AT A DISTANCE: A COMPARATIVE STUDY OF DISTANCE DELIVERY MODALITIES FOR PHD NURSING STUDENTS

by

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Abstract

This study sought to ascertain and compare the attitudes and perceptions of PhD nursing students attending their coursework through synchronous and asynchronous means at two different universities. Many studies have been performed comparing both synchronous videoconferencing and asynchronous online education with the traditional classroom, but no research has yet been performed directly comparing student attitudes and perceptions between synchronous and asynchronous education. This study applied a mixed method analysis using quantitative and qualitative data gathered through an online survey. *T* test analyses were performed to determine statistical significance of the quantitative data and the Constant Comparative Method of analysis was used to evaluate the qualitative data. The primary goal of this study was to determine how synchronous and asynchronous education delivery mediums are perceived by PhD nursing students. Additional analysis was performed to determine what factors may lead students to pursue their education through one distance delivery medium over the other and to what degree students feel the distance delivery medium either helps or hinders their educational pursuits. Results of the study indicate that there is a statistical significance between the attitudes and perceptions of synchronous and asynchronous PhD nursing students. Themes emerging from the qualitative data include technology challenges, satisfaction concerns, and recommendations for future student success in each modality.

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To my wife, for all her patience and support. And to my mentor and committee for their wonderful guidance and input. Also to my friend Dave, who was there with me during classes and colloquia to discuss ideas and concepts, and make sure that we were always heading in the right direction.

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CHAPTER 1. INTRODUCTION

Introduction to the Problem

Higher education institutions continue to rapidly adopt the use of technology in the classroom in support of the demand for student education at a distance. Although the use of technology in the classroom can enhance content and learning, individual pedagogies can also be impacted.

> The recent interest in technology-supported collaborative learning in higher education represents a confluence of trends: the development of new tools to support collaboration, the emergence of constructivist-based approaches to teaching and learning, and the need to create more powerful and engaging learning environments (Resta & Laferrière, 2007, p. 65).

When providing education through distance delivery technologies, the question arises about which delivery modalities may be more effective from student perspectives.

Background of the Study

Distance education has been used in various forms for many years including mediums such as television, radio, recorded video, phone conferencing, and more recently, Internet-based e-learning and live videoconferencing. Large numbers of colleges and universities have enhanced their classrooms through the use of asynchronous e-learning, and in many cases, have moved entire courses and degree programs to online delivery formats. Other distance delivery modalities have also been employed including the use of synchronous videoconferencing.

These trends have been the source of increasing research attempting to determine the effectiveness of teaching and learning in distance learning environments (Resta &

Laferrière, 2007). There are many topics of research including such areas as student attrition and persistence (DiBisceglie, 2002; Guiliano, 2001; Houle, 2004; Storrings, 2005), student and faculty perceptions (Beard, & Harper, 2002; Beard, Harper & Riley, 2004), learning and personality styles applied in distance learning environments (Aragon, Johnson & Shaik, 2002; Hughes, 2002; Klingner, 2003; McCoog, 2007; Neuhauser, 2002; Offir, Bezalel & Barth, 2007), student success rates and impacting factors (Guiliano, 2001; Hansen, 2000; McClure, 2006; McFarland & Hamilton, 2005), and comparisons between on-campus and online courses (Beard, Harper & Riley, 2004; King, 2001; Perez-Prad & Thirunarayanan, 2002; Scheetz, & Gunter, 2004).

Research has also been performed regarding the use of video-based synchronous delivery of distance education from different perspectives such as collaboration and knowledge construction (Hron et al., 2007), knowledge acquisition (Dal Bello, Knowlton, & Chaffin, 2007), teaching environments (O'Rourke, 2007; Zapantis & Maniscalco-Feichtl, 2008), and student perspectives (Gillies, 2008).

By way of comparison, many questions arise from the research and from the increasing uses of these technologies for the delivery of education. For example, what are the preferences of students between using face-to-face contact with faculty, and interacting with them through asynchronous methods such as an online classroom? Are students who attend class through a face-to-face method such as in live classrooms or through synchronous videoconferencing at a greater advantage than students who have no face-to-face contact with their teacher or other students? In a synchronous videoconferencing class, are students who attend the class in the live classroom at a greater advantage than those attending the same class through videoconferencing? What

are students' attitudes and perceptions between classes attended through an asynchronous online classroom versus attending through a synchronous videoconferencing method? As higher education institutions continue to increase their use of technology for education delivery, these types of questions need to be asked in order to find the right balance, both for the students and the faculty, to ensure quality education is delivered that meets people's needs.

Recently, economic changes in the United States have driven many organizations, including schools, to adjust their strategies allowing more people to telecommute or to have more flexible schedules. Students also appear to desire the same ability to telecommute to school. Several schools of higher education such as the University of Phoenix, Walden University and Capella University have developed complete curricular structures around the delivery of education at a distance in order to reach students that may not have been able to seek continuing education otherwise. The utilization of the Internet and other technologies in education will continue to encourage students to be much more self-directed in the learning process, and develop greater time management, self control, self-motivation and problem solving skills to be successful (Heimstra, 2003).

Challenges arising from the move to the use of asynchronous web-based education tools are changing the dynamics of adult higher education, and driving faculty to become more creative in their teaching approaches for student engagement in the classroom. In an effort to retain the perceived advantage of live face-to-face interaction between students and teachers, many schools offer synchronous courses and entire degree programs through the use of live videoconferencing. Students are held to a schedule, but are able to attend classes from the comfort of their own homes or elsewhere through the

use of a video camera and telephone conferencing or other Internet-based videoconferencing tools.

Although many research studies have been performed comparing synchronous and asynchronous distance education delivery modalities with on-campus delivery, there is a gap in the literature comparing different distance delivery modalities with each other. This study strives to address the perceived differences between synchronous and asynchronous distance education delivery modalities from student perspectives for PhD nursing students at two different universities. Each university has completed cohorts of PhD nursing students, one through completely asynchronous online courses, and the other through completely synchronous videoconferencing.

Statement of the Problem

It is not known how synchronous and asynchronous distance education delivery modalities are perceived by PhD nursing students.

Purpose of the Study

The purpose of this study is to ascertain how synchronous and asynchronous distance education delivery modalities are perceived by PhD nursing students.

Rationale

There are many different forms of distance education delivery modalities in use today. Among the most prevalent are asynchronous e-learning and synchronous videoconferencing. Research has been performed covering various aspects surrounding each of these delivery modalities; however, there appears to be a gap in the literature for their direct comparison.

For this study, data was used from two different universities that had recently graduated and were currently matriculating PhD nursing students: one through entirely asynchronous online learning, and the other through entirely synchronous live videoconferencing. This study provides a comparative analysis of student perceptions surrounding each delivery modality, what factors may have led students to select one delivery modality over another, and to what extent students perceive the different modalities may have either helped or hindered their educational pursuits.

Research Questions

Primary research question: How are synchronous and asynchronous distance delivery modalities perceived by PhD nursing students?

Sub-question 1: What contributing factors may lead students to select one delivery modality over the other?

Sub-question 2: To what extent do students perceive the different delivery modalities either help or hinder in their educational pursuits?

Hypotheses

Null Hypothesis 1: There is no significant difference between the perceptions of PhD nursing students about whether asynchronous online learning delivery helps or hinders their educational pursuits.

Null Hypothesis 2: There is no significant difference between the perceptions of PhD nursing students about whether synchronous live videoconferencing delivery helps or hinders their educational pursuits.

Null Hypothesis 3: There is no significant difference between the preferences of PhD nursing students for synchronous or asynchronous distance delivery modalities.

Null Hypothesis 4: There is no significant difference between the preferences of PhD nursing students for synchronous live videoconference education delivery versus on-campus instruction.

Null Hypothesis 5: There is no significant difference between the preferences of PhD nursing students for asynchronous Internet-based education delivery versus on-campus instruction.

Significance of the Study

Institutions of higher education are increasingly turning to technology for their delivery of education. Additionally, students are increasingly using technology to complete their educations at a distance. To meet the demands of students using technology, continued research needs to be performed to find the best possible solutions to meet those needs. This study provides further insight and adds to the body of knowledge by providing such a comparison between both synchronous and asynchronous modalities of distance education delivery.

Definition of Terms

The literature provides many different definitions of what constitutes distance learning. There are multiple factors involved, the combination of which produces a plethora of variances too complex to be addressed within this study. For example, some courses may be delivered entirely through asynchronous learning based on the use of Internet-based e-learning interfaces. Other courses may be delivered through synchronous technologies such as live audio or videoconferencing. Some courses may be taught

through a combination of either or both of these technologies, or other similar methodologies. Additionally, some courses may include an on-campus face-to-face component as well as use online learning tools to maintain asynchronous discussions between students and faculty and turn in work. In the same light, some courses may meet regularly in an on-campus classroom and also have occasional live video or audio conference sessions at different times. Some courses may be delivered through recorded television programs and others through video-based technologies such as video streaming over the Internet. These examples are by no means an exhaustive list of distance learning methodologies and are merely presented as examples to demonstrate the complexity of the definition of the terms *distance education* and *distance learning*.

This study is based on the delivery of education to students who have had no on-campus face-to-face curricular instruction in their particular degree-seeking programs and all education was delivered through the use of distance learning technology, either synchronous or asynchronous. For the purpose of this study, the following terms are defined:

Adult learning theory. The concept that adults tend to learn differently than children and that traditional pedagogical teaching methods do not meet everyone's specific learning needs.

Andragogy. The adult learning theory more recently developed by Malcolm Knowles. This theory specifically proposes differences between adult and traditional pedagogical teaching methodologies. "Andragogy and pedagogy refer to the study of teaching, with *andra* meaning *man, adult* and *peda* meaning child" (Galbraith & Fouch, 2007, p. 35)

Asynchronous education delivery. The delivery of education in a non-live format, allowing students to communicate with faculty and/or students on their own timetable.

Blended/Hybrid/Mixed learning. The combination of teaching in a traditional face-to-face method with distance learning methods, synchronous and/or asynchronous, either on-site, off-site or in combination.

Distance education. Education delivered in a time or place different from the instructor's, through the utilization of interactive telecommunications media, in either synchronous or asynchronous form. This term may be used alternately or in conjunction with distance delivery, distance learning, online education, online learning, web-based instruction, Internet-based instruction, Internet-based learning, distributed learning, and e-learning.

