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Factors Associated with Attitudes Toward Learning in an Online Environment: Transactional Distance, Technical Efficacy, and Physical Surroundings

Jodi Elizabeth Pettazzoni
University of Southern Mississippi

The University of Southern Mississippi

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Abstract of a Dissertation
Submitted to the Graduate Studies Office
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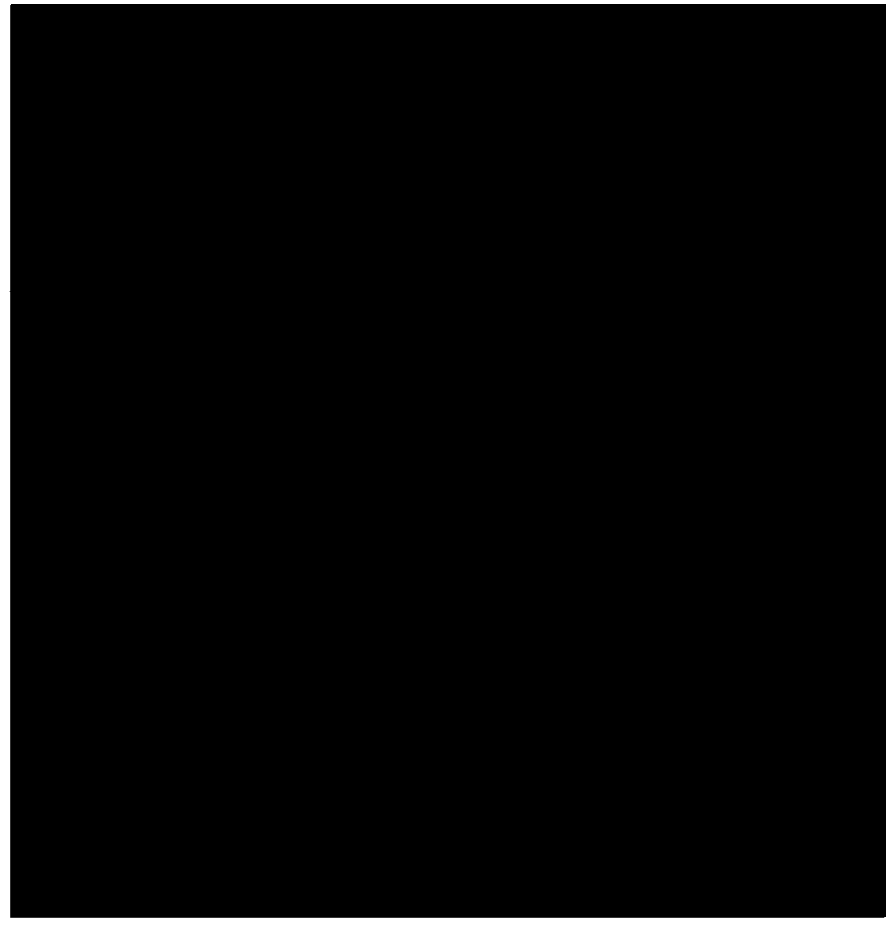

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ABSTRACT

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This study examines the relationship between a student's environment in an online course and their academic achievement. This study surveyed students who completed world literature classes in an online format that were part of their universities' general education curricula. Students responded to items assessing several constructs and personal demographic variables that together defined their learning environments: content, delivery, assessment and feedback, technical support, learner experience with technology, learner experience with distance learning, interaction, phys physical space, support network, characteristics of adult learners, and major. Academic achievement was the dependent variable and was defined as anticipated grade in the course. Using Spearman correlations, Mann-Whitney tests, and Multinominal Regression, the independent variables and constructs were analyzed for their relationship to the dependent variable. Interaction, physical space and major showed positive correlations with anticipated grade. In ancillary findings, all independent variables were found to have positive correlations with respondents' perceptions of having learned the course content.

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CHAPTER I

INTRODUCTION

With the increased delivery of core courses in an online format, repeated questioning of the efficacy of online learning as a mode of instruction has followed. Specifically, the argument has been made that if students are not seated in a classroom with the instructor and their peers, they are not able to learn as well as those who are seated in a classroom. Students taking online courses are able to create their own learning environment because they are often able to select the location, timing, and equipment for learning. It would be helpful to institutions and professionals who design online courses to understand how to advise students to create an environment that will allow improved opportunities for learning. By adapting online courses to deliver best results, and by advising students about enhancing learning, the institution's courses, programs, and enterprise as a whole will be more successful, because students will likely choose to proceed with more coursework through that institution's academic offerings.

The learning environment for this study will be segmented into three categories: the technical, physical, and personal environments of the learners. Impediments to any one of these aspects of students' educational environment can affect students' abilities to learn, and can influence whether they will enroll in other online courses and even persist in higher education. An examination of some of the key variables in distance learners' "classroom" environments that may contribute to the evaluation of how well they learned may help identify areas for improvement. If the instructor and the higher education institution can refine these factors, they may be able to improve persistence and retention in distance learning, and perhaps even in higher education overall.

Focus needs to be given particularly to the personal environments of learners. "Transactional presence (TP)," or the perceived connectedness that a student feels to his or her course instructor and peers, has been shown by Shin (2001) and others to influence adult students' perceptions of learning and their likelihood to persist (Garrison, 1989; Moore, 1993a; Richardson & Swan, 2003). Furthermore, Shin's study concluded independent from interaction activities,

> the perceptions of psychological presence a distance student holds in relation with teachers, peer students, and institution can be significant predictors of learning outcomes[;]... although teachers, peer students, and institution all serve as significant partners in educational relationships for distance students, their impacts on learning can differ in terms of degree as well as in nature; and an institution's TP may be relatively more important than teachers' and peer students' TP, especially for those students involved in out-of-classroom type of distance education; peer students' TP has more to do with affective learning, i.e., the acquisition of a positive attitude towards distance learning and its persistence, whereas teachers' TP has more to do with cognitive learning. (Shin, 2001, p.1)

Understanding that student relationships and sense of connection to their instructor and classmates influence distance learners' persistence in, or withdrawal from, distance learning courses or programs can shed light on ways to improve that persistence.

Statement of the Problem

The proposed investigation will study the relationship among variable dimensions of students' learning environment and their evaluations of academic achievement in online learning courses. The objective is to determine if particular aspects of the learning environment increase the probability that students perceive they have learned the course material well.

The following variables will be used in this study:

1. Content
2. Delivery
3. Assessment and feedback
4. Technical Support
5. Learner experience with technology
6. Learner experience with distance learning
7. Interaction
8. Physical Space
9. Support Network
10. Characteristics of adult learners

Each of these requires examination. Content and delivery impact learning. They are integrated to a degree, and are therefore presented together. Student respondents will be asked if the content was accessible, which addresses both the content and the delivery. They will be asked if the content was structured, and if the content increased their understanding of the course subject. They will also be asked if they felt comfortable with the online course management system that was used (Blackboard, WebCT, etc.).

Two additional closely-related constructs are personal support network and interaction. Since the student's personal support network in a study conducted by Comeaux (2005) has been shown to affect learning, this construct will be assessed. The specific issue to consider is the extent to which these students consider their immediate support environment (family and friends) to be positive. As Jegede, Taplin, Fan, Chan, and Yum (1999) point out, a student's social context impacts learning, especially online, as does a student's interaction with his or her peers and instructor. The "transactional presence" that a student feels within the context of a learning environment can be related to learning and to persistence (Rovai and Baker, 2005; Gibson, 1993; Thorpe, 1995; Shin, 2001). This study will investigate the level of connectedness and interaction that students feel in their online classes. Richardson and Swan (2003) determined that the input and feedback concerning assignments and discussions that students receive from their instructor and peers affects how connected they feel to their classmates and their academic studies. It will be important to study how this relates to learning. The assessment and feedback construct will ask the student about timeliness of feedback on progress and assignments, its connectedness to content, and its relation to improving learning.

The learners' experiences with technology can affect online course experiences. As King (2001) has indicated, technology is not the message, but it carries the message therefore it affects the message if it does not function well. He states that when the tool fits the task, the result is better. He adds that the technical design of the course seems at least *as important* as curriculum design, since technical problems can derail even the best curriculum. Hannafin, Oliver, Hill, Glazer, and Sharma (2003) found that students'

predispositions to learning online related to their learning experience. Computer Science majors were more comfortable learning online than other majors. It may, therefore, be worthwhile to online educators to know if it is worthwhile to adapt to different skill sets as they relate to the major, presenting lessons in different ways and with different activities to learners with different skills. So, participants will be asked what their major is, as well as their comfort level with the technology in the course. Specific issues to be addressed include comfort level with the software used, comfort level searching the internet and submitting assignments, and comfort level with the digital communications required for the course. Respondents will also be asked about support for their technology needs, as this can alleviate concerns about an unstable learning environment.

As Hannafin et al (2003) indicate, attitudes toward web-based instruction impact a students' abilities to learn in that media, so student data concerning distance learning is needed. Based on their particular academic background, students who routinely use computers are better able to learn via computer lessons. For those who do not use computers in their academic learning, they may bring biases against this mode. Therefore, information to be gathered includes about whether or not they have previously taken an online course. Participants will additionally be asked if they have ever taken a course online prior to this one, as prior use of computer technology was identified as relevant by Johnson (1985). As Eastmond (1994) found, students who succeeded online were either technologically adept themselves or had someone in their immediate support system (spouse or colleague) who could easily assist them. Students will therefore be asked about the people who may be involved in their support system.

The physical space in which students learn significantly impacts learning, therefore it matters whether they studied for this class in a public computer lab or in a private space (Eastmond, 1994; Knowles, 1985). Eastmond points out the need for a quiet, roomy study area to achieve success in learning. Successful work environments for adult online learners impacted whether or not they successfully completed a course. Domestic interruptions inhibited academic achievement, which requires that it be considered in this study. Participants will therefore be asked a few questions about their physical environment, such as did they attend the in-person lectures offered for the course on a regular basis? Did they consistently participate in this course online in the same place? Did they study for this course in a public lab or private room? Did the noise level in the study area negatively impacted learning? In addition, students will be asked when they studied, as well as their preferred time to study, because these aspects impact learning as well. This information will be accumulated into a single variable set regarding the students' physical surroundings.

This instrument for this study is a questionnaire based on a survey designed by Comeaux and used in fall 2005. The instrument has been enhanced and was piloted prior to use for the study.

Purpose of the Study

Online learning has been introduced in many institutions around the world. To attract more students, to increase revenue, to deal with diminishing space and number of faculty, universities are turning to this option as a means of meeting the credit needs of the student body (Watts, 2003). Facing these challenges, institutions of higher learning --

large and small -- have introduced into their course offerings classes taught via the internet. With this possible solution, schools have realized that in a competitive market, they may be able to serve a set of students who are interested in asynchronous education (learning done on an individual's personal schedule at their own pace) and possibly solve other problems. Students who would otherwise not be able to attend post-secondary classes because of the challenges of travel to a particular geographic location, limited classroom space, and too few faculty are now able to access that resource via technology.

The challenge for those institutions will be to make return "customers" of those new students. Research has shown that asynchronous learners make decisions about continuing their education from course to course (Eastmond, 1994). If they are able to weigh the cost-benefit of their situation and educational goals and determine it is worth their effort, they return for more. In fact, this decision is based on whether they perceive the online experience to have been positive. Without that positive assessment, they will either discontinue their learning or turn to another source. Institutions that wish to succeed in this realm must create an online-learning environment that makes students want to return.

This study will serve to inform discussions about learning environments for online classes. What happens during the class, what tools are given to students, and what existing skills the student has to participate in the course matter in the process of learning. Understanding the students who are enrolling in courses can benefit the instructor, the course outcomes, and institutional enrollment. With this information, devising interventions to address the potential problems could be done when resources allow.

Researchers have shown that there are a variety of issues that influence learning. Online learning presents unique circumstances, such as those created by technology. Student comfort with technology, support for technical issues, and instructor proficiency with the technology can be factors in learning. Revealing what is happening in online courses today, particularly courses in the required general education core, will provide insight into student learning outcomes now and in the future.

A significant change existing in distance, and specifically online, learning is the physical distance that exists between the participants. With instructors and students in most cases sharing little or no face-to-face interaction, making a connection and creating a sense of belonging are challenging. Nevertheless, a key component of students' abilities to learn is their interaction and relationship with teachers and peers (Eastmond, 1994). The educator-learner relationship ultimately influences student learning achievement. The perceived availability and connectedness the student has with his or her teachers and classmates and the connection he or she feels to the content are defined by Shin as the "transactional distance." Availability, according to Shin (2001), means that which is attainable upon request, and points to the "transactional distance" existing in a class. In his studies, Shin showed that this can be a significant predictor of student achievement, satisfaction and persistence.

The immediate goal for this study is to assist programs of online learning to design their courses for best success by its students, which will encourage students to continue enrolling in online learning courses at the institution. However, the notion of learning environments extends beyond just distance learning. Therefore, this study

should also be of value in all learning environments as higher education institutions work to reduce that distance in face-to-face, as well as distance learning, environments.

Hypotheses

The hypotheses for this study are:

H1: There will be a significant positive relationship between the support network subscore and academic achievement in the online course.

H2: There will be a significant positive relationship between the interaction subscore and the anticipated academic achievement in the online course.

H3: There will be a significant positive relationship between the experience with technology and perceive more academic achievement in the online course.

H4: Academic achievement in the online course will be significantly higher for those students who have previously taken an online course.

H5: There will be a significant positive relationship between the physical space subscore and academic achievement in the online course.

H6: There will be a significant positive relationship between the technical support subscore and academic achievement in the online course.

H7: There will be a significant positive relationship between the characteristics of adult learners subscore and academic achievement in the online course.

H8: There will be a positive relationship between students who have chosen majors in the fields of Science and Technology as defined by the college at The University of Southern Mississippi in Spring 2008 and academic achievement in the online course.

H9: There will be a significant positive relationship between academic achievement and the variables of support network, interaction, experience with technology, experience with online courses, physical space, and technical support in the online course.

Definitions

Distance learning. Instruction that involves physical and / or temporal separation of the student from the instructor and / or other students enrolled in the course. The course delivery and activities are conducted via web-based technology. For this study, students who are enrolled in courses that are taught in a web-based delivery method were the distance learners.

Transactional presence. The connectedness that a student feels to his instructor and others students in a class. Students also perceive a transactional presence with the course content. Transactional presence is subjective, and was measured by students' perception of their connection to the instructor and other students.

Support Network. The family, friends, coworkers and others who a student turns to for emotional support. The social context that a student associates with learning experiences can impact learning, so it is important to understand if support exists for him or her. For this study, students were asked if family, friends, and faculty advisor were supportive of their distance learning. They were also asked about their overall attitude toward this learning experience.

Content. The "information that is required to achieve course goals and objectives" (Comeaux, 2006, p. 18). More accurately, content is what is delivered to

students in a course through learning activities. In order to accomplish the goals and objectives of the course, however, the content must be linked to course goals and objectives. Students were asked if the course content was connected to learning goals and outcomes for the course. They were asked if the content did provide opportunities to learn, and if it was structured for learning.

