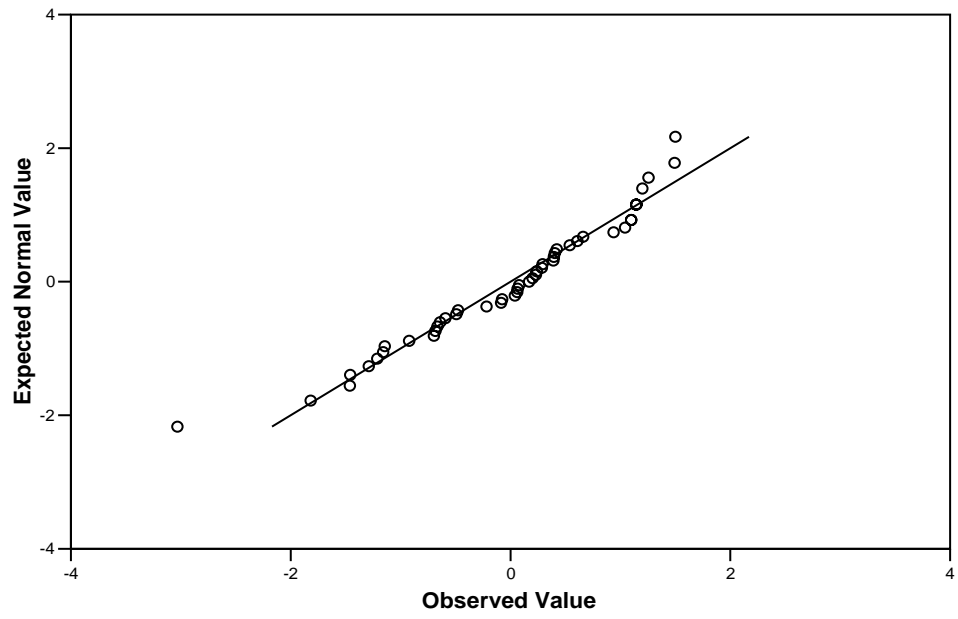


Figure 9. Q-Q Plot of the standardized residuals to check distribution of sample variables in the model for RH9

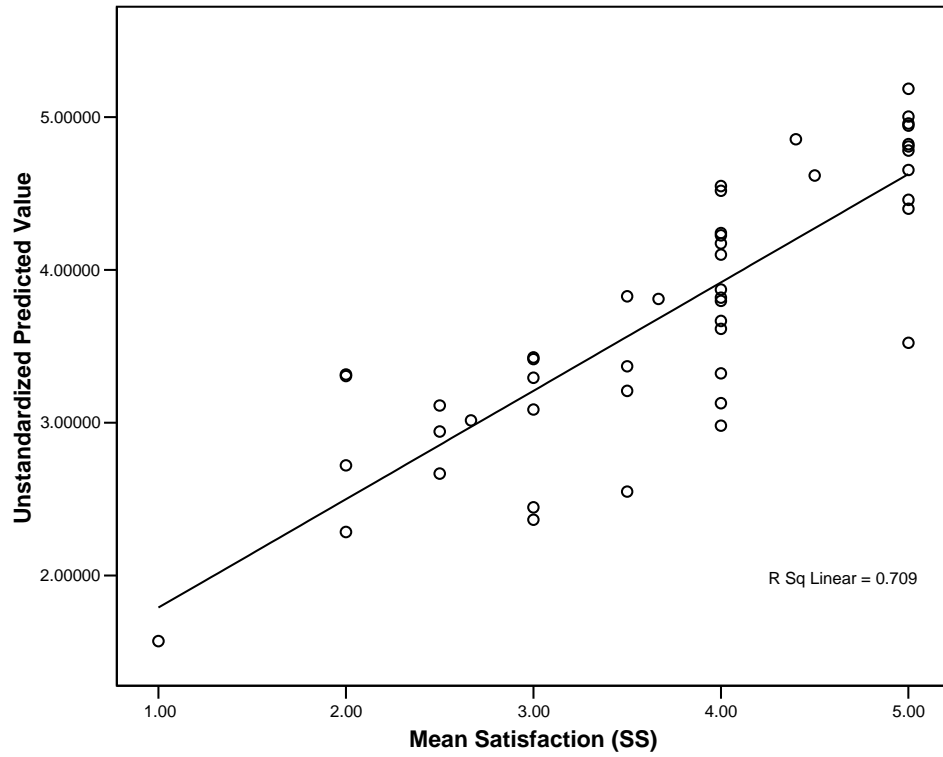


Figure 10. Scatterplot of predicted and observed values to assess equal variance of the variable student satisfaction using the model for testing RH1