E-Learning. Learning through the utilization of technology such as web-based interfaces.

Knowledge/Learning Transfer. Knowledge transfer occurs "when a learner understands how to apply knowledge in different contexts" (Ertmer & Newby, 1993, n.p.). "When something you learn in one situation affects how you learn or perform in another situation, transfer has occurred" (Ormrod, 2004, p. 166).

Learning styles. The methods in which people tend to learn primarily including auditory, visual, tactile and kinesthetic.

On-Campus Education. The act of teaching or learning in a face-to-face environment. This term may also be used interchangeably with brick-and-mortar, face-to-face, and in-house education.

Online learning. Learning through the utilization of the Internet.

Pedagogy. "Pedagogy is derived from two words, *paid* meaning 'child'…and *agogus* meaning 'leader of'. Thus, it literally means the art and science of teaching children" (Ozuah, 2005, p. 83). There are four primary pedagogical assumptions: first is the dependent personality of the learner; second is that learning needs to be subject-centered; third, motivation for learning is extrinsic in nature; and fourth is that the prior experience of the learner is irrelevant (Ozuah, 2005).

Self-Directed learning. "Learning that is widespread, that occurs as part of adults' everyday life, and that is systematic yet does not depend on an instructor or a classroom" (Merriam, 2001a, p. 8).

Synchronous education delivery. The delivery of education in a live format, allowing students to communicate directly with faculty and/or students receiving immediate responses and interaction.

Synchronous distance education delivery. The utilization of synchronous education delivery methods to communicate at a distance.

Videoconferencing. Technology used to delivery synchronous distance education through the delivery of live video.

Assumptions and Limitations

Students enrolled in the different universities presented in this study came from varying demographic backgrounds, and were therefore not comparable for this study. Demographic data is presented for informational purposes. Additionally, the curriculum taught at each university, though covering the same broad topic of nursing did not directly coincide and was therefore also not comparable for this particular study. The study focused on the attitudes and perceptions of students at each university regarding the

distance delivery modality used in their education. Therefore, the survey data gathered targeted individual opinions and may represent limitations. Because the study did not compare the same curriculum taught to students enrolled in the same university with the only difference being the distance delivery modality used, this study could not analyze factors such as student success rates, performance, retention, or other similar data. The focus and intent of this study was limiting in nature as it presents a comparative analysis of attitudes and perceptions.

It is assumed that students involved in this study have provided honest and complete information regarding their perceptions and attitudes toward the education delivery modalities.

Theoretical Framework

This study presents a comparative analysis of student attitudes and perceptions regarding the use and effectiveness of different distance delivery modalities employed at two separate universities. The research includes the analysis of existent data gathered from the two different universities, and additional data collected through electronic surveys of existing and graduated PhD nursing students. Information drawn from existent data focuses primarily on demographics. Survey data collected focuses on student attitudes and perceptions.

The research is primarily quantitative in nature providing an analytic look at student attitudes and perceptions. Qualitative information was also gathered to add reasoning and emotion to the data. The data is exploratory in nature and does not present definitive or confirmatory results.

The theoretical framework underlying this study involved the combination of distance learning education and adult learning theories. The study sought to examine concepts surrounding how adults learn and whether students perceive that the different delivery modalities either help or hinder their educational pursuits and the quality of their learning. The targeted study participants included PhD nursing students from two universities, each receiving their education through different distance modalities. The two delivery modalities used in this study were synchronous through live videoconferencing, and asynchronous through an Internet based classroom application. The hope of this study was to draw on the past educational experience of the targeted students as a basis for the reasoning used in their responses.

Due to the differences in the curriculum between the two schools, as well as the potential differences between student acceptance criteria, student success rates were not included in this study. The commonality between the two target groups was based on their level of education and general focus of curricular study. The intent was to determine if there is a difference in attitude and perceptions based on the difference between the two distance delivery modalities: synchronous videoconferencing and asynchronous online.

Organization of the Remainder of the Study

The remainder of the study includes a comprehensive literature review comprising information in four primary categories:

1. Distance learning
2. Adult learning theories applied in distance learning
3. Synchronous distance education delivery
4. Asynchronous distance education delivery

Chapter three contains a detailed description of the research methodology used for the study. Chapter four covers data collection and analysis. Chapter five contains the results, conclusions and recommendations of the study.

CHAPTER 2. LITERATURE REVIEW

The premise for this study is based on the fact that there have been many previous studies investigating the use of various technologies to deliver education at a distance. Many of these studies have been performed to evaluate the quality of education that students may receive when learning at a distance, as well as many of the challenges students and teachers face when using distance learning mediums. Primarily, these studies have focused on comparing the use of a specific distance delivery modality with on-campus instruction in order to determine if there is a difference in student success or performance between the two learning mediums (Edmonds, 2006; Fortune, Shifflett & Sibley, 2006; Poirier & Feldman, 2004; Scheetz & Gunter, 2004; Summers, Waigandt & Whittaker, 2005).

Although studies have been performed evaluating the attitudes and perceptions of students attending courses through distance education, they are relatively few. These studies have primarily focused on comparing attitudes and perceptions between distance education and on-campus students. The results of these studies are mixed. In general, the results tend to depend on various factors such as the subject taught, medium used, level of interaction in the courseroom, technical challenges experienced, and demographic factors (Beard & Harper, 2002; Beard, Harper & Riley, 2004; Cook-Wallace, 2007; Kushniroff, 2008; McFarland & Hamilton, 2005; Neuhauser, 2002).

Recent dissertations have been completed studying the use of technology in education including such areas as hybrid student satisfaction (Rothmund, 2008), learning styles in distance education (Slick, 2008), hybrid and distance only education (Davis,

2007), nursing education through television delivery (Kostrzewski, 2007), distance education perceptions with respect to commitment, administration and technology (Cook-Wallace, 2007), and the use of videophone delivery (Shewchuck, 2007).

The purpose of this study was to evaluate possible differences in the attitudes and perceptions of students currently enrolled or graduated in PhD nursing education through synchronous and asynchronous technologies. The theoretical framework guiding this literature review is based on four general areas: distance education, adult learning theories applied in distance learning, synchronous education through live videoconferencing, and asynchronous education through Internet-based applications. The literature review that follows focuses on each of these four themes and provides a foundation for the conceptual framework of this study.

Distance Learning

There are many facets involved in the definition of the overall concept of distance learning. In order to establish the theoretical foundation for this study, this section delves into the definition of distance education, trends in distance learning and technologies, blended/hybrid/mixed learning, and student and faculty perceptions.

Definitions

It is clear from the literature that there is no single distinct definition of what constitutes distance learning. Instead, definitions are developed and adapted to fit a specific institution or organization's needs and delivery modalities. As an example, Morrison and Guenther (2000) define distance learning as "[taking] place in a time or place different from the professor's" (p.16). In contrast, the director of The American Center for the Study of Distance Education at Pennsylvania State University defines

distance education as “Planned learning that normally occurs in a different place from teaching and as a result requires special techniques of course design, special instruction techniques, special methods of communication by electronic and other technology, as well as special organizational and administrative arrangements” (Kearsly, 1996, p. 2).

Desmond Keegan (1996) offered a descriptive definition of distance education as follows:

1. The quasi-permanent separation of teacher and learner throughout the length of the learning process
2. The influence of an educational organization both in the planning and preparation of learning materials and in the provision of student support services
3. The use of technical media—print, audio, video or computer—to unite teacher and learner and carry the content of the course
4. The provision of two-way communication so that the student may benefit from or even initiate dialogue, and
5. The quasi-permanent absence of the learning group throughout the length of the learning process so that people are usually taught as individuals rather than in groups, with the possibility of occasional meetings, either face-to-face or by electronic means, for both didactic and socialization purposes (Keegan, 1996, p. 50, as cited in Shelton & Saltsman, 2005, p. 3).

Utilizing a more current mentality toward distance education thinking, Simonson et al., (2006) state that, "Distance education is now often defined as: institution-based, formal education where the learning group is separated, and where interactive telecommunications systems are used to connect learners, resources, and instructors" (p. 7).

Below is a formal definition of distance education derived from the United States Regional Accreditation Association:

> Distance education is defined, for the purposes of accreditation review, as a formal educational process in which the majority of the instruction occurs when student and instructor are not in the same place. Instructions may be synchronous or asynchronous. Distance education may employ correspondence study, or audio, video, or computer technologies (Shelton & Saltsman, 2005, pp. 3-4).

Based on these varied definitions, there appear to be some commonalities: a separation between learners and instructors should exist, there is a utilization of some form of technology for the delivery and receipt of education, and the mode may be either synchronous or asynchronous. This study focused on distance education delivery through both synchronous and asynchronous methods and technologies. Therefore the following is offered as a working definition:

> Distance education is defined, for the purposes of this study, as education delivered in a time or place different from the instructor's, through the utilization of interactive telecommunications media, in either synchronous or asynchronous form.

Technologies

Distance education has existed for more than 160 years, and was reported to have begun in England in 1840 and within the United States since 1873 (Shelton & Saltsman, 2005). These distance education courses were also referred to as correspondence courses and relied on the mail systems and written documentation. The advent of new technologies has altered the delivery modality of distance education, and introduced such mediums as satellite, radio, television, and recorded video. However, the relatively recent introduction of the Internet has dramatically changed the face of distance education and brought about the use of online education as a major part of higher education today. "What has now been termed as *online education* has subsequently created a market that is increasing at a remarkable rate and is responsible for a major growth segment in the education industry" (Shelton & Saltsman, 2005, p. 2).

These changing technologies offer significant opportunities for educational systems and institutions; however, they also present significant challenges. According to Simonson et al. (2006), there are two conflicting pressures facing distance educators today. First is the increasing demand for students to be allowed to learn at a distance. "They want to be able to supplement, and even replace, conventional learning experiences with distance education experiences" (Simonson et al., 2006. p. 5). The second conflicting pressure facing educators is that students indicate a preference to not learn at a distance.

> "When asked, they say they prefer meeting with the learning group and the instructor in the classroom…they value the presence of a learning group, and that

the informal interactions that occur before and after, and sometimes during, a formal class are valuable components of the total learning experience" (p. 5).

These conflicting requests are representative of the different attitudes students have toward the use of distance learning technologies in education, and pose a dilemma for the educational community. This dilemma is at the core of the purpose for this study.