Delivery. The means by which learning is conducted for the students. It can include reading formal text, researching online resources, viewing multimedia presentations, or participating in interactive chat or discussion. Students in this survey were asked if delivery increased their understanding of course content, and if delivery was clear.

Assessment and feedback. The communication from teacher or peers to a student to "provide evaluative and corrective information about the learning process and its outcomes" (Comeaux, 2005, p. 19). They come from both instructor and other students in the course, and they tell the student about their accuracy of learning and the meaning of what they have learned. They can also provide the instructor with formative information to revise the course for better learning outcomes. In this study, students were asked if assessment was linked to course content, and if feedback helped improve their learning. They were also asked if feedback was provided in a timely manner, to allow for improved learning.

Technical support. The opportunities for support with technology that were available to the student. Technical support can come from the instructor, a formal technical support network at the institution, or from informal support networks to which that the student has access. In this study, students indicated if they understood where to

get technical help, and if they turned to family, friends, the instructor, or other students for technical help.

Learner experience with technology. The level of comfort that a student has with technology. Students were asked if they were comfortable using the hardware and software for the course, and if they were comfortable conducting activities with the technology to complete assignments. Finally, they were asked what their majors are.

Learner experience with distance learning. The number of online courses in which a student has previously enrolled. Students were asked this question.

Interaction. The activities in which a student participates in to complete a course. Interaction can be learner-to-instructor, learner-to-learner, and learner-to-content, and all are vital forms of interaction for learning. Each can result in different learning outcomes based on the level of engagement, and the source of interaction. Students were asked about whether their teachers and peers were available and approachable, and if they interacted with their instructors and peers via delayed or real-time methods.

Physical Space. The physical and temporal environment in which a student interacts and studies for the course. The noise level, distractions, temperature, lighting and comfort of the workspace can all influence a student's attentiveness and retention of the material. Students were asked if they chose their study space, if it was in a private or public location, if they thought the space was appropriate for learning, if they studied in the same place for most of their coursework, and if the space was perceived to interfere with learning. Time of day was also included in physical space for the purposes of this study because of the environment that is creates. Students were asked if they chose the

time to interact for their class, and if they scheduled a consistent time regularly to work on their coursework.

Characteristics of adult learners. Based on Knowles' five characteristics of adult learners. For Knowles, adult learners are unique because they are self-directed, have numerous and varied experiences, see how learning could apply to aspects of their lives, use a problem-centered approach, and are self-motivated. Students were asked 1) if they are interested in learning, 2) if they prefer learning that requires problem solving, 3) if they see a clear connection between learning in the course and their life experiences, and 4) they see how the course content will apply to their lives.

Academic Achievement. The students' anticipated grades for the course.

CHAPTER II

LITERATURE REVIEW

In recent years distance learning has evolved into a complex and dynamic entity. Still in its infancy, this educational revolution is feeding discussion about not just its future, but the future of higher education in general. The range of questions included in the larger discussion of distance learning range from what is distance learning, to who is learning via distance education, to what influences how they are learning.

In 2008, a student who learns online differs from the traditional face-to-face learner in the levels of independence and ownership they demonstrate, especially in asynchronous learning. Distance learning no longer resembles its previous incarnation as correspondence coursework, where students and instructors exchanged only assignments and feedback on a delayed timeline. Distance learning now challenges traditional learning as a means of connecting students to instructors and other students, and as a way to provide innovative opportunities for students to learn.

Three areas of research are presented in this review of the literature for this study: adult learning, distance learning, and learning environments. Adult education has a long history, having begun in the mid-nineteenth century. The industry grew in order to serve a population of learners who could not attend traditional schooling. Because their lives often involved marriage, children, employment, and being place-bound, certain "adults" who wanted to gain post-secondary education needed an option for higher education. They found it when organizations and institutions of higher learning began offering "correspondence courses." This backdrop will provide context for distance learning in the twenty-first century.

This new cohort of distance learners has the potential to create for themselves environments that contribute to their education. "Learning environments" are defined as not only the physical space, but also the technology and sense of connectedness they perceive with their instructor and peers in their online class. Since research has shown that these factors affect learning and retention, understanding and addressing the issues with learning environments can make a difference in students' learning and institutions' retention of that learner in distance and traditional education.

Adult Learning

Adult education as a formalized process began in the mid-nineteenth century. Students were adults who sought to acquire or enhance a skill or knowledge, but were not able to attend formal schooling. These students lacked the freedom of movement that schooling required for a number of reasons that included family obligations, work responsibilities, or connection to a particular location (Holmberg, 1989; Ljosa, 1993). People who were married, parents, employees, or place-bound, but still wanted or needed additional education, found that organizations and institutions offered them a solution in the form of correspondence coursework.

The term "adult" can be defined with many models, including chronological, legal, sociocultural, and developmental models. Chronological age is used by "ordinary people" to define people who are adults by calendar years (Rogers, 1979, p. 11). Twenty-five years is often used by researchers in the field of adult education as the chronological age of "adults," and therefore shows up as an independent variable in studies (Donaldson, 1999; Justice & Dornan, 2001). This model has been criticized as

inadequate to define "adult" because an individual ages physically, emotionally, and otherwise at different rates.

The legal model of adulthood relates chronological age to legal responsibility. When a person reaches a certain age, they are presumed by law to be able to take care of themselves and are held responsible for their own actions. They can vote, make binding contracts, purchase and dispose of property, and marry. Rogers (1979) says "this approach may be simplistic, [but] people differ so greatly that no other mark of adulthood would be legally workable" (p. 12).

Rogers (1979) says that psychologists favor the developmental model which addresses both psychological and biological changes. In this model, life is seen as a changing, growing process that leads people to mature and continuously adapt (p. 14). A key element of the developmental model is how people "relate to, or interact with, their interpersonal and non-personal environments" (p. 14).

Finally, the sociocultural model examines how age is socially and culturally determined, or how others perceive them, which is often connected to the roles they play in society. Roles generally have social behaviors associated with them, so society presumes certain characteristics of a person based on those roles. This "social age" varies greatly from one culture to another, and from one era to another (Rogers, 1979).

In research about adult education, age or chronology, has been used as a variable in studies regarding adult learning (Donaldson, 1999; Justice and Dornan, 2001), and the age twenty-five is generally used as the defining number for "adults" (Donaldson). However, the chronological model is not the focus of adult education. Lindeman (1926), Houle (1961), Knowles (1985), and others introduced and strengthened the new field of

"adult learning" in the early- to mid-twentieth century, and focused their studies on adults as unique learners because of the multiple roles they play in their lives. This sociocultural model has been sustained throughout the literature (Lindeman, 1926; Houle, 1961; Knowles, 1985).

Knowles (1985) introduced the term "andragogy," which he defined as a "systematic framework of assumptions, principles, and strategies" that define the body of knowledge about adult learners and their learning (1985, p.7). In that schema, he initially discussed his system by stating the psychological definition of adult, "one who has arrived at a self-concept of being responsible for one's own life, of being self-directing" (p. 9) This psychological context for adults allowed him to frame the principles of andragogy, which differentiated these adult learners from traditional learners.

The andragogical model states five driving principles which can help instructors of adult learners create a format that is more conducive to learning for these students. These principles have persisted throughout the literature concerning adult learning. First, the adult learner is self-directing, and perceives him or herself as being responsible for his or her own perceptions, decisions, and actions. Adults who are self-directing will resist or resent decisions being made for them. Knowles acknowledges that adults can be self-directing in every other area of their lives, but will revert to a dependency when put in a school setting, which can disrupt their focus on learning (Knowles, 1985, p. 9).

Second, adult learners have experiences that are greater in number and different in quality than traditional students. According to the sociological understanding of adulthood, adults have more roles to fill, such as spouse, parent, and employee. These experiences are additional to those of a traditional student, and contribute to a richer set

of context for adult learning. This has a strong connection to the third principle, which is that adults come to the education process more ready to learn because they see how learning could improve their lives. Many adult learners engage in learning because they want to expand their options for professional progress or personal improvement. (Knowles, 1985, pp. 10-11; Donaldson, 1999).

Fourth, because they see how learning can impact their lives, adult learners come to education with a "problem-centered orientation", which drives them to understand how learning can be applied to their lives. Drawing on the experiences in the other roles that they play, they look to solve problems. They enter a course wanting to know how it will fit into their lives, and where they can apply the learning. Justice and Dornan (2001) argue that these students are more likely to adopt a "deeper, comprehension-focused approach to learning" instead of learning in order to pass the assessment (p. 237). This is related to principle five: adults are more internally-motivated to learn. Adult learners will respond to external motivation like salary increases and promotions, but they are often driven by personal desire to increase their self-esteem or quality of life (Knowles, 1985, pp. 11-12; Justice & Dornan, 2001).

Understanding these characteristics can help instructors mold learning for better results from adult learners. To address the needs of this group of learners, Knowles presents an "adragogical process design" for teaching adult learners. It consists of seven elements: climate setting, involving learners in mutual planning, involving participants in diagnosing their own needs for learning, involving learners in formulating their learning objectives, involving learners in designing learning plans, helping learners carry out their

learning plans, and involving learners in evaluating their learning (Knowles, 1985, pp.14-18).

Among these seven, Knowles emphasizes the importance of the climate setting. Adult learning should communicate via a two-way exchange of information, and should remove the expectation that the teacher gives information while the students receive it. According to Knowles, the appropriate psychological climate of the design has several characteristics. The appropriate climate requires an atmosphere of respect, where students are not talked down to. It is collaborative, where "peers are the richest source for learning" (p. 15), and share time and information. Trust is important in the design because people learn more from those they trust, so this should be cultivated among students and between students and instructor. Students learn better in a climate that is supportive, where they do not feel judged or threatened, for this reason Knowles indicates that peer groups and coaching on how to support each other is important (p. 16). The ideal climate also includes openness and authenticity, and "pleasure" or fun. Finally, there should be a climate of humanness, or human comfort, which includes good lighting, ventilation, comfortable work space (Knowles, 1985, pp. 15-17).

The six other aspects of the andragogical process design consider the roles adults play in their everyday lives and use them to engage adults in taking some control in their educations. Adult learners are involved in mutual planning, diagnosing their own needs for learning, formulating their learning objectives, designing learning plans, carrying out their learning plans, and evaluating their learning because they are self-directed. Research has supported the adult learners' roles in these processes (Donaldson, 1999; Justice & Dornan, 2001; Tennant, 1991). These processes allow them to draw on the

roles they play every day and their personal life experiences to create self-directed lesson plans, activities, and assessments that conform to what their learning goals are. Where climate-setting examines learning environments, the rest of the andragogical model considers the structure of an adult curriculum.

Researchers have concluded that "the majority of distance education is concerned with meeting the educational needs of adults." (Garrison, p. 103) This is seen in the literature as the two terms "adult learners" and "distance learners" are used almost interchangeably as they refer to the same groups (Besich, 2005; Donaldson, 1999). Given that students in the twentieth century are fulfilling more roles (Kuh et al, 2005), understanding distance learning in the context of adult learning can benefit students, instructors, and the institutions. The strong connection between adult learning and distance learning offers opportunity for instructors and higher learning institutions to better understand today's students of higher education and to better prepare their distance learning classes.

Distance Education / Distance Learning

As Garrison stated, "The historical paths of distance and adult education not only have crossed many times but have often been one." The connection between adult learning and distance learning is clearly made in the literature. A first issue to consider is the evolving definition of "distance learning." That discussion will be followed by a consideration of whom distance learners are.

Distance learning has evolved in the more than one hundred years since distance education was first introduced. It no longer consists of a student and a tutor or instructor

passing assignments and feedback to each other through the slow method of ground mailing. Further, whereas correspondence coursework in the mid-nineteenth century originally focused on a particular vocation or skill, distance learning in the twenty-first century can lead to a degree in many advanced fields. Because of the emphasis on a student's learning in the process, the term "distance education" is often replaced by "distance learning," although the two are fundamentally the same. Different interpretations, and a rationalization for the name change, are presented to address what distance education is for the next generation of learners.

Holmberg (1989) wrote throughout the late 1970s and 1980s that "distance education" is the designation used in the United States as well as Great Britain and other countries to refer to what was previously called correspondence education, teaching and learning by correspondence, or independent study. He defines distance education as "study" that occurs without "immediate supervision" by tutors over students, but which exists within the structure of a "supporting organization" or institution of learning (p. 3). Holmberg contends that, although problem-solving, critical thinking, and other complex skills can and should be developed in distance education, the distance education of the late twentieth-century is similar, if not identical, to the distance education of the past. This working definition, that distance education is the education process that occurs between and instructor and a student while separated by physical distance, has been accepted for decades (Holmberg, 1976, 1989; Ljosa, 1993; Mood, 1995; Peters, 1965; Saba, 2005).

Keegan (1990) contributed to the discussion of distance learning by providing a list of five defining characteristics of distance education. The five characteristics of

distance education, according to Keegan, were: quasi-separation of teacher and student throughout the learning process; influence of an educational organization for the planning of the courses; use of technology and media – print, video, audio or computer – to carry content; provision of two-way interaction and communication; and quasi-permanent absence of a learning group so that students are taught more as individuals than groups. With these attributes, Keegan recognized the influence of new technologies on the field of distance education, both for carrying content and for providing a means of communication between the instructor and the learner. However, the link to traditional understanding of distance education remains, since the learning community still exists as individuals rather than groups.

Garrison (1989) stated that the term "distance education" was devised to reflect a concept larger than correspondence courses. In 1982, the International Council for Correspondence Education changed its name to the International Council for Distance Education, in order to formally recognize the changes in *delivery* of education at a distance that had occurred. Their major point of reference was the Open University in Great Britain, which began using television and other media to deliver content, and altered the concept of learning at a distance.

In fact, Garrison and Shale (1987) constructed a set of three criteria by which to judge the process for distance education. The third criterion was "distance education uses technology to mediate the necessary two-way communication" (p. 11). While Garrison has urged that "education at a distance" presents a less ambiguous term that places emphasis on education and removes the distinction from traditional education (1989, p.9), the terminology remains "distance education." Thus distance education became the

accepted term to reference education via any technical medium that involved a physical separation of student and teacher/tutor.

By the time that Threlkeld and Brzoska (1994) wrote about distance education in the 1990's, they had identified a distinction from correspondence courses of the past. The authors argue that two important features of distance education have evolved to change it from its traditional format: the instructor's almost immediate feedback and peer interactions. Without these, the learning environment resembles that of the traditional distance education/ correspondence course. The interaction of the individual student with his textbook or video still exists, but plays a less-important role in the independent study process than it previously had. Through much of the technology available, from fax machines to email accounts, instructors can provide students with feedback that allows them to progress in learning without delay. The authors also note that students desired synchronous interaction, and that they might not participate in a distance learning system that did not provide it (p. 49). These opportunities for personal exchanges are a significant contribution to the evolution from "education" to "learning."