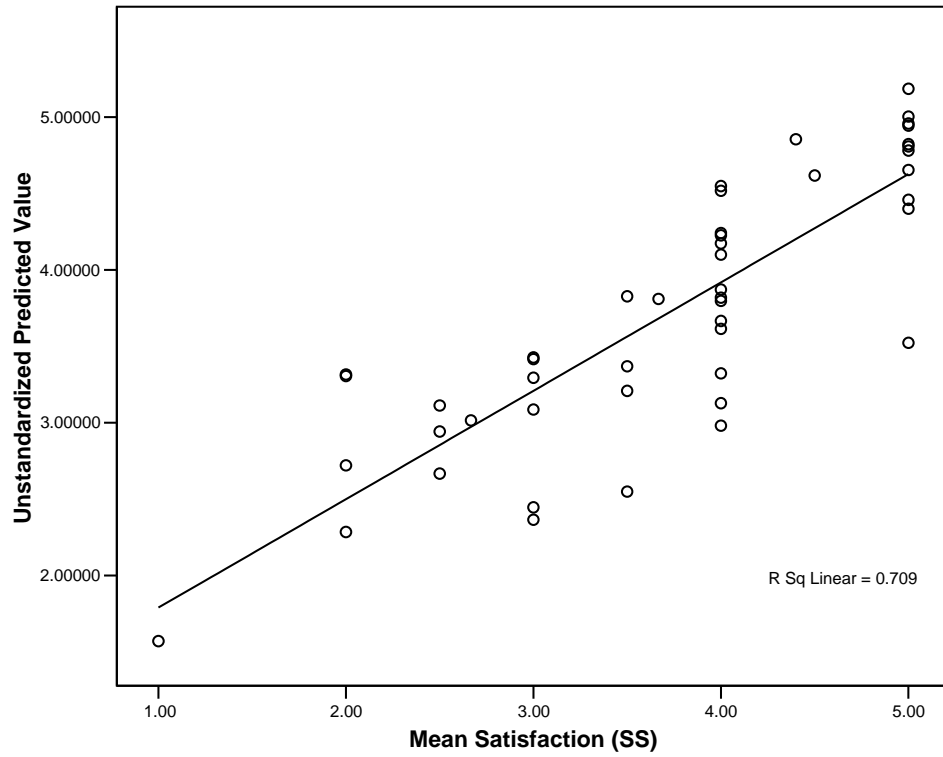


Figure 11. Scatterplot of predicted and observed values to assess equal variance of the variable student satisfaction using the model for testing RH2