Blended/Hybrid/Mixed Learning

Rather than move completely to an online learning environment, many schools have started offering hybrid learning environments. In these classrooms, students meet both face-to-face and online through discussion and assignment areas or through other distance learning mediums. Rothmund (2008) defines hybrid learning as "A combination of online learning that includes the conveniences of online courses with some face-to-face contact" (p. 1). Rothmund's (2008) study sought to investigate the impact of using hybrid courses to improve student satisfaction and retention. One of the results of this study indicated that students demonstrated greater course satisfaction with increased interaction between students and with the faculty, both through the face-to-face classroom as well as online. Davis (2007) also performed a study on hybrid courses in comparison with distance-only courses analyzing student performance and retention. Although no significant difference was found overall between hybrid and distance-only courses, differences were identified between genders attending the different delivery modalities. These studies raise an intriguing question, are the reasons behind using hybrid education, such as increased face-to-face contact and convenience also factors affecting student satisfaction in online-only or synchronous videoconferencing courses?

In a study on the use of an online discussion forum within a traditional face-to-face class, King (2001) identifies two primary areas of influence, "student relationships and face-to-face classroom interaction" (p. 349). The dynamics of the class changed as students were encouraged to post their thoughts in the online discussion forum. Those who were normally more reserved in the classroom were able to collect their thoughts before posting, and had more confidence to engage others in dialogue in the face-to-face environment. Students also discovered their social similarities and the face-to-face classroom became a hive of discussion (King, 2001). Do students have the same ability to create and build relationships through both synchronous and asynchronous learning environments? Or does one distance delivery method provide a more conducive environment for relationship building? Are there other factors that may be involved in fostering relationship building in learning environments such as personality or learning style? These questions do not appear to be adequately addressed in the literature.

Student and Faculty Perceptions and Success Factors

As the use of technology to deliver education at a distance continues to increase, the need for studies addressing the impact on student learning are vital. Many studies have been performed seeking to determine student and faculty perceptions of courses taught through distance learning mediums. The results of these studies are mixed, but are representative of the increasing importance of this topic.

Kushniroff (2008) performed a study comparing user satisfaction in an online course with a traditional classroom, and found that the majority of students (75%) agreed that the online environment is just as effective a learning medium as the traditional classroom. Additionally, there were four common areas identified among student and

faculty surveys that should be addressed through this learning medium: geographic location, gender, lifestyle, and culture. These results coincide with studies performed seeking to determine what other factors may affect student satisfaction, learning and success in distance education environments. Two such studies were performed by Cook-Wallace (2007) and Neuhauser (2002).

The research performed by Cook-Wallace (2007) was a dissertation on perceptions of university-level distance education students focusing on commitment, administration and technology. Four specific categories were perceived as both important and effective: policies, educational technology standards, full-time equivalent (FTE) of online courses, and technical support availability (p. ii). The research performed by Neuhauser (2002) was a study comparing two sections of the same course, one taught online (asynchronous) and the other in a traditional face-to-face classroom, examining several factors in an attempt to determine their impact on student satisfaction and success: gender, age, learning preferences and styles, media familiarity, effectiveness of tasks, course effectiveness, test grades, and final grades. "Ninety-six percent of the online students found the course to be either as effective or more effective [in] their learning than their typical face-to face course" (p. 99). Additionally, there were no significant differences found between learning style preferences or grades in either group.

Several additional studies have also been performed comparing online to in-house courses on student success and course satisfaction. Fortune, Shifflett and Sibley (2006) performed a study on skill development and the value of face-to-face interaction among business students both online and in-house. Perceived learning among students was found to be similar between the two groups. However, the value of face-to-face interaction was

perceived less important by online students than in-house. The research suggested that those electing to take online courses may be more independent learners and they may have been satisfied with the interaction received in the online environment (p. 213). Do students electing to enroll in synchronous videoconferencing courses perceive the value of face-to-face interaction as having greater value therefore driving their decision?

Summers, Waigandt and Whittaker (2005) found no significant difference in student grades for a statistics course taught both online and in-house; however, significant differences were found with online students being less satisfied on several dimensions with their online course. Poirier and Feldman (2004) found that online students performed better on exams and as well as in-house students on paper assignments in a psychology course, and in contrast to the study by Summers, Waigandt and Whittaker (2005) that online students showed greater satisfaction with their course than the comparison group.

Scheetz and Gunter (2004) found no significant difference in expressive manual communication skills or content knowledge between students receiving traditional instruction and students receiving instruction through an asynchronous videostreaming medium. Edmonds (2006) performed a study of general psychology students enrolled in comparative courses online and in-house, and then entered high school GPA and SAT composite scores into the equation to determine differences. He found that "students enrolled in the classroom based lecture course fared significantly better than the online course students" (p. 15). His study also references other similar studies presenting results that show both no significant difference in test results as well as results similar to his own showing a significant difference in exam grades. These results support the idea that

although online education may work for many students, it may not work for all, and there may be many varying factors impacting their individual success. Additionally, is it possible that students may elect to pursue their education through one distance delivery modality over another due to their perceived ability to succeed and perform well in a specific medium?

In 2002, Beard and Harper performed a study on student perceptions of online versus on campus instruction and found that, although the teacher as well as the students experienced some technical challenges, and several students indicated dissatisfaction with the ability to interact with the instructor, many students indicated that they would take an online course again. In a follow-up study performed in 2004, Beard, Harper and Riley performed another study on student attitudes and perceptions of online versus on-campus instructions and found similar results.

Attempting to clarify some of the differences presented in the research literature between student success and satisfaction also visible in the studies above, McFarland and Hamilton (2005) performed a "carefully controlled" study with the following three goals:

1. To see if careful control between online and traditional sections can alleviate the generally lower satisfaction of online students
2. To preliminarily propose a set of factors that could lead to increased performance and satisfaction for online students
3. To confirm previous work, which indicates that student performance online is no different than performance in a traditional classroom (p. 25)

The study found that by making the on-campus and online course experience for students virtually the same, there was no significant difference in either student grades or

student satisfaction. The students surveyed also presented their perceptions of significant factors affecting their satisfaction and grades in the course. Such factors included the number of courses taken at a time, effectiveness of assignments, and satisfaction with the technology and course concepts (p. 28).

The results of the literature presented above indicate mixed results. Although most studies demonstrate no significant difference between student success in online versus on-campus courses, some studies demonstrate better results among online students and other studies demonstrate better results among on-campus students. The same type of disparity also exists when comparing student satisfaction. In general, the results of each study appear to depend on the subject taught, the medium used, the level of interaction in the courseroom, the technical challenges experienced, and many other demographic factors. It was the intent of this study to address the apparent gap in the literature directly comparing synchronous and asynchronous distance learning modalities and determine factors that may affect student attitudes and perceptions between them.

Adult Learning Theories Applied in Distance Learning

Many theories exist suggesting that adults tend to learn differently than children. Within the distance learning environment, individual learning theories may be applicable to different modalities of education delivery. Additionally, different pedagogical applications may exist within different learning mediums and topic areas such as nursing education. Pedagogy applied through distance learning is a very broad topic, and the research literature demonstrates just how wide open this category appears to be. One theme within the literature appears clear though, and that is the need for a clear pedagogical approach to be applied. Students matriculated in courses through distance

learning technologies may have different needs than traditional students. The question driving this literature review was whether the application of different adult learning theories (or the lack thereof) may have an effect on student satisfaction or perception in distance learning environments. Subjects include a definition and description of pedagogy, a discussion of the overall concept of adult learning theories, specific learning theories including andragogy, self-directed learning, problem-based learning, transformational theory, multiple intelligences, learning styles, and constructivism through distance learning. The review concludes with a look at the impact of technology on distance education.

Pedagogy

The theory of pedagogy can be traced back to the seventeenth century where it was used in cathedral schools for the purpose of inducting young men in to the priesthood. "Pedagogy is derived from two words, *paid* meaning 'child'…and *agogus* meaning 'leader of'. Thus, it literally means the art and science of teaching children" (Ozuah, 2005, p. 83). Traditionally, a pedagogical approach to teaching and learning is "teacher-centered and subject-focused" (Kiely, Sandmann & Truluck, 2004, p. 20), and there are four primary pedagogical assumptions: first is the dependent personality of the learner; second is that learning needs to be subject-centered; third, motivation for learning is extrinsic in nature; and fourth is that the prior experience of the learner is irrelevant (Ozuah, 2005).

According to Kerka (2002), "Teaching adults should be different if adults learn differently than children do." Under the pedagogical assumption, children have "limited experience, [are] ready to learn based on age level, [are] oriented to learning a particular

subject matter, and [are] motivated by external rewards and punishment" (p. 3). Kerka (2002) also points out that if these assumptions are true, then it may be expected that they should be accounted for in organized adult education. However, Kerka (2002) notes that many of the popular adult learning theories of today are contested in their applicability for all adults.

The literature is not specific in defining pedagogical applications for adult learning through distance education, though it is broadly mentioned. The term "pedagogy" appears to be used as a general description for methods used to deliver education. For example, Miller and King (2003) state that "Distance education is fundamentally different from traditional classroom education and this drives the need for a pedagogical shift" (p. 290). The authors then refer to the need for students to interact with faculty throughout their education stating that "Research supports a need for distance education courses to be constructivist, collaborative, and student-centered" (p. 290). However, no specific pedagogically defined strategies or applications are mentioned. In general, it appears from the literature that there is no single accepted term used to define adult distance education, and the term "pedagogy" is therefore widely used to fill this broad topic.

Adult Learning Theories

Within the literature various adult-oriented learning theories such as andragogy, self-directed learning and transformational learning are widely discussed and reviewed for their applicability in adult distance learning education (Kiely, Sandmann & Truluck, 2004; Merriam, 2001a; Merriam, 2001b; Miflin, 2004; Wansick, 2007). Addressing adult learners directly, there are several theories that have been developed and studied in

education today. Of these, Galbraith and Fouch (2007) identify sensory stimulation theory, social cognitive theory, reinforcement theory, facilitation and andragogy, as the primary focus in literature. Additionally, Merriam (2001b) identifies andragogy, self-directed learning and transformational learning as "foundational" among adult learning theories (p. 93). With all of these different learning theories, "We have no single answer, no one theory or model of adult learning that explains all that we know about adult learners, the various contexts where learning takes place, and the process of learning itself" (Merriam, 2001a, p. 3). However, the combination of these theories, models, principles and explanations comprise what is considered the knowledge base of adult learning. This review of the literature aimed to explore the application of adult learning theories within the use of distance delivery education models and their potential impact on student attitudes and perceptions. To begin, we explore the theories describing how adults may learn and their specific needs.