Belanger and Jordan (2000), and Picciano (2000) argued that the emphasis in distance learning was on the "learning." Holmberg (1976) mentions in an earlier book *Distance Education* that distance education has earned support because of a "growing awareness" that learning, and not teaching, is the emphasis, but he did not provide further elaboration. For Belanger and Jordan, however, distance education, or teaching, is truly different from distance learning. Distance *teaching* involves delivering education or training material while not geographically located at the same physical space as the students. Distance *learning* is the *acquisition of knowledge* by the student who is

separated from his or her teacher by geographical location. Learning does not exist from the learner's point of view if any sort of barrier to learning is built (Belanger & Jordan, 2000). Such barriers might include a lack of familiarity with the course's technology, a missing administrative support structure, or a disconnection between the content taught and the content tested. Belanger and Jordan encourage designers and instructors of distance education to remove those barriers.

Picciano (2000) also emphasizes the learner. Distance learning, he says, is becoming more decentralized and student-centered as it becomes routinely offered with conventional academic programs. Instructors are looking for ways to improve learning by taking advantage of any technology available, and that can mean trying to replicate the best traits of face-to-face learning, like synchronous communications (p. 71). Along with adoption of traditional fields of study, distance learning is also adopting more of the traditional methods of education. For example, traditional lectures are often delivered in online courses.

Simultaneous with the movement of distance education toward traditional teaching methods is the adoption in traditional classrooms of the distance learning opportunities, such as use of a listserv for out-of-class interaction among students or lecture delivered via interactive video networking. Because of this sharing of teaching methodology between traditional and distance learning, it has been suggested that a new paradigm for education may be emerging (Garrison, 1989; Picciano, 2000). Jervon (1990) had challenged the distinction between traditional and distance learning without suggesting that it was a new paradigm. Instead, he pointed to the apparent sharing that had already begun, as traditional classes began using distance education materials.

Although this sharing was anecdotal, the convergence of the two delivery methods was in place. These authors challenge the accepted thinking that distance learning is a distinct form of education.

Distance education at the start of the twenty-first century generally describes education that occurs when the instructor and student are separated by distance, just as with earlier forms of distance education. The key development, however, is the utilization of several forms of technology to enhance the experience. It has even been argued that use of the term "distance education" has come to mean "simultaneous telecommunication delivery of instruction from a host site or classroom to distant sites," and therefore the definition should be understood broadly as such (Barker, Frisbie, & Patrick, 1993, p. 40). Fax machines and telephone conferences were an initial example of how technology could improve the two-way communication between the instructor and the student separated by distance, by reducing the student's wait for feedback and validation of progress. The numerous teaching and learning techniques that are currently available because of technology are a clear advantage to distance learners (Jervon, 1990). Interactive video networks, email, and content management systems delivered forms of communication that closely resemble the traditional classroom communication model, and improved the traditional model in some cases, while still providing the convenience delivered by distance learning.

These technologies also facilitated the movement away from teaching and toward learning. The interactions and transactions that have been allowed by accessible technology have permitted instructors and institutions to improve the educational experience of distance education students. Students can establish relationships with their

instructors and with their peers. They can also interact with the sponsoring institution more easily, receiving technical support, administrative assistance, and academic resources with relative ease. Barriers that may have existed for distance education students of the past have in many cases become no more insurmountable than those for the traditional student. "Distance education" that was defined by separation of student and teacher is transitioning toward "distance learning."

The techniques of teaching and learning in distance learning and traditional learning have converged at several points. This is largely because of the technology, but also because the students that are learning via distance education today do not seem to be a distinct type of student. The stereotype of the distance learner that was described in literature in the 1970s has changed. Students are not choosing online courses because they live far from the institution, or because they have commitments during the traditional daytime class schedules. The distance learner of today is the same student who is taking traditional classes, but chooses to learn online for a variety of reasons (Holmberg, 1976; Jervon, 1990).

Peters (1968) introduced the idea that distance learners were not different from traditional learners in 1968, but was largely ignored. He described students in the United States who are "regular" students living on campus but taking distance education courses. He corrects the term "distance education" with the qualifier of "not face-to-face," and introduced to the conversation about distance learners these students who were traditional college students who chose for themselves when, where, and how to study.

Adults who utilized the British Open University model that dominated distance learning in the 1970s were the vanguard of distance learners, and are what are typically

thought of as "distance learners." They can be divided into five categories of learners by their reasons for learning at a distance. First were adults who needed or wanted new technology-based education or training, but who had obligations that required that they remain part-time students. These are the groups that are traditionally thought of as the distance learners (Holmberg, 1989; Peters, 1965). There were four other groups of students, however, who have been identified as choosing distance education because it was the easiest, or sometimes the only means of getting education (Peters, 1968). These groups of students had a range of issues that kept them distanced from a traditional education. One group was those students who lived in sparsely settled areas, such as the children of Australian farmers who could not, or chose not to, leave their homes (Mood, 1995; Peters, 1968). Another group was those students who were site-bound because of service, like military personnel or families of diplomats and missionaries who were stationed abroad (Peters, 1968). A third group was learners who suffered from health problems and could not travel regularly to traditional schooling (Holmberg, 1989; Mood, 1995; Peters, 1968). And finally, there were prisoners and juveniles in reformatories who wanted an education (Holmberg, 1989; Mood, 1995; Peters, 1968). Each of these student groups had issues that prevented them from attending traditional schooling.

Jervon (1990) wrote that in the mid 1980's he attempted to challenge the traditional stereotype of distance learners as solely non-traditional adult learners, but his argument was "ignored," because it benefited the existing institutions, many of which existed solely as distance education institutions like the Open University in the United Kingdom, to market themselves as responding to a specific need and audience (p. 137). His argument supports Peter's discussion that "traditional" students are participating in

distance learning and need to be considered as part of the research on distance learning. Garrison and Shale (1990) affirm Jervon's challenge by calling the distinction between the two methods of education increasingly "untenable." The recognition that distance learners are not unique is not a recent or isolated argument. These authors make it clear that this "type" of distance learner is not a development of the late twentieth century, for students have been acting as hybrid (traditional/distance) learners for decades.

Holmberg (1989) recognized that evidence could not be provided to indicate that distance students should be regarded as a homogeneous group. However, he contended that "with few exceptions, these students are adults and consequently are gainfully employed and/or look after their families" (p. 23). Distance education traditionally was seen as a means of serving adults who could not or did not want to attend traditional classroom settings because of work or family commitments (Holmberg, 1989; Ljosa, 1993). They chose distance education for the convenience, flexibility, and adaptability that was needed because of their numerous other commitments. Their lives, if it was to include education, almost necessitated distance education. This other category of students, those who want to exercise the same type of control of their learning experience that adult learners do even though they resided on traditional college campuses, need to be considered as part of the distance learning population. Because of this, more context has been given to how better to describe distance learners.

One element that influences discussions among scholars trying to identify who distance education students are is the learners' motivations. Mood (1995) argues, and others agree, that most distance learners are highly-motivated and self-directed because they are adults who have specifically sought out and chosen distance education

(Holmberg, 1989; Peters, 1968). For professionals who are taking the courses to improve their futures, they are committed to finishing their studies, because to fail at a course would mean having to abandon the vision for professional advancement. Likewise, for learners who are geographically or physically isolated but prize the education, such as those with health issues or prisoners, they too will remain committed (Holmberg, 1989; Peters, 1968). Finally, Holmberg suggests that some students merely prefer the flexibility and independence seen in distance education, and that these students often persist through the courses (Holmberg, 1989). They still retain some of the traits of adult learners who are directing the course of the education, both in content (through the courses they choose) and in the delivery (through their selection of distance or traditional classes).

Not all distance students necessarily shared this commitment to defining the direction of the course or program. Peters (1968) cautions that some "regular" students who are enrolled in traditional courses but take a distance education courses view this type of learning "merely as an interesting episode," which may mean diminished motivation and commitment to the course(p. 39). These students might otherwise choose to finish the course, but some students drop out or fail the course because of external influences. Mood (1995) says that students who experience home situations that are not supportive of their distance learning will often not finish or will fail, because of the reality of their other commitments, and the lack of support to tend to both home and school responsibilities. She also argues that professionals do not always make distance education their top priority, because it is their work that pays the bills and schooling comes lower on the list of priorities. Thus, the successful distance learner may be the one

who better tends to these issues, or may find support in network of family, friends, or coworkers.

There are factors within the course that may whittle students' commitments to complete a distance education course. Outdated course materials (textbooks, handouts or media) discourage students. Instructors who do not maintain current literature will lose students. Additionally, instructors who do not provide timely feedback will hurt retention. Students who submit their assignments on time are more likely to persevere, just as professors who return assignments in a timely manner are likely to have students who are retained (Mood, 1995).

Students who succeed at learning at a distance must be committed to it. Mood identifies specific characteristics that are advantageous to distance learners. They must be self-motivated, be able to work on large projects without much direction, and be able to set and stay with a schedule, traits typical of "adult learners" (1995, p. 106). Because of the external and internal challenges of completing distance education courses, students are advised to think carefully about their resources and abilities before engaging in it.

Distance Education to Distance Learning

Distance *education* transitioned into distance *learning*. Its origin, with vocational and training purposes and for a very narrow and committed group of learners, forms a different picture for today. Since at least the 1960s, full-time students who reside on college campuses and are committed to finishing a degree have been taking independent study and distance education courses to add some flexibility to their study schedules. These have not traditionally been the most successful and committed of the distance

learners, though. It has often been the "adult learners", those who have the flexibility and professional motivation to complete their distance learning, that succeed in distance education. Factors both physical and emotional play into the formula of who completes their learning from a distance. Those with access to technology or appropriate study space and time, those with time-management and self-motivations skills, and those who are not distracted by other commitments or by devaluation of their educational efforts, are most likely to persevere through distance learning. Hence, the focus is now away from the education and teaching, and onto the learners who want to control how, what, and when they learn. This evolution is essential for understanding successful distance learning for the twenty-first century.

Learning Environments

Many aspects of learning environments have been identified in discussion and description of distance learning and those who select to learn at a distance. For distance learners, the environment that surrounds their learning experiences can influence their success in the course or program. The "environment" refers to the aggregate of surrounding sounds, conditions, or influences. In learning, environment encompasses the course content and structure, the space in which learning occurs, and the support for learning that the student receives.

Support Network

As Jegede et al (1999) point out, students' social contexts impact learning, especially online, as do students' interactions with their peers and instructors. The "transactional presence" that students feel within the context of learning environments

can be related to learning and to persistence (Gibson, 1993; Rovai & Baker, 2005; Shin, 2001; Thorpe, 1995). It is this aspect of students' distance learning environments that has a great influence because it is so personal. While the students have opportunities to affect this part of the learning environment, the instructor and the institution also have an opportunity, by purposefully implementing support networks within the course, and by encouraging students to seek them on their own, to increase the likelihood that students persist in the course and continue to enroll in courses at the institution. Understanding the level of connectedness and interaction (transactional presence) that students feel in their online classes can lead to strategies and policies to improve course and program retention.

Transactional Distance / Transactional Presence

"Transactional presence" describes the connectedness that students feel to instructors and others students in classes. It is "an invisible link between students and teachers normally apart from one other, and hence it can be conjectured that a student's perception of a teacher's presence connotes the student's conception of his/her relationship with the teacher" and peers (Shin, 2001, p. 6). This concept is crucial to the discussion of learning online, and derives from the theory of social presence that developed in the field of communication during the 1970s.

"Social presence" is defined as the "degree of salience of the other person in the (mediated) interaction and the consequent salience of the interpersonal relationships" (Richardson and Swan, 2003, p. 70). This was used by researchers in the 1970s to explain how consumers were encouraged to relate to commercials on television, based on

how the commercial's content tried to relate to and connect with them. Increasing the connection that a consumer feels with a product increases the likelihood that he or she sees relevance for the product in his or her life.

Drawing from social presence theory, Richardson and Swan (2003) argue that students' perceptions of social presence in online courses are related to their perceived learning and satisfaction with the instructor. While this result was proven in their research that surveyed undergraduate online learners enrolled at Empire State College, they also negated two other hypotheses. First, they found that age and number of course credits completed (i.e. whether they were a freshman, sophomore, junior, or senior) were not predictors of perception of social presence. Second, although they thought that course activities perceived by students as having the highest level of social presence would also be perceived as having high levels of students' perceived learning, they found that "social presence permeates not only the activities generally designated as social activities but also those activities usually designated as individual activities" (p. 80). For example, it was found that comments made by instructors on assignments returned to students created a sense of social presence.

Garrison (1989) affirms this conception of social presence. Social presence is, he says, a mutually respectful relationship between student and teacher for the purpose of identifying, understanding, and confirming worthwhile knowledge. Control becomes a factor in the independent aspects of distance learning, because it must be shared between student and teacher in traditional education, and its balance in distance learning is the driver of a successful course. When there is an imbalance of that control, there is no positive outcome because the control operated by one diminishes the quality of the

interaction for the other. "The quality of an educational experience is dependent upon encouraging students critically to analyse differing perspectives, thereby constructing personal meaning and validating that understanding by acting upon it through communicative acts" (p. 15). Thus, according to Garrison, if educational transaction is diminished in distance learning, then so is learning.

For Garrison, the emerging paradigm of distance education restructures what independence is to students, and implies the connection to adult learning. The student now assumes responsibility for constructing meaning in a collaborative or interactive setting. Interaction and transactional education are the foci in this new setting because it is here that the student offers and receives feedback, challenges, and information. Garrison's idea implies that the students become more independent by becoming more dependent on communication with others.

Moore (1993a) discusses "transactional distance," or the teacher-learner *disconnect* that develops when teacher and student are separated by time and space, which is the opposite of transactional presence. This separation, he says, profoundly affects both teaching and learning since the psychological and communication "space" to be crossed (where misunderstandings can occur) can be seen as the transactional distance. This occurrence is a relative rather than an absolute term, Moore says, because it also exists in the traditional classroom. "Seen in this way, distance education is a subset of the universe of education, and distance educators can draw on, and contribute to, the theory and practice of conventional education" (p. 23). Nevertheless, he says, the transactional distance is significant enough in distance learning that this setting can be distinguished from the traditional experience.

Shin (2001) offers an explicit explanation for this. In most distance learning, students are separated not only from the instructor and students, but also from the institution, so teachers and their peers are the window through which the students experience the institution, too. Teachers are the

> cultural mediators between students and institution, students' care-givers when needed, resource persons, subject experts, and guardians of knowledge. Peer students, on the other hand, play the role of collaborators who facilitate knowledge acquisition and revision within a community of inquiry, and of moral supporters on the basis of empathetic understanding (pp. 120-121).

The transactional presence perceived by a student is highly subjective, but if a student perceives that his or her instructor and peers are not connecting him or her to the course and the institution, the connection to the institution can be weak and can result in the student's lack of learning achievement and decision not to persist in the course or in program studies at that institution. Understanding how connected students feel to their instructors and peers can lead to understanding of learning achievement and persistence in studies.

Knowles (1985) refers to this sense of trust, support, and collaboration from within the course as part of "climate setting" for adult learners. The exchange of information between students and instructor, and among students, reduces the possibility that the student feels isolated and separated from their course. The involvement of students in the process of educating each other and of learning for themselves integrates them into the culture and climate of the course, and breeds a deeper connection to the

content, instructor, and peers. By developing these connections in distance learning, the instructors benefit students.