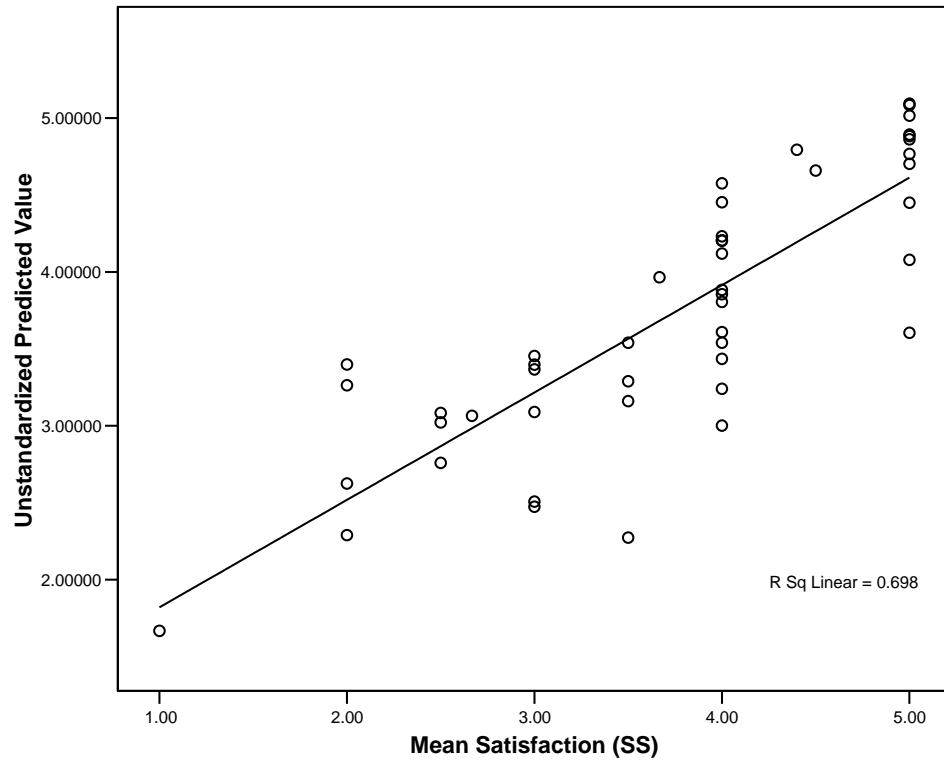


Figure 12. Scatterplot of predicted and observed values to assess equal variance of the variable student satisfaction using the model for testing RH3

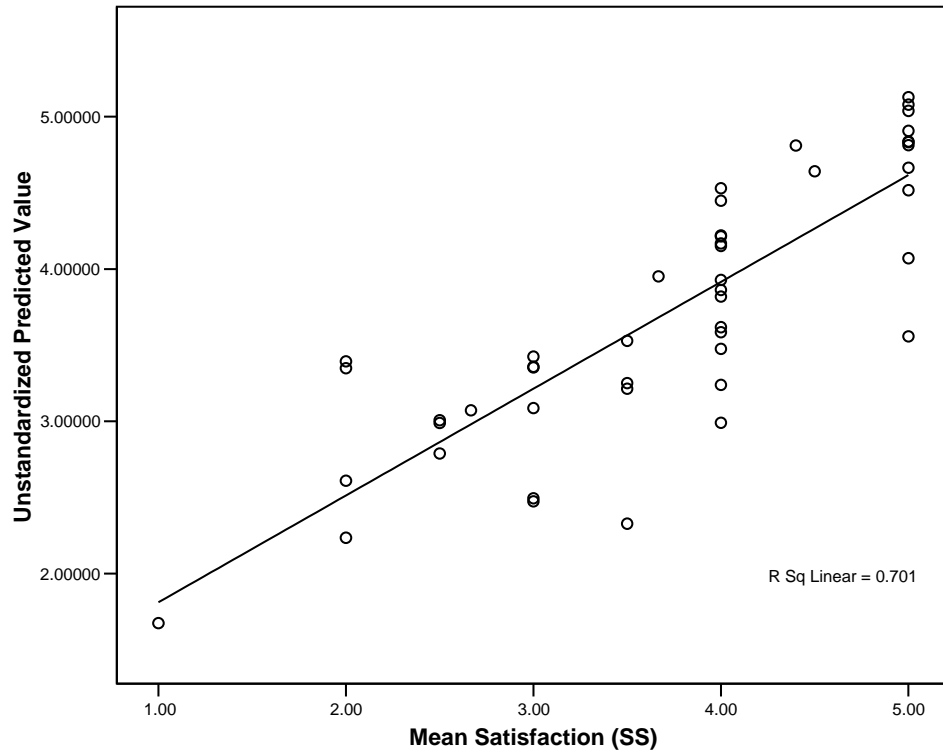


Figure 13. Scatterplot of predicted and observed values to assess equal variance of the variable student satisfaction using the model for testing RH4