Andragogy

Of the many adult learning theories which have been developed, purported, and are adhered to in higher education today, andragogy as developed by Malcolm Knowles (Ozuah, 2005) is one of the most prevalent. The theory of andragogy presents a set of assumptions about differentiations between adult and child learners.

According to Ozuah (2005), the term *andragogy* was first coined in 1833 by Alexander Kapp, and used to "…describe the educational paradigm employed by the Greek philosopher Plato" (Ozuah, 2005, p. 83). The nomenclature did not begin to really catch on until Eduard C. Lindeman utilized the term andragogy in 1926 and wrote extensively on his theory of adult learning. At that point, Lindeman's theory revolved

around the concept that adult learning was based on problem solving, not subjects, and that the purpose of the teacher was not to be the oracle in the classroom, but rather the guide who also participates in the learning process (Ozuah, 2005). Malcolm Knowles began the task of expanding on Lindeman's work in 1959. The work by Knowles and other educators provided a much more extensive set of assumptions about adult learners.

Adult learning theories such as andragogy assert that several characteristics of learning differ between adults and children. In contrast to the pedagogical learning assumptions made above, Galbraith and Fouch (2007) present the following list comparing some of these differences:

1. Children are dependent while adults see themselves as self-directing, independent and autonomous
2. Adults expect to be able to answer part of their questions from their own experience and children expect their questions to be answered by outside sources
3. Children expect to be told what they need to do, while adults may have a very different viewpoint on that issue based on first-hand experience
4. Adults frequently want input in their learning
5. Life experience may be both a barrier to learning, as well as a positive trait for adults, while children have limited experience to draw from
6. Adults need to understand the relevance of learning to their lives, whereas children are generally more accepting of subject-centered material (p. 37)

Differences offered by Kerka (2002) provide additional insight to the differences described above: (a) Children are oriented to learning a particular subject matter while

adults have a learning orientation centered on problems, not content; (b) Children are motivated by external rewards and punishment while adults are intrinsically motivated; (c) adults have a readiness to learn associated with a transition point or a need to perform a task; (d) adult participation in learning is voluntary; and (e) learning needs to be meaningful for adults (p. 3). The literature does not specifically state that these same differences apply to adult learners in both traditional and distance education environments. Therefore, it is not clear if distance learners have different needs that have not yet been defined in the literature.

Although it appears from the assumptions made about adult learners that there are distinct differences which should be addressed in education, there are those that contest their validity. Kerka (2002) offers that, "Some question the extent to which these assumptions are characteristics of adults only," and that "Learner-centeredness is an expression of a teacher's values, not a teaching method" (p. 1). These contentions with specific adult learning theories may help explain why there are many other learning theories in use today, each identifying different facets of the grand picture of adult learning, and each providing additional insights to teaching methods and the technical aspects of the learning process.

According to the literature, it is not possible for these, or any generalized assumptions to be applicable in all situations or to all learners. As Merriam (2001a) points out, "Some adults are highly dependent on a teacher for structure, while some children are independent, self-directed learners" (p. 5). The same inapplicability can be said for other assumptions such as motivation and experience. According to the literature, there are situations in which adults may be extrinsically motivated such as participating

in training to retain employment. As pointed out above, there may be times when prior adult experience can actually be a barrier to learning. Additionally, "Adults do not automatically become self-directed upon achieving adulthood. Some are not psychologically equipped for it and need a great deal of help to direct their own learning effectively" (Kerka, 2002, p. 3).

Recognizing shortcomings in andragogy, Knowles concurred that the theory serves more as a basis or model for emergent adult learning (Knowles, 1989, as cited in Merriam, 2001a). Merriam (2001a) also clarifies that due to the possibility that the assumptions made within andragogy were not necessarily true of all adults, between 1970 and 1980 Knowles revised his andragogy versus pedagogy approach, and implied that andragogy and pedagogy instead lie on a continuum "…ranging from teacher-directed to student-directed learning" (p. 6). This change in thinking resulted in the acknowledgement that both teacher-centered and learner-centered approaches could be appropriate for children or adults depending on the situation as well as the learner.

However, even though criticisms have been made that adults may not really be as described in andragogical assumptions, and that "Psychological studies suggest that differences in adult and child learning may not be dichotomies but qualitative and quantitative nuances along a continuum" (Kerka, 2002, p. 3), it appears from the literature that the assumptions made within andragogy clearly uncover differences that should be addressed by teachers of adults to make learning more effective. "Andragogy has alerted educators to the fact that they 'should involve learners in as many aspects of their education as possible and in the creation of a climate in which they can most fruitfully learn'" (Houle, 1996, pp. 29-30, as cited in Merriam, 2001a, p. 6). However, the

extent to which these differences are addressed in the literature for both synchronous and asynchronous distance learning environments appears sparse.

As a summary of the principles of adult learning, Ozuah (2005) offers the following, stating that adults learn best,

1. When they want or need to learn something
2. In a non-threatening environment
3. When their individual learning style needs are met
4. When their previous experience is valued and utilized
5. When there are opportunities for them to have control over the learning process
6. When there is active cognitive and psychomotor participation in the process
7. When sufficient time is provided to practice and apply what they have learned
8. When there is a focus on relevant problems and practical applications of concepts
9. When there is feedback to assess progress towards their goals (p. 86)

The summary above raises several questions regarding adult distance learners. For example, to what extent do students feel more or less comfortable through distance learning? Do students feel less threatened in an asynchronous online course where they have time to think about their responses to questions and write them down? Additionally, do these students also feel less threatened because they do not *see* the other students or teacher? In contrast, do students learning through synchronous videoconferencing feel

more comfortable in building relationships and conversing freely, and feel as though this environment may be better for their personal learning needs?

The plethora of discussions exploring andragogy and associated adult learning theories demonstrate the relevance of exploring some of the issues relating to adult education as a scientific discipline, "And it is as a guide to practice that andragogy has had its biggest impact" (Merriam, 2001a, p. 8). The assumptions made in andragogy are guides by which adult educators may amend their teaching styles and positively impact the adult learning environment. "Andragogy has been adopted by legions of adult educators around the world….Very likely, it will continue to be the window through which adult educators take their first look into the world of adult education" (Pratt, 1993, p. 21, as cited in Merriam, 2001a, p. 8). For the purposes of this study, the possible application (or lack thereof) of this or other adult learning theories may impact student attitudes and perceptions of their learning through the different distance learning modalities. If adult students learn differently, then perhaps the needs of adult students learning through the use of different distance learning modalities may also be different.

Self-Directed Learning

Hiemstra (2003) discusses key theorists that have driven self-directed learning theory over the past several decades, including Cyril Houle, Allen Tough and Malcolm Knowles. Merriam (2001a) indicates that Tough expanded on the work by Houle in the 1960's and 1970's to provide a comprehensive description of self-directed learning. Tough's description of self-directed learning is, "Learning that is widespread, that occurs as part of adults' everyday life, and that is systematic yet does not depend on an instructor or a classroom" (p. 8). Knowles, Tough, Brockett and Hiemstra wrote their

perspectives from the basis that "self-directed learning has as its goal the development of the learner's capacity to be self-directed" (p. 9). Merriam (2001a) identifies the second goal of self-directed learning as fostering transformational learning, and the third goal as "the promotion of emancipatory learning and social action" (p. 9).

Using Tough's views of self-directed learning, the goal of all education is to get adult students to the point where they rely on their own drive and desire for further education and search for knowledge without the control of an instructor. However, from the standpoint of adult education, this goal is difficult to fathom as achievable for everyone. Because not all adult learners exhibit the described qualities assumed in self-directed learning, andragogy, and other adult learning theories (Kerka, 2002), a good mix of several theories should be applied to engage learners on all levels. Guiding learners through the educational process, answering questions along the way and encouraging individual and team educational activity outside the classroom, are only a few of the ways in which adults can learn best. Although this advice applies to adult learners in general, it may be specifically applicable for students learning in distance education environments, and the mix may also vary for synchronous versus asynchronous learning.

The purist view of self-directed learning encourages students to basically search for and pursue their own education without the aid of an instructor. There are situations wherein this may not be the most appropriate approach. "I am still firmly convinced that adults are responsible for their own learning, but what I have come to reconsider is whether adults should be responsible for their own teaching" (Candy, 1987, n.p., as cited in Miflin, 2004, p. 48). The door is opened for misconceptions and incorrect findings when students are placed in a position of self-teaching using only textbooks and shared

group knowledge without the guidance of a qualified and experienced instructor to provide clarification and explanation along the way.

Some subjects may be inappropriate for the application of such learning theories as self-directed learning. Miflin (2004) focuses on the use of problem-based learning and self-directed learning from the standpoint of medical education, and expresses that learning in this manner may reduce the quality of education and subsequently, medical practice. The greatest concern expressed by Miflin (2004), and supported by Candy (1991) and Haggis (2002), is that teachers may operate under the misconception that self-directed and problem-based learning mean they do not have to teach, but instead simply monitor the classroom while students determine and direct their own educational pursuits. This may also indicate, as Miflin (2004) points out, that "teachers [may] believe erroneously…that self-directed learning means self-teaching" and because of this, "teachers may infer that their hard-won expertise is no longer required' (p. 51).

Self-directed learning in the e-learning environment may be more representative of a purposeful application of the learning theory, since interaction with the instructor is more limited, and shared learning through interaction with other students is required through online classroom discussions and team engagement. Alternately, learners who choose to participate in traditional higher education classes may do so in order to more easily tap in to the knowledge and experience of the instructor who is an expert in the particular subject. In addition, the ability to more easily engage in the interactivity of live classroom discussions may be a draw for adult students.

Therefore, according to the literature, teachers need to be flexible in their classroom approach. A good mix of several learning theories (including appropriate self-

directed learning activities), structures and an understanding of the students in the class, each with their own specific needs, maturity, learning abilities, and tendencies, will be more successful than the application of one specific adult learning theory such as self-directed learning.