Personal Support Network

The personal support network that students find in the course is as essential to learning and persistence as is their own personal support network (Gibson, 1993). This network consists of their family, friends, and coworkers, and others or experiences that may influence them. As was recognized early in the field of adult education, students do not come to education in isolation. Students are results of their cumulative life experiences, which can impact their learning.

Like Moore, Gibson (1993) argues that factors beyond the student-teacher interaction impact the distance learning experience. Primary to this idea is the "content" or *context* in which the teaching and learning occurs (p. 81). This refers to the *context* for the student, which may include his or her higher education experience, family, work, and home, among other things. She concludes that

> distance educators have not wholly ignored the contexts in which the adult lives and learns, but we have perhaps been less than systematic in our consideration of learners, their multiple teaching-learning contexts, the processes by which learning occurs (or fails to occur) within and as a result of these contexts, and the nature of the development that ensues. (p. 90)

Specific to studying distance learning, and use of technology in learning, Eastmond (1994) found, students who succeeded online were either technologically adept

themselves or had someone in their immediate support system (spouse or colleague) who could easily assist them. Students with a support network of family or friends have demonstrated an ability to overcome challenges that could otherwise have created a barrier to success. Having a support network provides advantages that may be crucial to distance learners.

Interactions

Important in creating a sense of connectedness to learning, the course, and the institution is the means of interaction involved in learning. Wagner (1997) argues that learning is "active, volitional, and internally mediated," and that "learning depends in large part on an individual's willingness to engage in the learning process" (p. 22). Students must engage themselves in the process of learning, but that often requires the instructor creating or requiring opportunities for interaction with the course content, among students, and between students and the instructor.

Opportunities for interaction can exist on three of levels. Learner-to-instructor, learner-to-learner, and learner-to-content are all vital forms of interaction for learning, and they can result in different learning outcomes (Wagner, 1997). Interaction with course material, for example, allows students to learn new information, provide meaning information they already have, and develop an opinion about it. Richardson and Swan (2003) demonstrated that receiving comments back on a paper offered value and created for the student a sense of that the instructor was present. Although this may be seen as one-way communication, where the instructor delivered comments to the student, the student saw it as two-way communication, where ideas were shared in an assignment,

and the teacher provided reinforcement or additional information that allowed learning and connection to grow.

Interacting with peers and with the instructor provides an important means of communication, because it allows students to exchange information, share opinions, receive feedback on those, and decide whether to maintain the opinion (Knowles, 1985). Through e-mail exchanges, listservs, electronic bulletin board posting, chats, teleconferences, and other direct connections between course participants, students ask questions of the instructor or other students about course content and assignments. This offers a way for students to validate their thoughts, or to get guidance about the course.

These interactions also provide a means of social support, as relationships develop for students to validate opinions and understanding of the course and themselves. McDonald (2002) supported the postmodern and constructivist idea that social interaction is a means of learning. The author stated "meaning is constructed as the result of social interaction... through interaction, groups provide support and mutual feedback that promote self-understanding and generate an experiential base for learning" (p.12). In many cases, learning communities and study groups act simultaneously as both educational and social arrangements.

Interaction with materials and people can allow students to grow in their relationships and in their knowledge, to truly learn. Willis (1994) offered a warning: "Those who are educators first and technologists second are finding that the importance of personal contact and relationship building remains a critical component of most effective distance education programs and is likely to increase as technical capabilities abound"(p.vi). By encouraging or creating frequent exchanges between students and the

instructor, their peers, and the course content, instructors can develop environments that are conducive to learning. These environments can not only improve students' learning achievement, but it also creates deeper connections for the learner which lead them to continue to be engaged in the program and at the institution.

Delivery

The method of delivery relates directly to interactivity in the course, and is important in removing the perception of transactional distance (Moore, 1993a and 1993b). Delivery is the means by which course content and information is conducted for the students. It can include reading formal text, researching online resources, viewing multimedia presentations, or participating in interactive chat or discussion (Comeaux, 2006, p. 19). The number of assignments, the format in which assignments are given, and the delivery of a lecture or the showing of a film are all methods of delivering content. Delivery methods can involve one-way communication, where information is given to students to process by themselves, or two-way communication, where students participate in directing discussion about the course and its content.

Instructors make numerous decisions about the delivery of instruction with every class that they teach. One-way communication is less valuable to education, according to Moore (1993b), because it increases the distance that content must travel to reach the student (p. 25). Students are less likely to engage with the material because it is given to them, without requiring their action or input. By manipulating the communications media to improve the dialog, however, the transactional distance is diminished. For example, if a student is asked to respond to one-way communication, some of the

transactional distance can be overcome. By creating a communication loop that requires the student to participate in learning, one-way communication can be transformed into a valuable learning experience.

Affecting the instructors' abilities to create opportunities for interaction is the delivery method of the class. A recorded program will increase the transactional gap more than computer-based real-time communication. While flexibility, or the ability of a program to accommodate students' needs, is relevant as it improves the ability of the student to control his or her learning experience, it can create a disconnection between a student and his or her peers, instructor, and coursework. Flexibility is beneficial as long as it does not separate a student from the course, and thus leave him or her in isolation from the instructor, peers, and the coursework. An instructor's ability to keep students connected to a course is crucial to learning (Shin, 2001).

Synchronous learning does not guarantee successful learning, however. An aspect of delivery that influences transactional presence is related to the atmosphere of the class. The number of students each teacher must instruct and the frequency of opportunity for communication are factors in creating a transactional distance. Interaction is easier to manage with fewer students, however there are different ways to create interactions among students and between student and instructor. Moore (1993b) states that the atmosphere encouraged by the teacher is important in learning. If he or she fails to encourage interaction between members of the course, the lack of interaction can negate other positive factors such as content and good technology in the course structure (Guri-Rosenblit, 1999; Moore, 1993b).

Cyrs (1997) wrote that "distance teaching is more of a team effort than classroom instruction is" (p. 16). Instructors of distance education must understand the importance of and be able to manage interaction within the distance learning course, because students depend on it for learning. Students must engage with the course content by responding to it as directed by the instructor. The instructor must know how to help students learn to work as teams, so that they can facilitate learning of the content for one another. The personal dynamics that exist within an online course contribute to the learning achievement of students, and these dynamics can be influenced by the opportunities to interact that are created by the instructor.

Delivery of course content can take on different forms that can include methods like lecture, reading, and discussion. Instructors who are aware that learning can be a social activity can provide for that social interaction and encourage it. Using different methods of learning that require students to engage with one another, exchange thoughts, explore new information, and validate ideas is important to achieve course outcomes, especially in distance learning.

Assessment and Feedback

Assessment and feedback "provide evaluative and corrective information about the learning process and its outcomes" (Comeaux, 2006, p. 19). They can come from both instructor and other students in the course, and they tell the students about their accuracy of learning and the meaning of what they have learned. Students can gain insight about how they are relating to the course content, and to their instructor and peers

during this process. What students gain from the feedback, and when students get this feedback can affect learning (Comeaux, 2006).

Thorpe (1995) emphasized that learning requires interaction and reflection by the learner, and the provision of feedback from a teacher who is able to frame the content to account for both content and students' responses (p. 176). Students develop as learners when the feedback they receive from the instructor and their peers provides more or different information. They can use it to consider their own thoughts or seek out more information to direct their understanding. Students who get support and information from their instructors and their peers about how their learning is progressing can assess how well they are relating to the course and its material. Students who get feedback are more likely to participate and do better in their coursework (Angelo & Cross, 1993). Feedback offers opportunity for better learning achievement.

The course can also benefit from the assessment conducted by the instructor. Feedback that is timely can be effective in addressing misunderstandings by students. Altering materials based on formative assessment throughout the course is necessary to address the weaknesses that the instructor sees in the students' cumulative work. When an instructor adjusts to the learning that is happening in the course, he or she can improve learning outcomes. (Mason, 1997, p. 213) The instructor also improves student retention for the course.

Assessment and feedback have a significant impact on students' persistence in a course. Richardson and Swan (2003) determined that the input and feedback about assignments and discussions from their instructor and peers affects how connected they feel to their classmates and their academic studies. That connectedness affects whether

they will stay in the course and in the program. Egan and Gibb (1997) wrote that students decide whether they will stay in a course based on the feedback received on an initial assignment or exam. Instructors have a valuable opportunity to improve the learning outcomes and success rate of the course by devising means of assessment and feedback that are meaningful to the learning. Providing meaningful feedback will engage students and enhance learning.

Content

Content has been defined as the "information that is required to achieve course goals and objectives" (Comeaux, 2006, p. 18). More accurately, it is what is delivered to students in a course through learning activities. In order to accomplish the goals and objectives of the course, however, the content must be linked to course goals and objectives (Belanger & Jordan, 2000; Comeaux, 2006).

The relationship of course content to course objectives affects student learning. To create opportunity for successful learning, Cyrs (1997) emphasizes this correlation. The instructor should understand how the subject matter will be learned by the students, in order to present examples, analogies, and other supporting materials to facilitate learning. Instructors must also construct organized presentation and delivery, so that the content is clear and appropriate to support learning. Communicating the course objectives at the start of the course, then drawing connections to those goals through the course content and assignments is necessary for learning.

Making sure that students can see the connection between the course content and the goals and objectives of the course is important. For students to engage in the course,

trust feedback from the instructor and peers, and learn the intended outcomes of the course, the instructor must present clear course content. Revisiting the content throughout the course and reinforcing it with feedback can remove concerns that students are not learning (Cyrs, 1997).

Technical Support

Technical support includes the opportunities for assistance with technology that are available to the student. Technical support can come from the instructor, a formal technical support network at the institution, or from informal support networks to which students have access. It is important that students know what their resources are, so that technical issues do not affect the access that students have to learning.

King (2001) argued that although technology is not the message, it is what carries the message. Problems with technology can create a barrier for learning, particularly for students who are new to distance learning. When students encounter technical problems, they need to know immediately to whom to address their issues. When they continue to struggle with problems, they can make the decision to abandon the process.

For this reason, the Southern Association of Colleges and Schools offers in their Best Practices for Electronically Offered Degree and Certificate Programs requires that "The institution [provide] students with reasonable technical support for each educational technology hardware, software, and delivery system required in a program" (SACS). They specifically recommend that help desks function when distance education students are likely to need it, and that there be people who can assist with the hardware and

software used in the course. These recommendations come in order to increase likelihood of student success, and are called "essential" for distance learning (p.1).

Learner Experiences with Technology

Learner experiences with technology can define an online course experience, as suggested by King (2001). When students gain experience with a tool, they are better equipped to deal with a problem, and persist through it. Because of this, understanding how student experience with technology can impact their persistence in distance learning matters.

Researchers have found that students' predispositions to learning online was related to their majors (Eastmond, 1994; Rovai & Baker, 2005). Computer Science majors were more comfortable learning online than were Oceanography majors, for example. As Rovai and Baker (2005) recognized, "computer literacy... and experience with online learning... influence receptivity to particular instructional strategies and influence online learning effectiveness" (p. 32). Students who are comfortable with technology seemed more likely to be comfortable in learning via technology, and therefore, more likely to persist.

Learner Experiences with Distance Learning

Closely connected to experience with technology is learners' experiences with distance learning itself. For the same reasons that familiarity can bring comfort, students who have taken a course in the distance learning format are expected to learn better than those who have not.

Attitudes toward web-based instruction impact a student's ability to learn in that media, and Johnson (1985) argued that whether a student has taken a course online prior to this is relevant. Understanding the experiences in learning online can allow instructors and institutions to address deficiencies, and create a stronger likelihood for success in distance education.

Physical Space

The physical spaces in which students study can make a difference in learning. The noise level, distractions, temperature, lighting and comfort of the workspace can all influence a student's attentiveness and retention of the material. Time of day will be included in physical space for the purpose of this study because of the environment that is creates. A "climate of humanness, or human comfort" are elements of Knowles' "climate setting," which affect adult learners (1985, pp. 15-17). Having a consistent space where a student feels they are able to learn can influence learning.

Creating an environment that is conducive to learning is an individual perception, but there are some demonstrated characteristics of positive learning environments. Eastmond (1994) points out the need for a quiet, roomy study area to achieve success in learning. He showed that domestic interruptions inhibited academic achievement, and created barriers to success for distance learners. These aspects of physical space can affect learning and whether learners successfully complete their coursework.

Conclusion

Hansen (2000) wrote that while distance education has been embraced as an opportunity for adult learners returning to school, it has not been as successful as initially anticipated. When reviewing distance education programs on their campuses, institutions found that distance education courses showed rates of attrition higher than in a traditionally delivered class. Solving that problem could lead to the success initially envisioned.

> ... [I]f an intervention is created that facilitates a better person-environment fit, ... students will be more likely to complete distance education courses and will be more likely to be successful. By strengthening an adult learner's person-environment fit within the distance education environment, the likelihood of course completion and success rates will increase. (p. 5)

The distance education learning environment consists of many parts. Where Hansen was referring to the "environment" as the course, this study attempts to draw attention to the personal environments of students. Learning is an active process, where the course material is not merely delivered, but is engaged. In order to understand how to stop attrition from distance learning courses caused when students cannot or do not engage themselves in the course, it is necessary to take a look at the complete learning environments that challenge students. Distance learning evolved from adult education, which as a discipline recognized the multiple roles of its students and sought to understand, and perhaps incorporate, them.

Students who learn via distance education in the twenty-first century are not unlike the students who attend the "traditional" higher education classes. Cyrs (1997) stated that in 1950, approximately ninety percent of students who attended college were between the ages of eighteen and twenty-one, were full time students, and lived in residence halls. However, in 1997, only 52 percent of college students were between the ages of eighteen and twenty-one, and fewer than 15 percent were full-time and living on campus (p. 8). More undergraduate students today also have the additional role of being married and employed, which compounds their list of obligations and priorities, and these are the same students who are not only taking "traditional" college classes, but are also enrolled in distance learning courses.

Research has shown that certain factors lead to better learning. Some can be controlled by the instructor and the institution. Others are under the control of the student. However, the instructor and the institution can offer students guidance about learning through distance education. By addressing as many challenges as possible through infrastructure, instruction, policy, and recommendations, institutions can make progress in improving success in distance learning and even where, as Zoeller says, "students can thrive" (1998, p. 6).

Research Problem

Previous research has established that students' ability to learn through distance education can be affected by various factors. These factors include the students' perceptions of connectedness to their instructors, peers, and course content; students' comfort level and experience with technology, and the students' physical environment for

studying. The studies have examined a single aspect of student learning environments, and have shown that, considered separately, each of these factors affects student learning in online courses.

This study was intended to gather information about the relationship among variables dimensions of a student's learning environment and his or her evaluation of academic achievement in an online learning course. The dimensions are content, delivery, assessment and feedback, technical support, learner experience with technology, learner experience with distance learning, interaction, physical space, and support network. The objective is to determine if particular aspects of the learning environment increase the probability that a student perceives they have learned the course material well.

Examining online learning at the course level is important, because students who are enrolling in online courses are not different from traditional students. In fact, many of the same students are enrolling in online courses, as well as in traditional courses, and are accessing these courses from university facilities. Students who do not have positive learning experiences in online courses can choose not to reenroll in them. Understanding the factors that lead to successful learning in online courses can direct improvements for all online offerings.