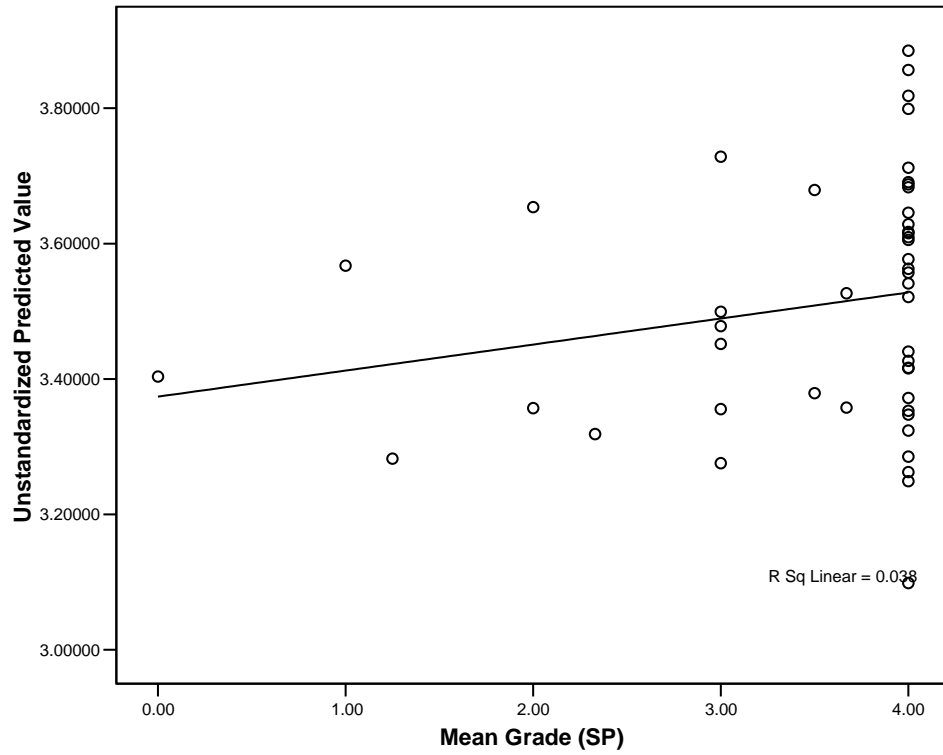


Figure 14. Scatterplot of predicted and observed values to assess equal variance of the variable student performance using the model for testing RH5