Problem-Based Learning

"[Problem Based Learning] was developed as an alternative approach to the education of physicians first implemented at McMaster School of Medicine in 1969" (Ramsay & Sorrell, 2007, p. 41). Problem Based Learning (PBL) was originally developed because it was deemed possible for medical students to memorize material and pass tests without actually having the ability to use the information and diagnose diseases. The ultimate goal of PBL is to help students develop critical thinking, communication and social skills, and PBL can be used to support teacher's goals of student development through self-directed and self-regulated learning (Sungur & Tekkaya, 2006). According to Ramsay and Sorrell (2007), the utilization of the PBL process has the potential to produce students "who can define problems, devise alternative hypotheses and develop reasonable solutions to the issues at hand" (p. 42).

The goals of PBL include helping students develop (a) flexible knowledge; (b) effective problem-solving skills; (c) self-directed learning (SDL) skills; (d) effective collaboration skills; and (e) intrinsic motivation (Hmelo-Silver, 2004, p. 235). With these goals in mind, the use of the PBL process is intended to help students become self-regulated, self-motivated, gain self-efficacy (Sungur & Tekkaya, 2006), put their knowledge to use, and be reflective and self-directed learners (Hmelo-Silver, 2004, p. 239).

The primary concern with PBL is much the same as the concerns with self-directed learning. “In PBL, the instructor or trainer functions as a facilitator rather than a content expert” (Ramsay & Sorrell, 2007, p. 42). Therefore, students are required to focus primarily on using their own skills and knowledge, relying very little on aide from the instructor. “The teacher is no longer considered the main repository of knowledge; she is the facilitator of collaborative learning” (Hmelo-Silver, 2004, p. 239). However, for targeted and structured activities, this may be a positive method for achieving the goals described above. “The role of the facilitator is extremely important in modeling thinking skills and providing metacognitive scaffolding” (Hmelo-Silver, 2004, p. 246). Therefore, in PBL the instructor’s role is critical. According to Ramsay and Sorrell (2007), the instructor has three main roles in PBL:

1. S/he helps to develop questions learners ask about the problem being investigated
2. S/he helps learners locate and understand appropriate references and resources. In this way, learners clearly identify professionally appropriate resources of their field and can begin to apply them to the problem at hand
3. S/he helps to create the “final product” or the proposed solution (p. 43)

The focus becomes the identification of knowledge deficiencies and the learning that comes as a result. During this process, “The teacher helps students learn the cognitive skills needed for problem solving and collaboration” (Hmelo-Silver, 2004, p. 237).

The research results of PBL are demonstrative of the goals of this type of learning. Sungur and Tekkaya (2006) performed research on the use of problem-based

learning (PBL) in the classroom compared to the use of a traditional instructor-led textbook-oriented approach. What they found is "PBL students had higher levels of intrinsic goal orientation, task value, use of elaboration learning strategies, critical thinking, metacognitive self-regulation, effort regulation, and peer learning compared with control-group students" (p. 307). Within distance learning environments, if PBL strategies are used, it stands to reason that students would benefit by improving in these critical skill areas.

In a study focused on the use of problem-based learning in a distributed distance learning delivery system (dPBL), Gale, Wheeler and Kelly (2007) found that "there are clearly some interesting insights to be gained from examining the effects of the online dPBL extreme experiences on professional identity, practice style, and the on going dynamics of learning groups" (p. 305). The challenges present in this study were evident in the various mediums used including synchronous videoconferencing, synchronous audioconferencing, and asynchronous e-mail communication. "These formats were designed to endow the problem-based learning aspect of the module with a range of contact modes and a flexibility of practice style" (p. 298). The results of this study did not provide a performance comparison with traditional students, but rather a focus on the socio-cultural aspects on utilizing the dPBL model in distance learning environments.

It appears from the literature that the PBL method contains positive goals and potential as long as the teaching concerns are addressed. Facilitation is a subtle skill that not all instructors possess. If instructors do not possess the skills to facilitate a PBL course, asking directive questions when appropriate, and guiding students to become self-directed learners, the process may become frustrating for all and the goals of PBL may

not be met. “The facilitator role is critical to making PBL function well. With its emphasis on learning through problem solving and on making key aspects of expertise visible, PBL exemplifies the cognitive apprenticeship model” (Hmelo-Silver, 2004, pp. 244-245).

Within both the synchronous and asynchronous distance learning environments, students are enrolled in courses outside the traditional classroom, therefore acting as more independent learners. Based on this review of the literature, the introduction of carefully controlled problem-based learning scenarios within the different distance learning environments may potentially have an effect on student satisfaction, attitudes and perceptions. Although this study does not seek to analyze the curriculum or teaching methodologies used within the two universities, the inclusion of PBL methodologies may have an influence on students learning within these distance learning mediums.

Transformational Theory

Mezirow (2004) describes the role of adult education as helping adults acquire the insight, ability and disposition to realize their capacity to engage in transformative learning. “The goal of transformational learning is independent thinking” (Merriam, 2004, p. 61). To achieve this goal, learners must achieve a higher level of cognitive development in order to critically reflect on experiences. “Mezirow (2000) wrote that ‘fostering greater autonomy in thinking is both a goal and a method for adult educators,’ and ‘achieving greater autonomy in thinking is a product of transformative learning’” (Mezirow, 2000, p. 29, as cited in Merriam, 2004, p. 61). “Mezirow defined his theory of transformative learning as stages in cognitive restructuring and integration of experience, action, and reflection” (Stansberry & Kymes, 2007, p. 489).

One of the major premises of transformational learning is the requirement of critical reflection. Merriam (2004) noted Brookfield's agreement with the central position of critical reflection within the theory of transformative learning when he stated, "An act of learning can be called transformative only if it involves a fundamental questioning and reordering of how one thinks or acts" (Brookfield, 2000, p. 139, as cited in Merriam, 2004, p. 62). Ultimately, Merriam (2004) points out that "Adults who are able 'to participate freely and fully in critical-dialectical discourse' exhibit highly developed metacognitive skills of critical self-reflection and reflective judgment" (Mezirow, 2003, p. 61, as cited in Merriam, 2004, p. 63).

"Critical reflection on experience is key to transformational learning" (Merriam, 2004, p. 62). One of the key activities in the adult higher education classroom is the encouragement of critical thinking and reflection. When students hone the ability to not only critically analyze the world around them, but can then also apply the same level of critical thinking to their own beliefs, values, knowledge, and understanding, they can achieve a degree of transformational learning. "Transformative learning involves altering a person's frame of reference and point of view through critical reflection. In fact, the unsettling feeling of being stretched to think beyond our normal capacity is seen in this theory to be one of the most valuable parts of learning" (Wansick, 2007, p. 21). Applying this theory to adult higher education through distance learning technologies, "Transformative learning moves students from the traditional learner to one who is a reflective practitioner within online collaboration spaces as well as their brick-and-mortar classroom" (Doering, 2006, p. 214).

Although higher cognitive development is certainly a goal for adult higher education, transformative learning is not achievable by *all* adult learners. "Studies…find that many adults do not operate at higher levels of cognitive functioning" (Merriam, 2004, p. 63). Therefore, in order to address a greater number of adult learners more effectively, a mix of concepts contained within the theory of transformational learning, as well as others such as self-directed learning and andragogy should be utilized in the classroom.

Within the learning environment, students may be asked to reflect on their learning and ask deeper questions in order to facilitate higher level cognitive thinking. One advantage that an online distance learning environment may have over a live synchronous videoconferencing environment is the ability for students to take the time to think about and formulate their responses. In a synchronous environment students may not feel as though they have enough time to really think through and reflect upon their learning and provide greater detail in their responses. This may also be a factor in determining why some students may elect to take their courses through one distance learning medium over another.

Multiple Intelligences

"Traditionally, higher educational institutions tend to focus mostly on just two intelligences—verbal/linguistic and logical/mathematical—and teachers essentially teach, test, reinforce and reward these intelligences" (Barrington, 2004, p. 423). In the 1980's Gardner published his book, *Frames of Mind* (Gardner, 1983), outlining the ideas inherent in his theory of Multiple Intelligences. This theory posits that individuals are not

limited to just two intelligences as noted above, but instead have as many as eight or more intelligences.

The seven intelligences originally identified and presented by Gardner include: visual/spatial, verbal/linguistic, musical/rhythmic, logical/mathematical, bodily/kinesthetic, interpersonal, and intrapersonal. Two additional intelligences proposed by Gardner following his initial publication are naturalistic and existentialist (McCoog, 2007). According to McCoog (2007), "The first step to incorporate MI theory into a technology-based curriculum is to assess students' strong and weak intelligences" (p. 25). The next step for the teacher is to assess and teach to each student's strengths. This process can be challenging and involved for the teacher, but the rewards for the students are promising. "The application of MI theory has been found to lead to increases in learning objectives and other holistic outcomes and has been lauded to be one of the most positive and influential theories in education today" (Shore, 2004, p. 112).

In its application to adult learning theories, Shore (2004) states that "effective adult learning involves (a) giving learning a purpose, (b) incorporating self-reflection, (c) facilitating self-directed learning, (d) including self-evaluation in assessment, and (e) valuing learner's experiences in instruction" (p. 114). Relating MI with the needs of adult learners as described by Brookfield, Knowles and Mezirow, Shore (2004) explains that in developing education for adults,

> Consideration must be given to an adult learner's previous experiences, the nature of the learning task and the domain involved, and the cultural context…Teachers, as adult learners, first require a clear purpose or real-world application for their learning and need to have time to reflect on that purpose (p. 114).

It is clear from the literature that there is research evidence supporting the development and use of multiple methods for teaching and learning among adults. How these theories may be applied through distance learning education will continue to be the focus of many studies as technology influences the field of education. Students may also elect to enroll in courses taught through one distance delivery medium over another based on the differences inherent in their personal intelligences. Additionally, students exhibiting stronger attributes in one intelligence area may tend to be more satisfied with their education or experience greater learning success than students exhibiting strengths in other areas. As this study seeks to examine student attitudes and perceptions toward learning in different distance learning modalities, as well as their perceived impacts on learning, such learning theories as multiple intelligences may provide insight to student responses in the data.

Learning Styles

What types of characteristics do distance learners typically possess? According to Miller and King (2003), (a) distance learners are typically adults who cannot attend courses on campus; (b) they are non-traditional learners with a wealth of knowledge that they bring with them to the classroom; and (c) they also have different expectations than traditional learners. Distance learners are voluntarily seeking to further their education, motivated, have higher expectations and are self-directed learners. Distance learners tend to be older and possess a more serious attitude toward their education than traditional learners (p. 289). With these differences in mind, one question that continues to arise is whether individual learning style preference is a factor in student success, particularly in distance learning environments. This topic has been the focus of several studies and

dissertations. Results of the studies indicate that there is no significant difference in student success due to differences in learning styles when success factors are controlled (Aragon, Johnson & Shaik, 2002; Klingler, 2003; Neuhauser, 2002; Slick, 2008), although there tends to be a wide variety of difference in learning style preferences.