Students' experiences in distance learning courses consist of many elements, and are not handled in isolation. Students bring to these courses, as to traditional courses, the many roles that they play every day – student, employee, roommate, spouse, parent, etc. Because of these roles, they bring to these courses different levels of technical understanding, and different approaches to studying. Where they study, when they study,

with whom they study contribute to the learning experience. By examining the proposed nine factors that affect online learning in one study, this research gathered data and determine results that can help define what constructs influence student learning. This information can offer direction to institutions and instructors who are creating online courses, so that they can provide learners the structure and support that result in better learning.

CHAPTER III

METHODOLOGY

This study consisted of a quantitative study of attitudes pertaining to learning environments for distance learning courses, analyzed by means of Spearman correlations, Mann-Whitney tests, and Multinominal Regression. The participants were undergraduate students enrolled in fully-online World Literature courses at doctoral-degree granting, non-flagship institutions in the southern region of the United States during spring 2008 semester. This sample was a subset of all students who enrolled in the online courses, since it will be voluntary.

Design

An instrument designed specifically for this study was utilized. This instrument was designed to measure several constructs that have been defined for the study based on research about distance learning. Each includes separate aspects of online instruction, including content, delivery, and assessment. They also include student attitudes concerning interaction, technical support, and personal support. Finally, they include technical support, experience with technology and experience in distance learning. Students were asked to rate their level of agreement with the statement using a 5-point Likert scale. There was additional demographic information collected that were short-answer (major) or multiple-option (degree/non-degree seeking) questions. The questionnaire is attached as Appendix A.

The questions that form the constructs were in part adapted from an instrument developed by Comeaux (2006), and in part original to this research. Prior to administering this survey for the study, this instrument was pre-tested to determine the

internal reliability for the scales and subscales. Since the reliability proved to be acceptable on all items tested, there were no modifications made to the instrument to address weaknesses based on the piloted questions. However, questions about adult learning characteristics were added to the questionnaire after it had been piloted, so the reliability of these questions was not proven. The pilot study also allowed a testing of the web-based survey tool, and the process of communication with the instructor.

This study was conducted during a five-week time span, starting the third week of April and ending the second week of May, following approval by the Internal Review Board (IRB). Approval for this study is attached as Appendix B. This timeline was intended to cover the last weeks of classes, final weeks, and a few days after the course ends for the four universities that had students participating in the study. Students' perceptions of the entire course were needed, so the study was not conducted earlier in the semester.

The survey was conducted using a web-based survey application, and a link was generated for the survey. The survey link was emailed to the instructors of the course, who were asked to place it in their web-based course management system. Instructions were sent along with the survey link, including suggested text to be distributed to the students. Faculty were told that they could adjust the provided text to better suit their students. Faculty members were not required to endorse the survey, although their encouragement was appreciated. Students were asked to participate in the survey, but were not required to. A reminder was sent to the instructors one week after the questionnaire opened, to remind students that the questionnaire was available, and that

reminder was distributed. An example of the original communication and the reminder communication are included as Appendices C and D respectively.

Procedures

Students enrolled in online courses that are part of the general education curricula at universities in the southeastern United States were asked to complete an online questionnaire. Courses were selected based on course description, location of the institution, and "level" of the hosting institution as defined by the Southern Association of Colleges and Schools Commission on Colleges. The courses were world literature courses, as indicated in the course description. The hosting institutions are all located in the southern region of the United States, and are accredited by the Southern Association of Colleges and Schools. Each of the schools is a Level VI institution, which is defined by SACS as institutions offering "4 or more Doctoral Degrees."

The researcher sent email requests to the chairs of the departments that instruct the courses, asking for participation by the students enrolled in the courses. When the instructor's contact information was available, that person was included in initial communications too; when requested, additional information was provided about the research. The questionnaire was provided to the instructor as a web link. The instructor was asked to post the web link and an invitation to the questionnaire in the course shell (Appendix A is the questionnaire and Appendix C is the invitation). They were asked to request participation by their students on the day that the web link was available. No personal emails for the students were needed. Participation was voluntary. An incentive in the form of a chance of winning one of five iTunes gift cards for participation was

offered. Participants were not required to share their contact information, but had to in order to earn a chance for the incentive. The researcher began collecting data starting in mid-April 2008 and continued until mid-May 2008. The questionnaire was conducted through Vovici/WebSurveyor.

The invitation to participate, which was distributed by the instructors via the course shell, explained the general nature of the research, requested the participant's voluntary participation, and assured the participants of anonymity/confidentiality. Any identifying information incidentally obtained through this survey has remained completely confidential. The invitation directed the respondents to the website for the questionnaire.

Once a participant completed the questionnaire, it was submitted to a secure and anonymous database. After the survey period ended, the researcher used a password to access the results at.www.vovici.com. The data were then transferred to the SPSS program to be analyzed. This data set was used for dissertation research purposes. It may also be submitted for presentation at a professional conference or publication in a journal.

A pilot of the instrument was conducted prior to the data collection for this study. A class of online learners enrolled in a Research and Foundations course at The University of Southern Mississippi was asked to take the questionnaire. Results of that pilot were used to determine any problems with reliability of the questions.

Instrument

This instrument is based on one developed in a pilot study in fall 2005 by Comeaux. That instrument was found to have a high internal consistency (Cronbach's alpha ranged between .83 and .93). For subscales, these items have been reformulated into 8 constructs and two independent variables to better suit the purposes of this study. A panel of experts consisting of instructors of online courses and students of online courses was asked to evaluate the instrument for appropriateness of the items.

Subscales of questions were devised based partly on Comeaux's constructs and based partly on the defined categories of this research. These are:

1. Content
2. Delivery
3. Assessment and feedback
4. Technical Support
5. Learner experience with technology
6. Learner experience with distance learning
7. Interaction
8. Physical Space
9. Support Network
10. Characteristics of adult learners

These subscales represent characteristics that previous studies have shown to make an impact on learning, and on distance learning. Definitions can be found in Chapter 1 of this research. The items were constructed in accordance with the definitions of the categories, and at least 4 items represent each category. This number is generally

held to be an acceptable number of questions to communicate and validate the meaning of a construct. In some cases, more than four questions are used to define a category. Likert-type item scores ranging from one (Strongly Agree) to five (Strongly Disagree) will be used.

There was demographic information collected for study. Demographic information was collected in text or multiple selection formats. Some of this data was used to assess additional information about the participants, and perhaps provide different information for the study.

The instrument consists of seventy questions/statements.

Data Collection

Data collection was done via the online questionnaire and collected in the database of the online survey tool Vovici. Instructors of world literature courses at four institutions of higher learning allowed their students to participate. The researcher made the survey available and provided the survey link to the instructor of the course. Students were asked to volunteer their time to complete the survey, but there was no penalty for not participating. Students were required to make selections about their agreement with a statement, or were asked to provide text for short answers. Students were allowed to skip items, and that did not nullify the data set. Upon completion of the survey, the student selected "Submit Survey" to complete the activity. Students who abandoned the questionnaire without submitting results were not counted in the sample.

Submission of the questionnaire by a participant created a complete data record in the database that was used for analysis in SPSS. At the end of the survey period, the

dataset was closed and analyzed. Survey participants did not have access to the records or to the results.

Data Analysis

The researcher captured data from the questionnaire after the survey window closed. Spearman correlation was used to determine the correlation of the constructs to anticipated academic achievement in six hypotheses. A Multinominal Regression was used for the correlation for the final hypothesis. Mann-Whiney tests were used to test two situations in which the independent variables were not constructed from several questions, in order to see how they correlated to anticipated academic achievement. A table of the hypotheses (H1-H9) for this study follows (see Table 1).

Limitations

The researcher recognizes that this study is based on student perception of learning, and not on actual learning. It is, therefore, missing direct measures of learning. This study did not survey students who did not persist in these courses. The researcher did not make an effort to contact those students who did not complete the course. This offers opportunity for further research, to validate or revise results from this study. Finally, this instrument's validity has not been confirmed. Statements about the use and reliability of the instrument can not be unequivocally made.

Table 1

Hypotheses

Item	Questions Associated	Hypotheses Associated
Learner Experience with DL	4	H4
Learner Experience with Technology	5, 6, 7, 8	H3
Content	10, 11, 12	H9
Delivery	15, 16, 17	H9
Assessment and Feedback	18, 19, 20	H9
Interaction	21, 22, 23, 24, 25, 26, 27, 28, 29	H2
Support Network	30, 31, 32, 33, 34, 35, 36	H1
Physical Space	37, 38, 39, 40, 41, 42, 43, 44, 45, 46	H5
Technical support	48, 49, 50, 51, 52, 53	H6
Characteristics of adult learners	13, 14, 56, 57	H7
Major	63	H8

Summary

This study is designed to identify which of the ten factors identified for this study of the learning environments are predictive of student learning. The categories identified as relevant draw from the literature about learning, adult learning, and distance learning. A basis for the survey instrument was found in research conducted by Comeax in 2005, but adapted to extend the purpose and usefulness of the study.

Data collected in this research provided evidence about what characteristics of students' environments are associated with attitudes about learning in online courses, how students participate in online courses, how students perceive interactions and connectedness in online courses, and students' perception of learning in online courses. The use of Spearman correlation and chi-square analysis allowed conclusions to be drawn about the correlation of these factors to learning in distance education. The results of the study can inform decisions about creating online learning courses, and about preparing students to participate in online courses.

The success of this study depended upon participation from others. Faculty who were willing to allow their students to volunteer to be subjects in this study had to be engaged. Students also had to be willing to complete this survey. Encouraging faculty and students to engage in this study presented a challenge for this study, and was addressed through an incentive for participation by the students. Students who completed the questionnaire and provided contact information were randomly selected to get one of five iTunes gift cards.

CHAPTER IV

RESULTS

During the survey period, the link to the online questionnaire was sent electronically in an e-mail to approximately three-hundred students from four different Level VI SACS (Southern Association of Colleges and Schools accreditation agency) institutions. One hundred seventy (170) students of different backgrounds completed the questionnaire. All 170 cases of data were analyzed, and no particular item was missing more than five responses. The survey period lasted for four weeks. Of those students who logged onto the survey hosting site, fifty-six percent (56%) completed and submitted the questionnaire. The response rate reflects the percentage of students who submitted results for the questionnaire after activating the link for it. The abandonment rate (those who opened the questionnaire but did not complete it) was forty-four percent.

Sample Characteristics

The responses came from four institutions and covered a wide range of demographics. Respondents' ages ranged from 18 to 54 years, and their experience with online courses ranged from first-time participants (54% of respondents) to 5 or more courses (7% of respondents). Thirty-eight percent (38%) of the sample was male; sixty-two percent (62%) was female. Five percent (5%) of respondents were married, ninety-four percent (94%) were single, and one percent (1%) was separated. Respondents were Caucasian (59.4%), Asian-American (18.8%), African American (7.6%), Native American (1.2%), Hispanic (7.6%), and Other (5.3%). Respondents' majors included Biology, Business, Elementary Education, Fashion Design, History, Nursing, and "Undecided" among 61others. They classified themselves as Freshmen (13.5%),

Sophomores (60%), Juniors (14.7%), Seniors (10.6%) and non-degree seeking (1.2%). Forty-five percent of respondents do not work, but the fifty-five percent who do work are employed for less than 20 hours (24%) up to forty hours or more (8.2%). Eighteen percent (18%) of these respondents are attending college for the first-time.

For the purpose of analysis, the items were grouped according to the constructs they measured, and the descriptive statistics for each item were calculated. Responses could range from 1 (Strongly Disagree) to 5 (Strongly Agree). The means of the items were all above 3.0, except for one item measuring interaction, one item measuring physical space, and three items measuring technical support. The standard deviations for the items grouped by construct were calculated, and they ranged from .092 to 1.25. Spearman correlations were conducted for 6 of the hypotheses, Mann-Whitney tests were conducted for two hypotheses, and a Multinominal Regression was conducted for one hypothesis. Tables for each of the items measuring each construct are presented below (see Tables 2-10).

Table 2

Item Statistics for Learner Experience with Technology (N=168):

Item	Mean	SD
I was comfortable using all software needed to complete the course	4.19	.979
I was comfortable navigating the Internet to locate information for this course.	4.29	.936
I was comfortable submitting online assignments.	4.08	1.035
I was comfortable using digital communications required for this course.	4.02	1.100

Table 3

Item Statistics for Content (N=167)

Item	Mean	SD
The content was structured (ordered and sequenced) to make learning easier.	3.95	1.005
The content was neither too simple nor too complex.	3.73	.978
Specific examples were used to help increase my understanding of the course content.	3.92	.960

Table 4

Item Statistics for Delivery (N=167)

Item	Mean	SD
Instruction was delivered clearly.	3.96	.946
Instruction included multiple methods of delivery, such as use of textbook, videotaped presentations, PowerPoint slides, discussion board, etc.	4.14	.959
The reading, discussions, writing, and problem solving in this course helped me learn the course content.	3.87	1.071

Table 5

Item Statistics for Assessment and Feedback (N=170)

Item	Mean	SD
Assignments and exams were clearly linked to content.	4.30	.737
My instructor's feedback on assignments was used to guide and/or improve learning.	3.74	1.074
My instructor's feedback was received in a timely manner	3.96	.935

Table 6

Item Statistics for Interaction between Students and Their Peers or Instructor (N=165)

Item	Mean	SD
Interaction with my instructor helped me to learn the courses content.	3.62	1.045
My teacher willingly helped me with my coursework when I asked for it.	3.90	.838
I feel that my teacher is approachable.	4.11	.834
Student work groups were incorporated for the completion of projects and/or assignments.	3.50	1.108
Learning groups where students worked together to complete an activity or prepare for an exam were supported by the instructor.	3.72	1.052
Interaction with other students helped me to learn the course content.	3.24	1.066
I participated frequently in chats/discussions for this course.	3.18	1.158
I participated frequently in study groups for this course.	2.67	1.170
I feel that other students in my class were approachable.	3.45	1.021

Table 7

Item Statistics for Support Network (N=165)

Item	Mean	SD
My family members were supportive about my taking an online course.	3.64	.904
My friends were supportive about my taking an online course	3.67	.898
My faculty advisor was supportive about my taking an online course.	3.61	.881
I discussed taking an online course with people who are close to me.	3.15	1.198
Going into this course, I had a negative attitude about taking an online course.	3.36	1.250
I would recommend this online course to a friend or fellow student.	3.63	1.127
I will take another online course.	3.70	1.138

Table 8

Item Statistics for Physical Space (N=165)

Item	Mean	SD
I had control over where I did my work for this course.	4.18	.833
The physical location where I did my work was always the same place.	3.45	1.202
The physical location where I did my work was appropriate for my learning.	3.91	.936
The physical location where I did my work was noisy.	2.55	1.050

The physical location where I did my work did not interfere with my learning.	3.76	.932
I had control over when I did my individual work for this course.	4.07	.816
I had control over when I did group work for this course.	3.38	.997
I was required to attend a scheduled lecture or session for this course.	3.96	1.150
I scheduled time to do the work for this course just as I would schedule attendance and work for a traditional course.	3.60	1.103
I did my work for this course during the time of day when I know I learn best.	3.52	1.045

Table 9

Item Statistics for Technical Support (N=169)

Item	Mean	SD
My teacher provided technical support through Web pages, telephone, e-mail request.	3.98	.873
The institution provided technical support through Web pages, telephone, e-mail request.	3.85	.893
My family provided technical support.	2.74	1.119
Fellow student in the course provided technical support.	2.93	1.113
My friends not in the course provided technical support.	2.74	1.093
If I had a problem with the technology, I knew who to contact for support.	3.60	1.071

Table 10

Item Statistics for Characteristics of Adult Learners (N=166)

Item	Mean	SD
I see a clear connection between what I have learned in this course and my previous life experiences.	3.26	1.144
I have a clear idea of how I can apply this course content to my life.	3.14	1.159
Learning interests me.	4.15	.836
I prefer learning that requires me to solve problems.	3.65	.990

Then, the data were analyzed to gain some information about the reliability of the instrument. A reliability coefficient was calculated for each of the constructs (Learner Experience with Technology, Content, Delivery, Assessment and Feedback, Interaction, Support Network, Physical Space, Technical Support, and Characteristics of an Adult Learner) assessed. Overall, a consistent pattern of high reliability resulted, with Cronbach's alpha values ranging from .752 (Assessment and Feedback) to .919 (Learner Experience with Technology), although the reliability for Characteristics of an Adult Learner was a .665. The Cronbach's alpha values for each construct, as well as descriptive statistics for all independent (predictor) variables, are given in Table 11.