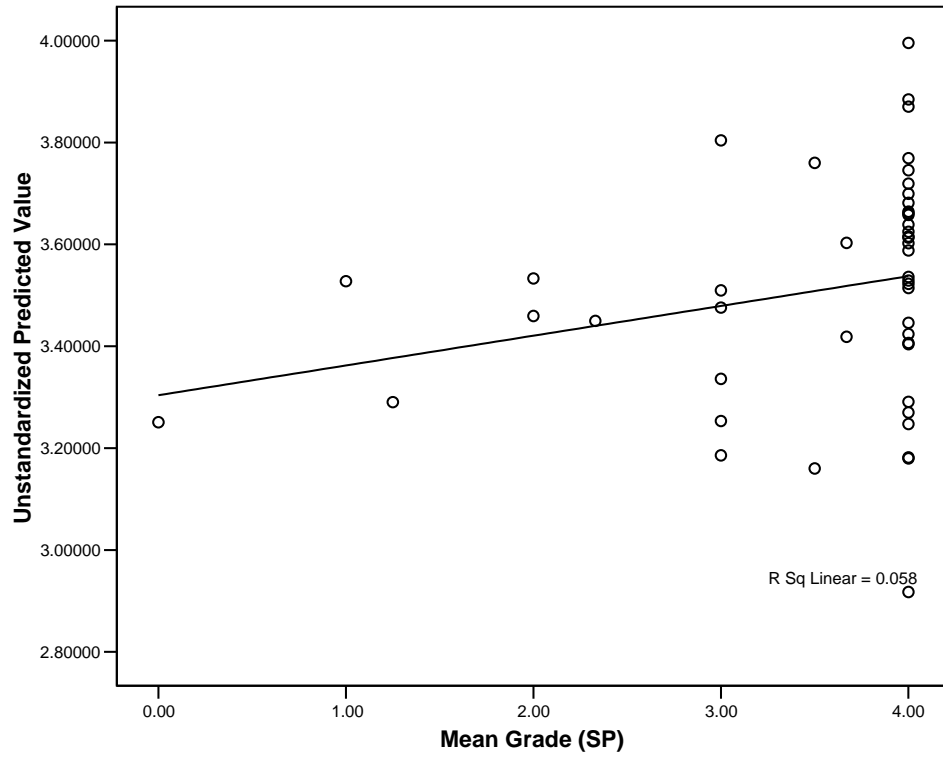


Figure 15. Scatterplot of predicted and observed values to assess equal variance of the variable student performance using the model for testing RH6

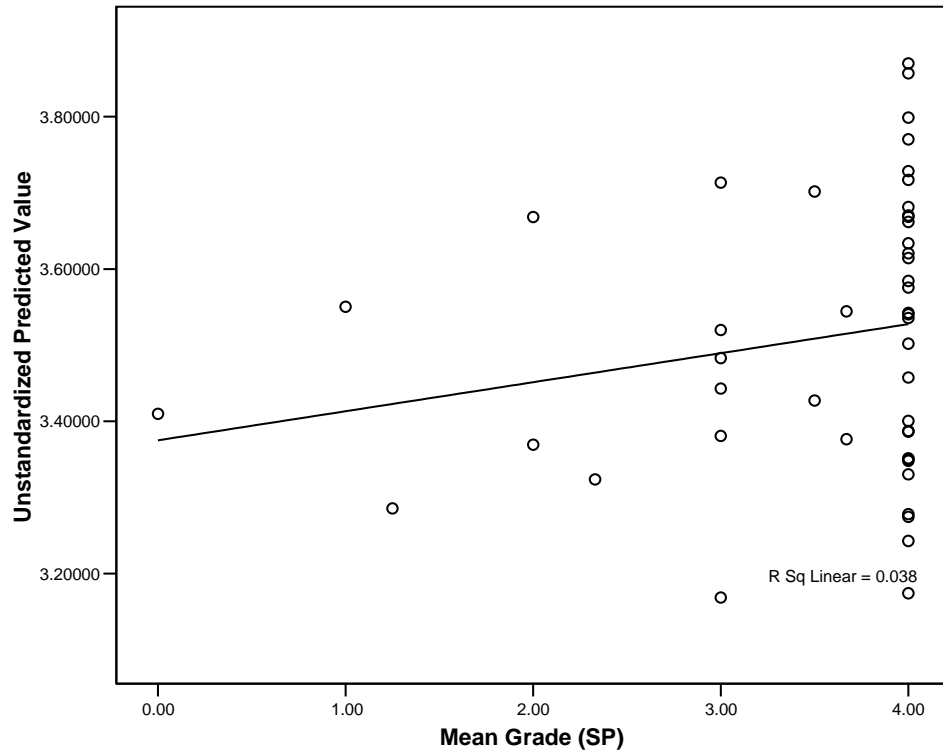


Figure 16. Scatterplot of predicted and observed values to assess equal variance of the variable student performance using the model for testing RH7