There are many different learning style instruments available and used in the research. For example, Kolb and Kolb (2005) use the Learning Style Inventory (LSI) which tends to be the focus in experiential learning theory research. The LSI model contains four learning styles associated with different approaches to learning: diverging, assimilating, converging, and accommodating (p. 196). Based on the dominant senses, the most common learning style preferences in use are visual, auditory, tactile and kinesthetic. Visual learners tend to prefer visual aids such drawings, charts, outlines and other visual representations of information. Auditory learners tend to prefer to learn information orally. Tactile learners prefer the ability to make some form of physical contact with their learning material. Kinesthetic learners prefer to be actively engaged and participative in their learning process (Klingler, 2003).

Research indicates that there are significant differences in the learning styles of students who prefer distance learning to traditional education (Heiman, 2006; Hughes, 2002). There are also significant differences in retention rates between online and on-campus courses when comparing learning style preferences (Hughes, 2002). Klingler 2003) performed a research study on the relationship between adult learning style preferences and both success and satisfaction within an online learning environment. The results of the study found that "there was no noticeable pattern between learning style preference and success or satisfaction with online learning" (p. i). However, there

appeared to be a clear trend of student satisfaction among those participating in the study receiving their education through distance learning.

In another study, Sawaan (2006) presents the concept that rather than having students fill out learning style preference tests prior to taking e-learning courses, their learning style preferences may be determined by simply monitoring their computer use behaviors. In this manner, an adaptive system can be established that can tailor e-learning delivery to the individual learner's learning style preferences. By tailoring e-learning to fit an individual's learning style, the educational environment no longer must be constrained to a one-size-fits-all type of delivery, where the instructor presents education to an entire class based on the most common learning styles present.

Slick (2008) performed a study seeking to determine if learning styles matter in an online business course using the Kolb Learning Style Inventory. The goal of the study was to determine if a difference existed in student performance relating to grades and completion rates when sorting outcomes based on learning style preferences. The results of the study found no significant difference in learner grades for three of the four learning styles (Assimilator, Accommodator, and Converger); however a statistically significant difference did exist among the Diverger learning group for learner grades. No difference was found among any learning style group with regard to student retention.

Boyatzis and Kolb (1991) present the idea that learning styles and learning skills are different concepts. "Learning style describes basic and [generalized] dimensions of individuality in learning, while a learning skill is more situational and subject to intentional development" (n.p.). The study was written to build on prior work by Kolb and others regarding learning styles and experiential learning theory (Kolb, 1984).

Ultimately, the literature tends to present a wide array of perspectives on the topic of learning styles and how they can be addressed through distance learning technologies.

This study did not seek to explore the potential impact of different learning styles within distance learning environments, however according to the literature it may be possible that student satisfaction or the election to enroll in education through certain distance delivery modalities may be impacted by individual student learning styles (Heiman, 2006; Hughes, 2002; Klingler, 2003).

Constructivism and Distance Learning

There are several and various definitions of constructivism. For example, Wink (2006) offers two definitions, one for pedagogical constructivism, and the other for epistemological constructivism. "Pedagogical constructivism views the individual learner as the only location where knowledge is generated and maintained." Alternatively, "Epistemological constructivism views knowledge as something that individuals and groups construct from their own choices" (p. 113). Ormrod (2004) describes individual constructivism as, "The process of construction occurring separately within each learner," and social constructivism as, "Theories of learning that focus on how people work together, either at a single sitting or over the course of many years" (p. 161). Although there are different definitions and perspectives on constructivism, the theory surrounding the process of how people learn constructively remains a commonality. These commonalities can be summarized in three concepts described by Ertmer and Newby (1993):

1. Learning is 'creating meaning from experience'
2. The mind filters input from the world to produce its own reality

3. Learners build personal interpretations of the world based on individual experiences and interactions (p. 50)

Ultimately, constructivists believe that "Teachers cannot 'pour' knowledge into the heads of students as they might pour lemonade into a glass; rather, students must make their own lemonade" (Ormrod, 2004, p. 161). There are, however, questions that may be asked about constructivist theory such as who decides what should be learned? Additionally, "How can we introduce students into a rigid system such as modern chemistry and still let them construct their own knowledge?" (Wink, 2006, pp. 122-123).

What is involved in creating a constructivist learning environment in the distance education classroom and how will the creation of a constructivist learning environment impact student satisfaction? Unal and Akpinar (2006) provide a list of recommended constructivist elements:

1. Attention to the individual and respect for students' background or prior knowledge
2. Encouraging and facilitating group dialogue
3. Planned and often unplanned introduction of formal domain knowledge into the conversation
4. Provision of opportunities for students to determine, challenge, change or add to existing beliefs and understandings through engagement in tasks
5. Development of students' meta-awareness of their own understandings and learning processes
6. Evaluating the students in process and give priority to their participation (p. 41)

Even if an instructor is able to initiate the use of these constructivist elements in the classroom, there is no guarantee that students will become fully engaged, successful or satisfied with their learning. Research demonstrates that not all teachers who support and profess to adhere to constructivist teaching methodologies actually fully engage in these practices in the classroom (Chung, 2004; Gömleksız & Bulut, 2007; Mvududu, 2005; Unal & Akpinar, 2006; Wink, 2006). Unal and Akpinar (2006) provide research demonstrating that teachers with longer tenure in the classroom tend to move away from the traditional objectivist teacher-centered approach to a mix between transitive and constructivist approaches. The transitive approach is more student-centered, but the teacher still makes decisions on what and how students will learn instead of acting as a guide while students construct knowledge based on their own experiences, as in the constructivist model.

Not every author agrees with the concept of pedagogical constructivism either. Sher and Flinders (2006) review a recent book by Bowers (2005) entitled *The False Promises of Constructivist Theories of Learning: A Global and Ecological Critique* in which the author attempts to demonstrate that, "The constructivist principles are used as a tool of cultural imperialism to create a monoculture of neo-liberal, consumer-centered individualism" (Sher & Flinders, 2006, p. 164). However, there is plenty of literature that suggests there are many positives derived from constructivist theory that can be applied in the distance education classroom.

> The recent interest in technology-supported collaborative learning in higher education represents a confluence of trends: the development of new tools to support collaboration, the emergence of constructivist-based approaches to

> teaching and learning, and the need to create more powerful and engaging learning environments (Resta & Laferrière, 2007, p. 65).

There have been several studies and dissertations performed analyzing in whole or in part the constructivist approach to learning and its application in distance education environments and technology-enhanced classrooms. Within these studies the needs for collaborative learning and social interaction and discussion are stressed as a basis for constructivist learning (Adams, 2004; Cook-Wallace, 2007; Kushniroff, 2008; Leisure, 2007; Rothmund, 2008; Sweeney, 2007). Therefore, based on the literature the extent to which constructivist teaching and learning methodologies are employed within both synchronous and asynchronous learning environments may have an impact on student learning and satisfaction.

The Impact of Technology on Distance Education

The traditional classroom is rapidly evolving with the increasing move by schools to offer classes in hybrid or fully online environments. Faculty and schools are finding that their standard curriculum cannot be delivered in the same format as designed for the face-to-face classroom. Weisenberg and Stacey (2005) describe the change in the classroom from the instructor in the front of the room acting as the expert (teacher-centered), to acting more as a guide for the students (student-centered). When moving to an e-learning medium students also change to a greater reliance on self-directedness and subsequently, an increased need for communication and dialogue both with the instructor and with other students in the class. Learning is becoming more student-centered as learners become more self-directed, especially in the distance learning environment (Weisenberg & Stacey, 2005).

The application of adult learning theories in the e-learning environment is a significant challenge for curriculum designers. McLoughlin (2002) states, "In order to support learning, the task, teacher and environment must provide certain conditions for learning" (p. 150). McLoughlin (2002) presents the following list of instructional design guidelines following the constructivist learning theory that enable the creation of goal-oriented, intentional knowledge building learning environments:

1. Provide experience of the knowledge construction process
2. Provide experience in and appreciation of multiple perspectives
3. Create learning tasks that are relevant and authentic
4. Encourage ownership and voice in the learning process
5. Embed learning in social experience
6. Encourage the development of multiple modes of representation
7. Encourage self-awareness of the knowledge construction process (p. 150)

Within the traditional face-to-face classroom, scaffolding in learning conversations can take place and provide several immediate benefits such as offering detailed explanations, inviting students' participation, verification and clarification of students' understandings, modeling of desired behaviors, generating questions and comments, and inviting students to actively contribute to the class (McLoughlin, 2002, p. 151). Comparing these benefits to the distance learning environment, direct intervention and interaction both with the teacher and other students in the classroom is not always possible. Also, since the virtual classroom is typically asynchronous and self-paced, live interaction and discussion is also limited. Therefore in order for online courses to provide equivalence to the traditional face-to-face environment, curriculum must be designed

with the self-directedness of learners in mind. “Effective support would need to include the encouragement of reflective thinking, provision of social support for dialogue, interaction and extension of ideas with feedback from peers and mentors on emerging issues” (McLoughlin, 2002, p. 152).

King (2001) also identifies instructional design concerns for a technologically enhanced classroom from an adult learning perspective. “Paramount in this consideration are the needs of the adult learner and program planning: as we plan to use online conferencing, we must be aware of the prior experiences, skills, and expectations of class members” (p. 350). Additionally, there is the requirement to meet the technological needs of the students. Not all students possess the ability to use technology effectively and may experience difficulties in the online environment. The literature indicates that it is essential to provide support to these individuals so that they may also be actively engaged in the online classroom.

Additionally, the mix of multiple learning styles existent among students must be addressed (Neuhauser, 2002; Slick, 2008). A highly text-based environment is not suitable to all learners and some will struggle with typing, writing skills, and even reading skills. However, the online learning environment offers potential solutions to students that may have greater challenges in the traditional face-to-face classroom (King, 2001).

The benefits derived from a hybrid or online learning environment demonstrated in the research above present the ability to focus on student-centered learning as stressed by adult learning literature (King, 2001; Ozuah, 2005). Two of the primary student-centered benefits that can be identified from this type of learning are (a) actively

involving learners, and (b) developing and using critical thinking skills (King, 2001, p. 351). This type of learning also fosters reflective thinking and is a critical part of adult learning theories.