Table 11

Descriptive and Reliability Statistics

Construct	N	Mean	SD	Cronbach's Alpha	Associated Hypothesis
Experience with Technology	169	4.14	.87	.919	H3
Content	167	3.87	.84	.828	H9
Delivery	167	3.99	.85	.822	H9
Assessment and Feedback	170	4.00	.76	.752	H9
Interaction	165	3.48	.62	.780	H2
Support Network	165	3.53	.68	.762	H1
Physical Space	165	3.64	.58	.764	H5
Technical Support	169	3.30	.70	.760	H6
Characteristics of Adult Learners	166	3.56	.74	.665	H7
Major	170	3.617	.77		H8

Statistical Analysis

The hypothesized relationships between the eight defined constructs assessed and anticipated academic achievement were tested through Spearman correlation analyses of the multiple independent variable constructs and the one dependent variable. Mann-Whitney tests were conducted for the independent variables of learner experience with distance learning and major, and the dependent variable of anticipated academic achievement. The dependent variable was "Anticipated Achievement by Expected Course Grade," and it was measured on an ordinal scale of 0 through 4, with 0=F, 1=D,

2=C, 3=B, and 4=A. For analytical purposes, the "D" and "F" grades were collapsed into a single categorical variable. The frequencies indicated that most students had high expectations for their anticipated grades.

The individual item responses for each construct were combined into single independent variables by averaging the responses to represent the constructs. The scores for each question were averaged to create a single mean for the construct. To answer the research questions, the independent variables of Learner Experience with Technology, Interaction, Support Network, Physical Space, Technical Support, and Characteristics of Adult Learners were entered into a Spearman correlation with the dependent variable of academic achievement. Spearman correlations were run to test each of the constructs with the dependent variable of anticipated academic achievement.

Of the nine hypotheses, four were supported and five were not. The constructs that demonstrated a statistically significant positive relationship to anticipated academic achievement are interaction and physical space. When the constructs of content, delivery, and assessment and feedback are removed as variables, the remaining constructs of support network, experience with distance learning, physical space, interaction, experience with technology, and technical support have statistically significant correlation with anticipated academic achievement. Mann-Whitney test showed a statistically significant relationship between anticipated academic achievement and major. The other constructs of support network, technical support, experience with technology, and characteristics of adult learners failed to show significant relationship to expected academic achievement. Finally, the previous experience a learner had with distance learning showed a relationship between anticipated academic achievement and

experience with distance learning when run with a Mann-Whitney test, but not in the way hypothesized. If learners had previously taken online courses, instead of anticipating a higher grade than those who had not previously taken an online course, they anticipated lower grades than those who had no experience in an online course. A table of the results of the correlation statistical analyses follows (see Table 12).

Table 12

Correlation Coefficients of Construct Hypotheses with Academic Achievement

Hypothesis	N	Correlation Coefficient	Sig. (2-tailed)
1 – Support Network	170	.008	.916
2 – Interaction	170	.258*	.001
3 – Experience with Technology	170	.140	.068
5 – Physical Space	170	.209*	.006
6 – Technical Support	170	.044	.569
7 – Adult Learner	170	.143	.063

*Note: *p<.05*

Hypothesis 1

There will be a significant positive relationship between support network and academic achievement.

The hypothesis that a student's support network would positively relate to a student's perception of academic achievement was not supported in this study, using a Spearman's rho rank order correlation procedure. Students who talked to their family, friends, and guidance counselor about taking an online course did not report higher anticipated academic achievement than their counterparts. Although they reported that they would recommend this course to a fellow student (mean = 3.63) and that they will take another course (mean = 3.7), their perceptions of learning was not higher than those

who reported less support. With a Spearman's rho correlation coefficient of just .008, this was the smallest correlation in the study, and the hypothesis was not supported (see Table 12).

Hypothesis 2

There will be a significant positive relationship between interaction and academic achievement.

The hypothesis related to the Interaction construct was supported. This factor has a statistically significant relationship with anticipated academic achievement, $\rho(170) = .258$, $p<.001$. Students who agreed that their teachers and fellow students were available and approachable, that they participated in discussions with the teacher and peers, and that these interactions helped them learn, were more likely to report a higher anticipated academic achievement in their online courses.

Hypothesis 3

There will be a significant positive relationship between experience with technology and academic achievement.

The relationship between experience with technology and anticipated academic achievement was not statistically significant using Spearman rho's correlation coefficient. Students who reported they were comfortable with the software, hardware, and electronic communications necessary for the course did not report that they expected higher grades than students who were less experienced with the technology necessary for the course.

Hypothesis 4

There will be a significantly higher academic achievement for those students who have previously taken an online course.

The result of a Mann-Whitney test did not support the hypothesis that students who had previously taken an online course would anticipate higher academic achievement than those who had not. The results, in fact, supported a contrary relationship. The mean rank was higher for those who had not taken an online course previously, indicating that those students who previously took an online course anticipated a lower level of academic achievement, U=2431.000, z = -3.825, $p < .05$. The Mann-Whitney test results are presented in Table 13 (see below).

Table 13

Mann-Whitney Test for Experience with Distance Learning and Anticipated Grade

Experience with Distance Learning	N	Mean Rank	Mann-Whiney U	Z	Asymp. Sig
No	92	97.08			
Yes	77	70.57			
Total	169		2431.00	-3.825	<.001

Note: p<.001

Hypothesis 5

There will be a significant positive relationship between physical space and academic achievement.

Spearman rho's correlation coefficient was statistically significant for this hypothesis, $\rho(169) = .209, p<.05$. Students who anticipated a higher level of academic achievement also agreed that their workspace affected their ability to learn. Students who reported that they had control over their workspace (M = 4.18), that the space was appropriate for learning (M = 3.91), that the space did not interfere with their learning (M = 3.76), and that they scheduled time for this course just as they would for traditional courses (M = 3.60) also reported higher anticipated academic achievement.

Hypothesis 6

There will be a significant positive relationship between technical support and academic achievement.

The hypothesis that technical support would have a positive, statistically significant relationship with anticipated academic achievement was not supported by the Spearman rho's correlation coefficient. Students who reported that they received technical support from the instructor, institution, friends, and family did not always anticipate higher academic achievement. The means for the responses to the questions ranged from 2.74 to 3.98, showing a moderate range of agreement from one question to another question within the construct.

Hypothesis 7

There will be a significant positive relationship between characteristics of adult learners and academic achievement.

Spearman's rho correlation coefficient for the relationship between characteristics of adult learners and academic achievement was .143, which was not statistically significant. Items assessing interest in learning for learning's sake, preference in problem-based learning, and seeing a clear connection between what they are learning and what they experience in their daily lives were drawn from Knowles' work (1985). The hypothesis was that students who agreed with these statements would achieve higher academic achievement in the online course. The aggregate responses in this study did not support this hypothesis, as seen by the item statistics in the data in Table 10 and the correlation coefficients in Table 12.

Hypothesis 8

There will be a positive relationship between students who have chosen majors in the fields of Science and Technology… and academic achievement.

For the analysis of major to determine if students in Science and Technology programs are more likely to perceive academic achievement in online learning, the hypothesis is supported when a Mann-Whitney test was used to analyze data for students who were in science and technology majors compared to those who were in other majors, $U = 1869.500$, $z = -3.879$, $p = .001$ (see Table 14). Students whose majors are in fields that are related to science or technology demonstrated expectations of higher grades than did those in other majors.

Table 14

Mann-Whitney Tests for Major in Science and Technology

Science and Technology Major:	N	Mean Rank	Mann-Whitney U	Z	Asymp. Sig.
No	123	77.20			
Yes	47	107.22			
Totals	170		1869.500	-3.879	.000

Note: $p<.001$

Hypothesis 9

There will be a significant positive relationship between the variables of support network, interaction, experience with technology, experience with online courses, physical space, and technical support, and academic achievement.

For the final hypothesis (H9) that removes Content, Delivery, and Assessment and Feedback as factors in anticipated academic achievement, the results were significant. Using Multinominal Regression, Interaction and Experience with Distance Learning were statistically significant, while Support Network, Technical Support, Physical Space and Experience with Distance Learning were not ($R^2_{CS} = .276$). The strongest relationship to anticipated academic achievement was interaction, while experience with technology was the weakest.

Table 15

Likelihood Ratio Test

Constructs	Chi-Square	df	Significance
Support Network	6.319	3	.097
Interaction	11.748	3	.008*
Experience with Technology	5.125	3	.163
Physical Space	5.257	3	.154
Technical Support	5.908	3	.116
Experience with Distance Learning Courses	14.560	3	.002*

Note. $*p < .05$

Ancillary Findings

The data from Hypothesis 9, regarding the significance of the constructs when Content, Delivery, and Assessment and Feedback are removed from the analysis revealed some interesting statistics regarding the relationship of the constructs and academic achievement when the categorical grades are examined. For students who anticipated a grade of "D" or "F", there was a significant correlation between technical support and academic achievement (p=.033); for students anticipating a "C" or above, there is no statistical significance. Conversely, students who anticipated a "B" or higher grade also reported stronger agreement with the questions in the construct for Support Network, and the relationship was statistically significant, (p=.032). Similarly, the correlation between experience with technology and academic achievement was not significant for students

anticipating a "D", but was higher for students anticipating a "B" or "C"; while none are statistically significant at $p<.05$, the difference is noted.

The construct called "Characteristics of Adult Learners" resulted from changes to the questionnaire after the instrument had been piloted. It included statements derived from Malcolm Knowles' descriptions of adult learners, and it was used in order to identify students who participated in the online class with the purpose and intent that Knowles described in adult learners. The hypothesis was that students who agreed with these statements would achieve higher academic achievement in the online course. The aggregate responses in this study did not support this hypothesis, $\rho(170) = .143, p = .063$, as seen in the data in Table 12.

There was an interest in seeing if older students would define themselves in this way, and if the characteristics of adult learners were associated with higher anticipated academic achievement. In filtering the students who are over the age of 25 (Age greater than or equal to 25) which has been defined in many studies as the age of "adult learners" (Donaldson, 1999; Justice & Dornan, 2001), there were only 16 cases in the data set. Since a larger N was not present, the data sample was weighted to see if a larger population might have produced results that did support the hypothesis. When the sample was weighted by a factor of 2.2, the results revealed that characteristics of adult learners, when traditional college-aged students are not included in the sample, are statistically significant, $R^2 = .114$, $p<.05$ Students who had taken courses before were older (22.92 years versus 18.98 years), they perceived a stronger support network and they anticipated a lower grade. This indicates that the construct may be sound, but also

that responses from traditional-aged college students who would not be expected to demonstrate characteristics of adult learners may have produced false negative results.

Another ancillary finding was also identified. The analyses of the data revealed that the constructs did not accurately predict the grade that students anticipated in all hypotheses. However, students were also asked about their perceived learning. The statement they responded to was "I learned the content of this course." Statistical analysis was run using the same constructs, to see if there is a positive correlation between the constructs and this statement about perceived learning. For all six of the constructs –support network, interaction, experience with technology, physical space, technical support, and characteristics of adult learners – there was a positive correction (see Table 16).

Table 16

Perceived Learning (N=167)

Construct	Spearman Correlation	Sig. (2-tailed)
1 – Support Network	.484	<.001
2 – Interaction	.477	<.001
3 – Experience with Technology	.356	<.001
4 – Physical Space	.459	<.001
5 – Technical Support	.266	<.001
6 – Adult Learner	.570	<.001

From this data set, the difference between anticipated grade and perceived learning is clear and distinct. The grade that a student earns may not reflect the learning that has occurred. The result is that the constructs that were identified as having probable impact on student learning online, and the hypotheses that were developed to investigate the relationship, may have more validity than the original results of this study indicated. By moving the focus away from grades and pointing it toward learning, research can reveal strengths and interventions that could improve or maintain high levels of learning both online and in the traditional classroom.

CHAPTER V

DISCUSSION

Overall, the empirical investigation reported in the previous chapter supports the constructs of interaction, physical space, and major as related to academic achievement, as assessed by anticipated grades. Students' perceptions of the frequency and strength of the availability of and connections to their instructor and their peers correlates positively to their anticipated grade. Their abilities to control their physical space, to create a physical environment in which they were ready and able to learn, also related to their academic achievement. Finally, the hypothesis that students who were Science and Technology majors were also more likely to anticipate a higher grade in the courses was also supported. The study does not support the hypotheses that support networks, technical support, characteristics of an adult learner, or previous experience with distance learning could correlate with academic achievement. In an unanticipated discovery, the data do show that each of the six constructs of support network, physical space, interaction, experience with technology, technical support, and characteristics of adult learners does relate to whether a student believes that he or she has learned the content of the course. This chapter will discuss what these results may mean to the study and practice of online learning.

Support Network

The first hypothesis of this study, that a strong support network would lead to higher anticipated grade, was not supported by these data. Although there were high means within this construct, questions within the construct had higher standard deviations. The items assessed students' opinions as to the extent to which their friends, family, and advisor supported them taking an online course. For each group, students reported relatively high levels of agreement, revealing a perceived high level of support from these groups. The results also revealed that they would recommend this course to a friend and would take another online course. These results would suggest that they anticipated being successful in this course and would thus try again. These responses would suggest an environment that would lead to success in this course.

Students were neutral about whether they had a negative attitude about taking an online course. Hannifin, Oliver, Hill, Glazer, and Sharma (2003) indicated that student attitudes toward different dimensions of web-based education vary and are revealed in their expectations for learning. This information in isolation may indicate a predictor of academic achievement, and should be investigated. It may help explain the lack of relationship between this construct and anticipated academic achievement.