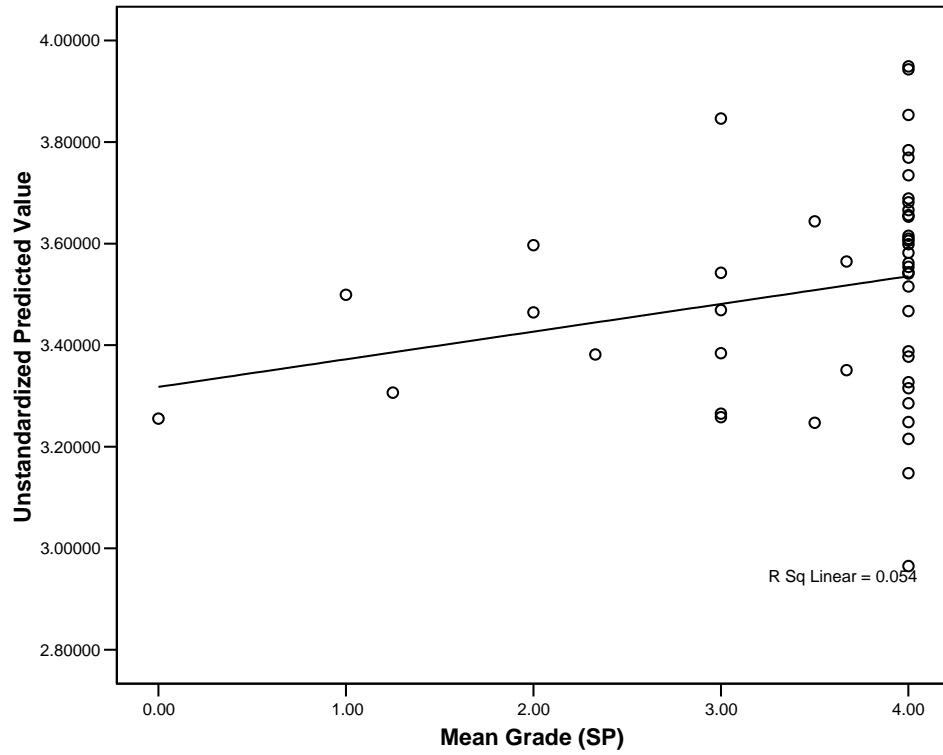


Figure 17. Scatterplot of predicted and observed values to assess equal variance of the variable student performance using the model for testing RH8

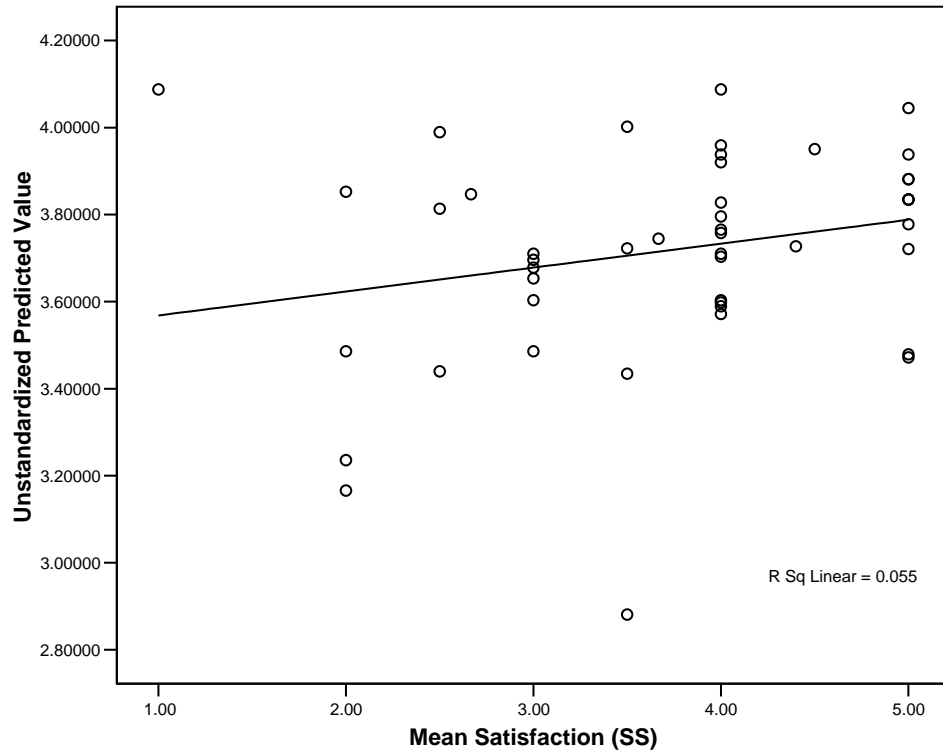


Figure 18. Scatterplot of predicted and observed values to assess equal variance of the variable student satisfaction using the model for testing RH9