This study sought to determine how synchronous and asynchronous distance delivery modalities were perceived by PhD nursing students, what contributing factors may lead students to select one delivery modality over the other, and to what extent students perceived the different delivery modalities either helped or hindered their educational pursuits? Based on the review of the literature above, how students learn within their respective distance education environments may have a significant influence on their attitudes and perceptions toward their learning. These factors may also impact their individual decisions to pursue their education through a specific distance delivery medium, and may also have an impact on their perception of their educational success within the different learning mediums.

Synchronous Distance Learning Through Live Videoconferencing

Synchronous education can be defined as the delivery of education in a live format, allowing students to communicate directly with faculty and/or other students receiving immediate responses and interaction. Synchronous distance education delivery therefore, can be defined as the utilization of synchronous education delivery methods to communicate at a distance. Dal Bello, Knowlton and Chaffin (2007) describe the use of Interactive Videoconferencing (IVC) in a synchronous format as consisting of "…live, synchronous audio and video communication via a computer or digital phone network among sites in different physical locations" (p. 38). With this understanding of synchronous distance education delivery, this section reviews the literature on the use of

synchronous videoconferencing as a distance education delivery medium and research that has been performed in various educational environments, as well as the relation of existing literature to this study.

Much of the literature presents the use of synchronous videoconferencing as a positive educational tool, taking advantage of many of the expressed benefits found within the traditional classroom, including live interactive communication with the instructor and other students, face-to-face contact where non-verbal communication can be utilized, and the ability to create relationships with others (Dal Bello, Knowlton and Chaffin, 2007; O'Rourke, 2007). Additional benefits identified in the research can be seen in cost advantages for students, faculty and educational institutions due to reduced travel and facilities costs, and access to education from remote locations (Dye, 2007; Gillies, 2008; Hron et al., 2007; Koenig, 2007; Shewchuck, 2007).

Disadvantages or challenges present in synchronous videoconferencing identified in the literature are generally focused around technical challenges such as Internet communication speed, connection performance, video speed and performance, student access to technology, and pedagogical challenges (Dye, 2007; Gillies, 2008; Hron et al., 2007; Shewchuck, 2007).

Shewchuck (2007) performed a dissertation analysis on the use of synchronous two-way audio/video within a university setting. This analysis sought to evaluate group dynamics versus individual sessions, the effect of audio/video sessions versus audio-only, learning preference capability, distance learning acceptability, social interactivity, and student academic performance in both audio/video and audio-only sessions (p. i). The results of the study compared factors such as gender and social interactivity to determine

possible differences. No significant difference was found in student success overall between the two delivery mediums, however significant differences were found when comparing gender success rates between the two mediums.

Sweeney (2007) studied the use of synchronous videoconferencing in support of constructivism in K-12 education. The intent of the study was to build on existing research performed on the use of videoconferencing and the relationship between videoconferencing and educational theory. Findings included four videoconferencing constructs as being valid: learner directed/active learning, mental models, interactivity and prior knowledge. Second, a strong correlation was identified as existing between constructivism preferences and the use of particular videoconferencing techniques supporting constructivist learning environments. Third, "Respondents frequently made use of prior knowledge in their videoconferences by having students brainstorm about the topic, as well as read and write about the topic before the videoconference" (p. iii). This third finding is congruent with constructivist educational theory as well as andragogy developed by Malcolm Knowles (Galbraith & Fouch, 2007; Ormrod, 2004). The relation of this research to adult learning theories also reviewed within this literature review indicates that concepts contained within these theories may help explain some of the data regarding student perceptions of synchronous distance learning through videoconferencing.

Gillies (2008) performed a study focusing on student perspectives on the use of videoconferencing in teacher education at a distance. Challenges for the pedagogical aspects of the synchronous videoconferencing learning environment identified in the study included such areas as "…the lack of physical contact between parties, the absence

of shared space, [and] the lack of, or limited prospects for, alternative supportive learning contexts" (p. 108). Significant value is placed on the use of face-to-face interaction within the study and is judged to be "…the supreme example of social presence, while mediated relationships – such as in videoconferencing – can be diminished through the absence, or impairment, of vital aspects such as body language and facial expression" (p. 108). These may be important factors influencing students' perception of this distance learning modality, or even students' election to learn through this medium.

The importance of designing education to fit the cognitive learning needs of the student is a very important success factor. Offir, Bezalel and Barth (2007) present a study building on earlier research focused on specific learner characteristics such as attitudes and self-image as well as other psychological factors, "…examining how a range of factors such as levels of self-efficacy and creativity affect learning outcomes in a synchronous videoconferencing-based environment" (p. 4).

> This study focused on cognitive style among university students in a videoconference-based learning environment. The main purpose of this study was twofold: (1) to understand how students with different cognitive styles have different perceptions of the constraints that characterize videoconferencing, and (2) to determine to what extent these perceived difficulties correlate with student outcomes (p. 4).

Perceived difficulties within the synchronous videoconferencing learning environment in the study included lack of personal contact with the lecturer and tension during the lesson. These difficulties were analyzed for significance based on students' tendency toward extroversion or introversion, and the results indicated a statistical

significance in difference between them. Introverts tended to need greater personal contact and sensed greater tension in the lesson. The tension was focused more on the need to be attentive at all times during each lesson so that nothing would be missed, including comments from other students.

The study performed by Offir, Bezalel and Barth (2007) has direct correlation to this current study, as attitudes and perceptions of students learning in a synchronous videoconferencing environment (as well as an asynchronous online learning environment), may be affected by their individual cognitive styles and the extent to which students perceive the constraints of the learning environment as impacting their performance and success.

Some of the research literature tends to group synchronous and asynchronous learning models, and the need for constructivist learning models, group interaction, support systems, and interaction within both mediums (Resta & Laferrière, 2007; Zapantis & Maniscalco-Feichtl, 2008). According to the literature reviewed in this section, student attitudes and perceptions within the synchronous videoconferencing learning medium may be affected by several factors. Managing and controlling those factors, as well as creating a constructivist learner-centered environment focusing on student interaction and engagement, may be keys to fostering positive attitudes and success among students.

Asynchronous Learning through Web-Based Interfaces

A significant amount of research has been performed in recent years exploring many facets of online learning. These studies cover a wide array of topics including such areas as learning styles and learner characteristics (Plotnick, 2003a; Wansick, 2007),

pedagogical aspects and instructional methods (Kanuka, Rourke & Laflamme, 2007; Miller & King, 2003), interaction online (Battalio, 2007; King, 2001; Kushniroff, 2008; Scheetz & Gunter, 2004), cost effectiveness of distance education programs versus in-house or other educational mediums (Koenig, 2007; Kushniroff, 2008), attitudes and perceptions of both students and faculty (Beard & Harper, 2002; Beard, Harper & Riley, 2004; Cook-Wallace, 2007; Kushniroff, 2008; McFarland & Hamilton, 2005; Plotnick, 2003b; Summers, Waigandt & Whittaker, 2005), and many comparisons of online versus on-campus, or other instructional mediums' learning success factors and comparisons (Davis, 2007; Edmonds, 2006; Poirier & Feldman, 2004; Scheetz & Gunter, 2004). There are also books that have been published about online education, curriculum and courseroom development, technologies, and instructional aspects (Shelton & Saltsman, 2005; Simonson et. al, 2006). Since the focus of this study was on the attitudes and perceptions of students completing higher education through distance learning mediums, this section focuses on the literature addressing attitudes and perceptions as well as the pedagogical aspects of teaching and learning online.

Attitudes and Perceptions

The majority of research tends to demonstrate that students attending courses online perform either the same or better than their on-campus counterparts (Beard & Harper, 2002; Beard, Harper & Riley, 2004; McFarland & Hamilton, 2005; Poirier & Feldman, 2004; Summers, Waigandt & Whittaker, 2005). There are some research studies which demonstrate contradictory results (Edmonds, 2006); however, these findings appear less common. The research regarding attitudes and perceptions is a bit more complex and less consistent in their results.

Davies and Graff (2005) performed a study attempting to determine if there is a statistical difference in student performance in online courses based on the number of courseroom postings as a determining factor for participation. The results of the study determined that there was no significant difference in student grades based on the number of posts, although failing students did tend to interact less frequently. The authors hypothesize that the results may indicate it is not the quantity of the posts online that count, but the quality. This hypothesis may also be an indication of student attitudes toward their participation in the courseroom (or lack thereof), and its effect on their grades.

King (2001) performed a related study analyzing how online bulletin board discussions held between class sessions impacted overall student interaction in the classroom as well as student satisfaction and performance. It was found that these online interactions had significant positive impacts in the classroom including student success and satisfaction. Scheetz and Gunter (2004) performed a study evaluating the use of asynchronous videostreaming compared to on-campus instruction and discussed from the results that students attending the course in the live classroom had the ability to interact with the instructor and other students providing them an advantage over their counterparts who were restricted to the use of the asynchronous medium. The ability to interact and ask for immediate clarification from the instructor or other students appeared to be a key factor impacting student success and satisfaction. Dissertation research performed by Kushniroff (2008) also agrees with these results, indicating high value toward the ability to interact with faculty and other students in an online course. One of the key results of the study indicated that “if a collaborative learning environment is

fostered by the instructor, whether it is a traditional classroom based or an internet-based class, there was no difference in the perception of student learning" (pp. 95-96).

In other research, results seem to indicate students who are amenable to taking online courses may be more successful and have greater satisfaction from learning in this medium (Poirier & Feldman, 2004). The research by Kushniroff (2008) also agrees with this concept and adds that there are certain traits online learning students possess which enable success in this learning environment: self-discipline, the ability to work independently, a structured learning environment, and individualized and self-paced learning ability (p. 95).

In 2002, Beard and Harper performed research studying student perceptions of online versus on-campus instruction. They found that, although most students said that they would take another online course (this was the first time they had taken an online course) and they touted the convenience of this learning medium, they experienced frustrations with the technology and the lack of teacher-student and student-student interaction. In a follow-up study, Beard, Harper and Riley (2004) performed similar research and experienced similar results. The primary attitude of students was that they would take another online course, even given its limitations in interaction and technology, because of the flexibility and stress release.