Interaction

Students who responded positively to availability and interaction with their instructors and peers responded positively to anticipation of high academic achievement. Interaction has been identified as a significant factor in student success, retention, and graduation for decades. Malcolm Knowles (1985) wrote specifically that interaction

allows understanding to grow, since it provides the opportunity for students to examine their thinking, receive input from the instructor and other students, and validate or revise their thinking. Astin's monumental work, *What matters in college* (1993), showed through five years of research that students are more likely to persist when they are engaged as part of a community of learners, interacting with their fellow students as well as with faculty. Along with the work of Pascarelli and Terranzini (2005), Kuh, Kinzie, Schuh, and Whitt (2005) and others, evidence repeatedly reveals the importance of engaging students in all experience during college. Engaging students in learning requires making it meaningful for and important to them, so that they see the value in participating.

In online courses, as this study has revealed, engagement in the form of interaction with faculty and students supports student success. Those who reported interaction in the class also reported anticipated success in academics. These successes contribute to retention and graduation of students (Wagner, 1997). This research shows a moderate correlation between the two. Students who found the teacher approachable and available and who took the opportunity to interact with other students benefited from this in higher anticipated grades. This suggests that institutions should pay attention to the interactivity of classes, both online and in the classroom, to identify if the students would benefit from involvement and connection to their instructors and peers as a way to improve academics. The data of this study communicate a value in this type of research.

Experience with Technology

Results of this study do not support the hypothesis that a student's experience with technology can be a factor in whether he or she anticipates a good grade in the online class. King (2001) wrote that a tool can affect learning, especially when it is the primary messenger for content delivery. When students are unable to handle the tool, there is an impediment to learning. This bore out in the results of this study only when examining students who anticipated a D. Students who reported that they were comfortable with the software and hardware required for the course also reported higher anticipated grades. The course functioned well for them, and this facilitated progress through the course.

For institutions that engage in online learning, which accounts for more than 60% of public institutions currently, this fact needs to be a consideration. Students should not be prohibited from enrolling because of lack of experience with a technology tool. They should instead be given opportunities to become comfortable with the tool, prior to jeopardizing academic success because of the lack of experience. States like North Carolina have introduced programs of online learning for high school students, involving onsite facilitators and other technical support for students. This type of program may allow students to become comfortable with online learning, while having onsite support to help them overcome the technical learning curve. Institutions might consider creating similar ventures, either on-campus facilitation or introductory courses, to allow students to get the hard skills needed to succeed online. The data confirm the connection between a relative lack of experience with technology and lower levels of anticipated academic achievement in online learning courses.

Experience with Distance Learning

The data from this study did not support the hypothesis that students who had previously taken an online course would anticipate higher academic achievement in this online course. While research, including this study, has shown that comfort with a learning environment positively influences learning (Johnson, 1985; King, 2001), the single factor of having previously taken an online course did not result in higher anticipated grades. This was not a construct but was a single question: "How many distance learning courses have you taken, including this one?" It was surmised that students who had taken more than one would have greater success because of familiarity with the environment. The opposite proved true from the data of this study. Students who took this course as their first online class anticipated higher grades than those who previously took an online course.

Additional analysis with regard to this variable revealed more information that may guide future research. Students who had previously taken online courses were compared to students who were in their first online course, with regards to all of the constructs and the demographic variable of age, to see if anything would be revealed about these learners. There was statistical significance for only three variables. Students who had taken courses before were older, they perceived a stronger support network and they anticipated a lower grade. A definitive conclusion about why this may be cannot be stated from this research, and any explanations would be speculation. It does point to a need to understand why previously taking an online course would not lead to higher expectation of learning. This would indicate that while projects such as those introduced

in North Carolina could provide a level of comfort with technology, merely taking the course does not provide anticipation of academic success. Looking at the students' previous academic success in other courses may be one avenue of research. This raises questions about *why* students who previously took online classes did not anticipate greater academic success than those who did not, an area of research that might offer valuable information to academic planners.

Physical Space

The data from this study support the hypothesis that the physical space in which students study for an online course is associated with their anticipated grades. Students who reported that they controlled their environment – when they learned and where they learned – also reported higher levels of anticipated academic achievement. A learning environment affects a student's focus on learning because an environment that does not meet the learning needs of the student does not lend itself to successful learning for that student. As Eastmond (1994) and Knowles (1985) argued, the physical environment can influence whether a student is retained and succeeds in a course. Knowles even mentioned the temperature of a room making a difference. This study asked students about control over the work space, and their perception of whether it was appropriate for their individual learning. Students who responded positively to their ability to control the workspace, be free from interference, and learn where it was appropriate for them also reported higher academic achievement.

The lesson from this information is that students need to have access to study spaces that suit their learning. Students in this study were asked about participating in

their online classes at a time that suited their learning, and they were asked if they scheduled time to participate. Students who identify the appropriate time for learning and schedule a consistent time to do are considered mature students who will succeed as online learners (Mood, 1995). Students who are not able to do this are more likely to not persist in a course. This suggests further study of students who do not persist in a class, to see if time management lessons might improve online course retention. This would also indicate to institutions that are offering online courses that students might benefit from suggestions about where to study, and that study areas for traditional students taking online courses could be designed around how and when students learn best. For those students who do structure their physical learning environment to their personal needs, anticipated academic achievement was more likely.

Technical Support

The results of this study did not support the hypothesis that perceived access to technical support would lead to academic achievement. The hypothesis may have failed because of the variation of questions within the construct. Responses to the questions about technical support showed a distinction that may reveal a need for clarification in the questions. The items proved to be valid in the pilot, and the reliability of the construct was strong with a Cronbach's Alpha of .760. The responses to questions about getting support indicate that students got technical support where and when they needed it (questions 1, 2, and 6 in this section). However, when asked about *who* they turn to, students selected a neutral response. When asked if they turned to family, friends, or fellow classmates (questions 3, 4, and 5 in this section) the strength in agreement with the

statement was lower, as revealed in Table 9. This may indicate that the focus of this construct should be on information and availability of technical support rather than the personal support network, so this should be considered in future studies. The overall means for other questions in the construct, related to technical support from the instructor, institution, and overall comfort with knowing who to contact for technical help, may reveal the resources to which students turned for help.

The exception to this is for students who anticipated a lower grade of "D" or "F." For the items within the constructs, these students both disagreed that they knew who to call for assistance, and that they got help from the instructor or their peers. For those students who do not know where to seek technical assistance, the hypothesis that they would not succeed in an online learning environment proved correct. Institutions with online learning programs should understand the likelihood of low achievement if technical support provisions are not provided and communicated. For students who anticipated higher grades, however, further investigation into who students sought out for help may uncover the real source of technical support, although this study suggests that help comes from the institution and not family and friends.

Characteristics of Adult Learners

The hypothesis for this study stated that students who describe themselves with traits of adult learners would anticipate higher academic achievement. The data for this study did not support that, when looking at the overall population. Students were asked to respond to statements that Knowles (1985) and others have deemed typical of adult learners. They were asked if they are interested in learning, if they prefer learning that

involves problem solving, if they see a clear connection between the course content and their lives, and if they have a clear idea of how to apply the course content to their lives. The data set did not reveal a correlation between students who responded positively to these questions and to anticipated academic achievement.

Further analysis sought to look at the pool of students who are "adult learners" based on their age, (greater or equal to 25). The data set was weighted to see if a larger sample of students might have presented results that supported the hypothesis. Based on the weighting, this data set indicated that the hypothesis would apply to chronologically "adult" learners. However, for students who are under 25 there is not a significant correlation between characteristics of adult learners and anticipated academic achievement in these online courses.

Major

The hypothesis that students who were Science and Technology majors would anticipate a higher grade (academic achievement) was supported. Eastmond (1994), Hannifin et al (2003), and Rovai and Baker (2005) all demonstrated through their research that computer literacy, technical experience, and comfort with particular instructional strategies influenced online learning. Students comfortable with technology overall seemed more likely to be comfortable in learning via technology, and therefore, more likely to persist and succeed in this online course, as the data in this study showed.

Just as with the "Experience with Technology" construct, this result does not ignore the fact that these students may be intelligent, and that this alone may explain their success. Standardized test scores for entering freshman are typically higher for those

declaring majors in the fields of Science and Technology, and this may explain some of the results of this study. However, further study into the overall academic achievement of the students in the data set would be required to come to that conclusion.

Contributions to the Literature

This study enhances the work about interaction and online learning put forward by Moore (1993a & 1993b) and Shin (2001). Moore and Shin revealed that transactional distance can result in less connectivity to the course, content, instructor, and peers, which can result in failure to persist for distance learners. The data from this study support the hypothesis that interaction among students and between students the instructors has a significant relationship to a student's perceived learning, as well as to the anticipated grade. This study supports the need for research into the types and levels of interaction that result in improvements in learning.

It adds to the literature about overall learning environments contributing to the learning of students, as researched Knowles (1985) and Eastmond (1994). Where and when a student studies seemed to have a significant affect on the success of students who participated in this study. Helping students select the space and time in which they complete their online studies can make an impact on how they achieve academically. Working with students to understand their learning environments, and looking at the specifics of those environments, will improve learning outcomes.

Most importantly, this study has revealed the importance of a variety of factors related to student learning. The distinction between grades and learning is important.

Students can learn without achieving the top grades, and that needs to be recognized at institutions of higher learning. Students also have responsibility for learning, and can control the environmental factors that influence learning. They need to be made aware of variety of factors that contribute to or detract from learning. More needs to be understood about the variables that may directly relate to learning, but recognizing that factors can influence learning must be appreciated and respected.

Conclusions

This study was undertaken in order to examine the learning environments for undergraduates taking online literature courses that are required in their institutions' general education curricula, in order to offer recommendations for improving student academic achievement in these courses. The study offered constructs that defined aspects of the learning environment, based on research about online learning environments. The constructs included the physical environment, but focused on other aspects of the course environment. The Content, Delivery, and Assessment and Feedback of the course were presented as parts of the course environment because they are the structure within which the course operates. Particular focus was given to the personal support structures that surround the student, giving them a sense of presence in the course. The constructs that addressed that support structure were support network, technical support, characteristics of adult learners, and interaction. Finally, two demographic elements – experience in distance learning, experience with technology, and major – were understood to influence student learning online, and also were examined.

This study revealed that students in this study responded as predicted in only three of the nine analyses. Physical space predicted student academic achievement. When a student's major is in the hard science or technology fields, that also to predicted higher academic achievement in these courses. Those with experience and therefore comfort with the required software and hardware were more likely to predict academic achievement. Finally, students who reported a higher perceived sense of connection and interaction with their instructors and peers also anticipate higher academic achievement.

These data suggests that the constructs devised for this questionnaire provide some evidence of environmental factors that influence student learning. The original research supported use of interaction in online courses to improve academic achievement. Students who indicated being able to approach their instructors and their fellow students also indicated that they anticipated higher grades. These students engaged in discussions with classmates, had opportunities and encouragement to participate in group assignments, and received help and attention from the instructor when it was requested. This hints that involving students in classes as participants, engaging them in learning through interaction with their peers and the instructor, and creating a climate of approachability among participants in the class would increase the level of academic achievement in classes that are online, and probably those that are traditionally delivered. The access to conversation, communication, and interaction, which Shin calls Transactional Presence, encourage learning (Shin, 2001). Incorporating this into learning by requiring and or encouraging participation, particularly for this students who are physically separated from their instructor and students because of online learning, was

shown in this study to lead to greater anticipated academic success and perceived learning.

It also indicated that ensuring student experience with technology, particularly for students who are not Science and Technology majors, is important. Students who reported that they felt comfortable with the technology required for this course, including submitting assignments, using digital communications like e-mail and discussion boards, and working in the course management software like Blackboard and the internet, were also more likely to report higher anticipated grades. Students who reported comfort with the technology for the courses were more likely to anticipate higher grades. Eastman (1994), Hannifin et al (2003), and Rovai and Baker (2003) and others relate students success in online learning to their ability to use the technology involved. Without a fundamental acquaintance with the technical tools used in these online courses, students were less likely to anticipate academic success. This study would indicate that improving student comfort with technology would improve student success.

Providing physical environments or communicating to students about environments that improve academic success is important, based on results of this study. Mood (1995), Eastmond (1994), and Knowles (1985) suggest that physical environment that includes the location for learning, time of day of learning, and creation of a consistent schedule for learning. That finding is supported by this study. Students and institutions are encouraged to create physical environments that encourage learning, removing distraction and presenting a structure that can be adapted for students.

While these results support some of the hypotheses about learning environments for online learners, unanticipated results also reveal information that should be considered by administrators and instructors of online learning courses and programs.

Academic achievement in this study is defined as anticipated grade. Higher grades were equated with higher "academic achievement." However, students were also asked to respond to the statement "I learned the content of this course," which may be a more relevant indicator of academic achievement. (This question will heretofore be referred to as "Learning".) The Southern Association of Colleges and Schools Commission on Colleges has revised its principles to reflect movement away from grade-based evidence toward that of learning. Grades do not necessarily accurately reflect the level of proficiency achieved by students. Instead, measurements of what students know, do, or value more accurately communicate to faculty, students, administrators, and all constituents what students are learning. This research did not focus on direct measures of learning, and so direct assessments of learning cannot be discussed. However, students provided an indirect assessment of learning by responding to the question about what they believe they learned.

Analyses were run for each of the construct hypotheses, replacing the dependent variable of "anticipated grade" with the responses to Learning. For each construct, the results were statistically significant (see Table 17). The result is that the constructs that were identified as having probable impact on student learning online, and the hypotheses that were developed to investigate the relationship, may have more validity than the original results of this study indicated. By moving the focus away from grades and

pointing it toward learning, research can reveal strengths and interventions that could improve or maintain high levels of learning both online and in the traditional classroom.

This study supports the concept of environment as a factor that influences academic achievement in online learning course. Academic achievement can be examined to two ways, first as an anticipated grade and second as learning knowledge, skills, or values. Factors that predict either variety of learning include interaction, physical space, and major area of study. However, constructs that did not predict anticipated grade but did predict learning included support network, experience with technology, technical support, and characteristics of adult learners. This study points to research that needs to be conducted, based on these results.

Several constructs utilized in this study need to be reexamined. Items contained in the construct of technical support reveal standard deviations over 1.0 for three of the six questions. These three questions relate to technical support received from family and friends. These may not be the people who could or should be depended on for assistance with technology. The construct needs to be reexamined to focus on the institutional support provided for the students, which is the appropriate system and location for providing support.

The construct for characteristics of adult learners also needs to be reexamined. These questions were not piloted in the earlier version, and may not be reliable. Without a questionnaire or literature upon which to base current characteristics of adult learners, the characteristics presented by Mood and Knowles were adapted into questions. Additional research about adult learning and instruments needs to be done. Research currently being conducted in the field of adult learning may present a more reliable set of

questions and characteristics. A wider sample of adult-aged respondents may have allowed for more conclusions from this study about these learners.

This study contributes to the field of online learning by drawing attention to the relevance of online learning environments. The physical environments and technical experiences are infrastructural changes that can be made to the online learning organizations of an institution. These changes should be investigated.

The most significant change that may need to be made, and the most challenging change to make, is to the instructional system to ensure a sense of transactional presence for students. Interacting with peers and with the instructor provides an important means of communication, allowing students to exchange information, share opinions, receive feedback on those, and decide whether to maintain the opinion. In online courses, new varieties of technology can be employed to encourage interaction. E-mail exchanges, listservs, electronic bulletin board posting, chats, teleconferences, and other direct connections between course participants will engage students in communications with peers and the instructor that create a sense of community. Students will have a way to validate their thoughts, or to get guidance about the course. These interactions also provide a means of social support, as relationships develop for students to validate opinions and understanding of the course and themselves.

Interaction may create new challenges for faculty who are teaching online. The "chalk and talk" format has value and many instructors have had success in traditional classrooms using this method. For online learners that do not have the opportunity to observe the lecturer or stop by an office for a conversation about the course, this may present barriers. Moving away from the traditional teaching method to one that uses

more two-way communication may require retraining by faculty and promotion of the process. Institutions will need to be prepared to explain the value and present professional development to teach the teachers about using interaction to teach.

The resulting efforts may lead to student learning, and that needs to be the primary consideration in making a move toward more interactive courses. Students who engage in their learning report learning more. By creating direct measures of this learning, and using that data of improved learning to reinforce the process, institutions may anticipate more learning, retention in courses and programs, and graduation of students.

APPENDIX A

Students' Attitudes About Online Learning Environments

Welcome to the "Students' Attitudes About Online Learning Environments Questionnaire." The purpose of the questionnaire is to collect data related to students' perceptions of the environments in which they learn online. This research is for my dissertation. Participation in the survey is voluntary and anonymous.

Please complete the survey by rating items and providing other requested information based on the distance learning course you are currently taking. The survey will take approximately 20 minutes.

The responses will be collected so that they are completely anonymous. Following data analysis, the results of the questionnaires will be deleted from the database. Your participation is completely voluntary, and participation can be discontinued at any time. **If you are under the age of 18, you may not participate in this questionnaire**. As an incentive for participation for those 18 or older, you may enter for a chance to win one of five $25 iTunes gift cards at the end of the questionnaire. To be entered in the drawing, you will provide an e-mail contact, but that information will be separated from your responses before analysis is conducted. Your responses will be anonymous. If you prefer not to enter your e-mail with your responses, you may send an e-mail to jodipettazzoni@comcast.net to be entered in the drawing.

1) Please indicate your institution:

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2) Please indicate the course you are taking:

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3) What is your anticipated grade for this course?

- ○ A
- ○ B
- ○ C
- ○ D
- ○ F

4) How many distance learning courses have you taken, including this one?

- ○ 1
- ○ 2
- ○ 3
- ○ 4
- ○ 5 or more

5) For the next few items regarding your experience with technology, select the response that most closely indicates your experience and/or comfort level with the following: *Strongly Disagree, Disagree, Neutral, Agree, or Strongly Agree.*

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
I was comfortable using all software needed to complete the course (i.e., Blackboard, Internet Explorer, Netscape, Adobe Reader, etc.	○	○	○	○	○
I was comfortable navigating the Internet to locate information for this course.	○	○	○	○	○
I was comfortable submitting online assignments.	○	○	○	○	○
I was comfortable using digital communications required for this	○	○	○	○	○

course (i.e., email, discussion board, chat, etc.)					

6) For the next few items regarding course content, select the response that most closely indicates your experience and/or comfort level with the following: *Strongly Disagree, Disagree, Neutral, Agree, or Strongly Agree.*

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
I understood the connection between content and course goals/objectives.	○	○	○	○	○
The content was structured (ordered and sequenced) to make learning easier.	○	○	○	○	○
The content was neither too simple nor too complex for the course level.	○	○	○	○	○
Specific examples were used to help increase my understanding of the course content.	○	○	○	○	○
I see a clear connection between what I have learned in this course and my previous life experiences.	○	○	○	○	○
I have a clear idea of how I can apply this course content to my life.	○	○	○	○	○

7) For the next few items regarding instructional delivery, select the response that most closely indicates your experience and/or comfort level with the following: *Strongly Disagree, Disagree, Neutral, Agree, or Strongly Agree.*

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Instruction was delivered clearly.	○	○	○	○	○
Instruction included multiple methods	○	○	○	○	○

of delivery, such as use of a textbook, videotaped presentations, PowerPoint slides, chat sessions, discussion board, etc.					
The reading, discussions, writing, and problem solving in this course helped me learn the course content.	○	○	○	○	○

8) For the next few items regarding assessment and feedback, select the response that most closely indicates your experience and/or comfort level with the following: *Strongly Disagree, Disagree, Neutral, Agree, or Strongly Agree.*

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Assignments and exams were clearly linked to course content.	○	○	○	○	○
My instructor's feedback on assignments was used to guide and/or improve learning.	○	○	○	○	○
My instructor's feedback was received in a timely manner.	○	○	○	○	○

9) For the next few items regarding course interaction, select the response that most closely indicates your experience and/or comfort level with the following: *Strongly Disagree, Disagree, Neutral, Agree, or Strongly Agree.*

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Interaction with my instructor helped me to learn the course content.	○	○	○	○	○
My teacher willingly helped me with my coursework when I asked for it.	○	○	○	○	○
I feel that my teacher is approachable.	○	○	○	○	○
Student work groups were incorporated for the completion of projects and/or assignments. For example: the instructor allowed students to work in	○	○	○	○	○

groups to complete an assignment.					
Learning groups where students worked together to complete an activity or prepare for an exam were supported by the instructor.	○	○	○	○	○
Interaction with other students helped me to learn the course content.	○	○	○	○	○
I participated frequently in chats/discussions for this course.	○	○	○	○	○
I participated frequently in study groups for this course.	○	○	○	○	○
I feel that other students in my class were approachable.	○	○	○	○	○

10) For the next few items regarding support networks, select the response that most closely indicates your experience and/or comfort level with the following: *Strongly Disagree, Disagree, Neutral, Agree, or Strongly Agree.*

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
My family members were supportive about my taking an online course.	○	○	○	○	○
My friends were supportive about my taking an online course.	○	○	○	○	○
My faculty advisor was supportive about my taking an online course.	○	○	○	○	○
I discussed taking an online course with people who are close to me.	○	○	○	○	○
Going into this course, I had a negative attitude about taking an online course.	○	○	○	○	○
I would recommend this online course to a friend or fellow student.	○	○	○	○	○
I will take another online course.	○	○	○	○	○

11) For the next few items regarding your physical location, select the response that most closely indicates your experience and/or comfort level with the following: *Strongly Disagree, Disagree, Neutral, Agree,*

or Strongly Agree.

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
I had control over where I did my work for this course.	O	O	O	O	O
The physical location where I did my work was always the same place.	O	O	O	O	O
The physical location where I did my work was appropriate for my learning.	O	O	O	O	O
The physical location where I did my work was noisy.	O	O	O	O	O
The physical location where I did my work did not interfere with my learning.	O	O	O	O	O
I had control over when I did my individual work for this course.	O	O	O	O	O
I had control over when I did group work for this course.	O	O	O	O	O
I was required to attend one or more scheduled lectures or sessions for this course.	O	O	O	O	O
I scheduled time to do the work for this course just as I would schedule attendance and work for a traditional course.	O	O	O	O	O
I did my work for this course during the time of day when I know I learn best.	O	O	O	O	O

12) Please indicate where you most often did your work for this course:

_____

13) For the next few items regarding technical support, select the response that most closely indicates your experience and/or comfort level with the following: *Strongly Disagree, Disagree, Neutral, Agree, or Strongly Agree.*

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
My teacher provided technical support through Web pages, telephone, e-mail request.	O	O	O	O	O
The institution provided technical support through Web pages, telephone, e-mail request.	O	O	O	O	O
My family provided technical support.	O	O	O	O	O
Fellow students in the course provided technical support.	O	O	O	O	O
My friends not in the course provided technical support.	O	O	O	O	O
If I had a problem with the technology, I knew who to contact for support.	O	O	O	O	O

14) For the next few items regarding self-assessment, select the response that most closely indicates your experience and/or comfort level with the following: *Strongly Disagree, Disagree, Neutral, Agree, or Strongly Agree.*

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
The online course was equally as good as a classroom course.	O	O	O	O	O
I learned the content of this course.	O	O	O	O	O
Learning interests me.	O	O	O	O	O
I prefer learning that requires me to solve problems.	O	O	O	O	O
Taking this online course means I do not have to travel to the university.	O	O	O	O	O
I am taking this online course because it fits into my schedule (school, home and/or work).	O	O	O	O	O
I am taking this online course because it is available only online.	O	O	O	O	O

15) If you are taking this course for another reason, please explain why.

_____

16) Age:

_____years

17) Major:

_____

18) Marital status:

- ❍ Single
- ❍ Married
- ❍ Divorced
- ❍ Separated
- ❍ Widowed
- ❍ Prefer not to answer

19) Hours employed per week:

- ❍ Do not work
- ❍ Less than 20
- ❍ 20 - 29
- ❍ 30 - 39
- ❍ 40 or more

20) Gender:

- ❍ Male
- ❍ Female
- ❍ Prefer not to answer

21) Race/ethnic group:

- ❍ Asian-American/Pacific Islander

- ❍ Caucasian
- ❍ African American
- ❍ Native American/American Indian
- ❍ Hispanic/Latino
- ❍ Other

22) Classification:

- ❍ Freshman
- ❍ Sophomore
- ❍ Junior
- ❍ Senior
- ❍ Non-degree seeking

23) Total credit hours completed after this semester:

_____

24) Please indicate if you are the first person in your family to attend a college or university:

- ❍ Yes
- ❍ No

25) You may enter for a chance to win one of five $25 iTunes gift cards. To be entered in the drawing, provide your e-mail contact. If you prefer not to enter your e-mail with your responses, you may send an e-mail to jodipettazzoni@comcast.net to be entered in the drawing.

E-mail Address _____

Thanks for sharing your thoughts!

APPENDIX B

THE UNIVERSITY OF SOUTHERN MISSISSIPPI

Institutional Review Board

118 College Drive #5147
Hattiesburg, MS 39406-0001
Tel: 601.266.6820
Fax: 601.266.5509
www.usm.edu/irb

HUMAN SUBJECTS PROTECTION REVIEW COMMITTEE
NOTICE OF COMMITTEE ACTION

The project has been reviewed by The University of Southern Mississippi Human Subjects Protection Review Committee in accordance with Federal Drug Administration regulations (21 CFR 26, 111), Department of Health and Human Services (45 CFR Part 46), and university guidelines to ensure adherence to the following criteria:

- The risks to subjects are minimized.
- The risks to subjects are reasonable in relation to the anticipated benefits.
- The selection of subjects is equitable.
- Informed consent is adequate and appropriately documented.
- Where appropriate, the research plan makes adequate provisions for monitoring the data collected to ensure the safety of the subjects.
- Where appropriate, there are adequate provisions to protect the privacy of subjects and to maintain the confidentiality of all data.
- Appropriate additional safeguards have been included to protect vulnerable subjects.
- Any unanticipated, serious, or continuing problems encountered regarding risks to subjects must be reported immediately, but not later than 10 days following the event. This should be reported to the IRB Office via the "Adverse Effect Report Form".
- If approved, the maximum period of approval is limited to twelve months. Projects that exceed this period must submit an application for renewal or continuation.

PROTOCOL NUMBER: **28041403**
PROJECT TITLE: **Measuring Factors That Influence Attitudes of Learning in Online Learning Environments: Transactional Distance, Technical Efficacy, and Physical Surroundings**
PROPOSED PROJECT DATES: **04/14/08 to 05/16/08**
PROJECT TYPE: **Dissertation or Thesis**
PRINCIPAL INVESTIGATORS: **Jodi Pettazzoni**
COLLEGE/DIVISION: **College of Education & Psychology**
DEPARTMENT: **Educational Leadership & Research**
FUNDING AGENCY: **N/A**
HSPRC COMMITTEE ACTION: **Expedited Review Approval**
PERIOD OF APPROVAL: **04/14/08 to 04/13/09**

Lawrence A. Hosman, Ph.D.
HSPRC Chair

4-17-08
Date

APPENDIX C

Request for Student Participation

I am a doctoral student who is researching environments associated with online learning. I need your help in order to measure students' attitudes about their online learning environments. The sole purpose of this questionnaire is to collect data for my dissertation, and data collected via the survey will be used for this purpose, and for publications and presentations that result from it. By taking this questionnaire, you will be providing information about online learners' attitudes and environments that may help instructors and institutions create better online learning environments for future online learners.

It is an opinion survey, so you merely have to report your thoughts about the statements presented. The survey will take approximately 20 minutes. The responses will be collected so that they are completely anonymous. Your participation is completely voluntary, and participation can be discontinued at any time. **If you are under the age of 18, you may not participate in this questionnaire**. As an incentive for participation for those 18 or older, you may enter for a chance to win one of five $25 iTunes gift cards at the end of the questionnaire. To be entered in the drawing, you will provide an e-mail contact, but that information will be separated from your responses before analysis is conducted. Your responses will be anonymous. If you prefer not to enter your e-mail with your responses, you may send an e-mail to the e-mail address below to be entered in the drawing.

Please be as honest as possible when answering these questions -- this is the only way that accurate analysis can be done of the responses. Neither your instructor nor your institution will see your individual responses. Results of this questionnaire will only be published as aggregate numbers. If you have questions about completion of the survey, use of the data, or publication of this information, please contact me at jodipettazzoni@comcast.net .

Thank you in advance for you assistance.

Please take the survey now. If you cannot access the survey through the link in your online course, please copy and paste the following address into the address line of your browser (Internet

Explorer, Netscape Navigator, Firefox, etc.). By completing this questionnaire, you (the respondent) give permission for your data to be used for the purposes described above.

http://vovici.com/wsb.dll/s/12f31g328f0

THANK YOU!

APPENDIX D

Second Request for Student Participation

Last week you received an invitation to participate in research that I am conducting about environments that lead to successful online learning. If you have not yet completed the questionnaire, I am asking again for your participation. It is an opinion questionnaire, so you merely have to report your thoughts about the statements presented. The questionnaire will take approximately 20 minutes. The responses will be collected so that they are completely anonymous. Your participation is completely voluntary, and participation can be discontinued at any time. **If you are under the age of 18, you may not participate in this questionnaire**.

As an incentive for participation for those 18 or older, you may enter for a chance to win one of five $25 iTunes gift cards at the end of the questionnaire. To be entered in the drawing, you will provide an e-mail contact, but that information will be separated from your responses before analysis is conducted. Your responses will be anonymous. If you prefer not to enter your e-mail with your responses, you may send an e-mail to the e-mail address below to be entered in the drawing.

Please be as honest as possible when answering these questions -- this is the only way that accurate analysis can be done of the responses. Neither your instructor nor your institution will see your individual responses. Results of this questionnaire will only be published as aggregate numbers. If you have questions about completion of the survey, use of the data, or publication of this information, please contact me at jodipettazzoni@comcast.net .

Thank you in advance for you assistance.

Please take the survey now. If you cannot access the survey through the link in your online course, please copy and paste the following address into the address line of your browser (Internet Explorer, Netscape Navigator, Firefox, etc.). By completing this questionnaire, you (the respondent) give permission for your data to be used for the purposes described above.

http://vovici.com/wsb.dll/s/12f31g328f0

THANK YOU!

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