Kanuka, Rourke and Laflamme (2007) performed research on how instructional methods may impact the quality of online discussions. In reviewing the students' journal entries for the course, it was hoped that students would critically reflect on their learning and present their thoughts in their journals. Instead, "They rarely went further than what was required in responding to differences of others' opinions, justifying their own

opinion when challenged and working towards resolution of the problems presented" (p. 267). Additionally, students expressed the need for collaborative learning and a learner-centered approach, however, "Many of the course participants failed to understand the commitment required to their group, the increased responsibility required with learner-[centered] approaches, and the hard work and time required to achieve higher levels of understanding" (p. 267). The research concludes that, in agreement with prior research, student discussions within an online asynchronous learning environment tend to be "Serial monologues… [exploring] the issues in an interesting way, but without integration or resolution" (p. 269).

Touting the best of both worlds, hybrid education has also become a popular choice. Davis (2007) performed a dissertation comparing hybrid education to distance-only courses. The hypothesis for the study was based on the concept that the physical classroom is the "heart" of the institution, and therefore offers the best opportunity to enhance student efforts. In contrast, online learning offers greater flexibility and convenience than traditional classrooms. The central theme of the study was that retention rates and student success based on grades were higher in hybrid education courses than in distance-only. The results of the study found no significant difference in student retention rates between hybrid and online-only courses, indicating that hybrid education does not appear to bridge the gap entirely from this perspective. When comparing grades, students in the hybrid course performed significantly better than their online-only counterparts. Indications from faculty and students were that interaction in the hybrid classroom allowed for greater in-depth discussions and better organization of assignments. These factors positively impacted overall student satisfaction as well.

Pedagogy Online

In reviewing distance education literature from a pedagogical perspective, Miller and King (2003) point out that distance education courses typically suffer from a common problem of high dropout/low course completion rates. Factors identified that may impact these statistics include, "Lack of feedback, feelings of isolation, frustrations with the technology, anxiety and confusion" (p. 286). Of these, timely, critical feedback tends to top the list in perceived value to students. Feedback can be public or private, positive or negative, but the mere reception of critical feedback in any form impacts student perception and satisfaction within the course, and may also influence student retention. "Although frustrations with technology will continue to be a problem for the foreseeable future, research indicates that social, more than technical factors, are the main determinants of success or failure in a computer-mediated course" (p. 287).

Another key factor that appears in the literature is that distance learners "…must be self-regulated and self-directed" (Miller & King, 2003, p. 289). Additionally, research indicates that distance learners must be more actively engaged in their learning than traditional students and take greater responsibility for their own learning. Asynchronous distance education students must possess good communication skills, particularly in written form since, unlike in synchronous or traditional education settings, the ability to enhance communication through non-verbal mediums is not available.

Considering these factors, for a course to be successful online, a different course of action must be taken than simply transferring all of the instructor's instructional materials such as PowerPoint presentations and notes to the electronic courseroom. The majority of research literature indicates that courses taught to students attempting to

mimic the same presentation methods and materials, found that student satisfaction was significantly different between online and traditional learners (Miller & King, 2003; Poirier & Feldman, 2004; Scheetz & Gunter, 2004; Summers, Waigandt & Whittaker, 2005). One particular research study attempted to control and regulate the learning environment similarity between an online and traditional classroom to a very tight degree. The results of this study found no significant difference between either student success or student satisfaction in each course. This is attributed to the extremely tight controls maintained between the course materials and delivery methods between the two mediums (McFarland & Hamilton, 2005). Such tight controls between course delivery mediums do not seem possible in all cases, nor is it a realistic goal, and based on the differences between distance and traditional learners identified above, it also does not seem an appropriate form of pedagogy. As stated by Knowlton and Weiss (2000), "When faculty attempt to enhance their courses with technology but do not consider pedagogy, they are usually disappointed with the results" (as cited in Miller & King, 2003, pp. 289-290).

Focusing on the application of good pedagogical practices, "The interaction between the instructors and the students in a distance education course is critical to its success" (Miller & King, 2003, p. 290). Many of the research articles reviewed above point to the significant value placed on student-teacher and student-student interaction, not only for greater student satisfaction, but also in enabling better pedagogy. "Research supports a need for distance education courses to be constructivist, collaborative, and student-centered" (p. 290).

Faculty who are new to teaching in distance learning mediums may not be prepared for the change in pedagogy, and may attempt to simply transfer traditional classroom-based instructional methods to the new medium. However, "The difficulty in making this change in teaching and learning styles cannot be understated, given how deeply embedded direct instruction is in educational institutions and classrooms" (Miller & King, 2003, p. 290). Particularly in an asynchronous online learning environment, where live interaction is not available, it is critical for faculty to adjust their pedagogy to engage students so they do not feel alone in their educational pursuit. "The single most important skill that all distance educators must develop is to make their students active participants in their educational program (Moore & Kearsley, 1996, p. 133, as cited in Miller & King, 2003, p. 291).

From a more technical perspective, Adams (2004) discusses three components of computer-based learning, "Hardware, software and 'underware', the pedagogy that underpins its development" (p. 5). The *underware* is based on instructional theories utilized in the development of electronic-based courses, focusing on revelatory, conjectural and emancipatory instructional methods. These theories are tied to behaviorist, cognitivist and humanist psychologies, and are drawn from Rusby's paradigms (Rusby, 1979, as cited in Adams, 2004, p. 10). One specific point that should be made is that quite often faculty get caught up in all of the technological advances, and attempt to use technology in the classroom for reasons other than their appropriate pedagogical uses and student benefits. "If… teachers are not aware of the pedagogy associated with [computer-based learning], then they are in danger of including features simply because they are available" (p. 11). This same logic also applies to the instigation

of a distance learning program, either through synchronous or asynchronous mediums. Simply because the technology is available, does not make it the right choice for certain educational subjects, schools or types of students.

This type of constructivist approach is different than faculty may be accustomed to. "This is a dramatic shift from the classic 'instructivist' pedagogy, characterized by instructor-generated resources and delivery of content in a very uniform manner (Summers, Waigandt & Whittaker, 2005, p. 236). However, although this change may be difficult for many faculty and institutions to make within their curriculum delivery approaches, it is vital for student success and satisfaction. "In changing from traditional classrooms to distance education, the revamping of pedagogical methods is more critical [than] any technical or software issue that may arise" (Miller & King, 2003, p. 290). Additionally, "In considering these critical pedagogical changes, the literature points to one method that has been more successful than any other in courses taught at a distance – a collaborative community approach" (p. 290).

Conclusion

This literature review focused on four key areas related to this study: distance education, adult learning theories, synchronous and asynchronous learning environments. The literature surrounding distance education and delivery mediums primarily focuses on comparing the use of a specific distance delivery modality with on-campus instruction in order to determine if there is a difference in student success or performance between the two learning mediums. Research performed addressing student satisfaction, attitudes and perceptions also follows a similar trend, comparing students within either synchronous or asynchronous distance learning mediums with students learning in the traditional

classroom. The literature reviewed surrounding adult learning covers a broad range of different theories, each of which has been shown to potentially affect student learning, satisfaction and success in their respective learning environments, including distance education.

One noticeable topic missing in the literature is a direct comparison of students learning through different distance education mediums. The single study presented in this literature review that most closely approximates such a comparison is that of students learning in distance-only education versus students learning through a hybrid format (Davis, 2007). The study sought to determine possible differences in student success rates and grades, and did not seek to determine student attitudes or perceptions between the two learning environments.

Therefore, the primary question remains, which distance learning medium do students prefer? As universities and colleges rapidly increase their use of technology for the delivery of education through both synchronous and asynchronous means, the reasoning behind their selection of a specific distance delivery medium should be examined. Do schools choose to deliver asynchronously because they believe this medium will provide the best possible learning environment for their students? Or is the choice driven by economics with the hope of increasing enrollment by increasing the school's reach to students outside of their area? Is the intent of offering education through synchronous videoconferencing to provide students the closest approximation to a traditional classroom, with the belief that students learn best in that environment? Or do schools have other driving factors encouraging the use of synchronous videoconferencing such as outreach programs for students in rural areas? Do students elect to take courses

from a certain school in a specific subject area because of the type of delivery method offered or the particular adult learning methodology employed? What influences students to take courses through either synchronous or asynchronous distance delivery methods? Are there several influencing factors such as their own learning styles, the type of pedagogical delivery, or economic factors? Does the specific subject matter play a role in students' decisions to take courses through a certain distance delivery modality? Once enrolled in distance education courses, do students feel that the type of distance delivery method used affects their ability to learn? Do students perceive that the challenges they face learning in the different distance delivery mediums affect their educational pursuits?

None of these questions posed appear to be either addressed sufficiently or at all within the literature. This study could not possibly address all of the questions above. Instead it focused on attempting to answer the primary question posed regarding student attitudes and perceptions toward the different distance delivery modalities, what factors may lead students to elect one distance delivery modality over another, and to what extent students perceive the different delivery modalities either help or hinder in their educational pursuits.

CHAPTER 3. METHODOLOGY

Introduction

As technology continues to evolve within the realms of higher education, both synchronous and asynchronous delivery modalities are gaining momentum and popularity. Students opt to enroll in courses and even entire degree programs through different distance delivery technologies for various reasons, and their perceptions and attitudes toward these different delivery modalities may impact their success.

This chapter will provide a brief restatement of the problem followed by a description of the purpose and research design. A detailed description of the research methodology, survey and data collection methodologies and analysis procedures will also be provided.

Restatement of the Problem

Higher education institutions continue to rapidly adopt the use of technology in the classroom in support of the demand for student education at a distance. Although the use of technology in the classroom has the potential to enhance content and learning, individual pedagogies can also be impacted.

> The recent interest in technology-supported collaborative learning in higher education represents a confluence of trends: the development of new tools to support collaboration, the emergence of constructivist-based approaches to teaching and learning, and the need to create more powerful and engaging learning environments (Resta & Laferrière, 2007, p. 65).

When providing education through distance delivery technologies, the question arises about which delivery modalities may be more effective from student perspectives. Many research studies have compared factors impacting student success in distance learning modalities, as well as attitudes and perceptions of students in both distance learning and on-campus classroom environments. There appears to be a gap in the literature comparing the attitudes and perceptions of students between different distance delivery modalities, synchronous and asynchronous, and more specifically at the graduate student level.

Purpose and Research Design

There are many different forms of distance education delivery modalities in use today. Among the most prevalent are asynchronous e-learning and synchronous videoconferencing. Research has been performed investigating various aspects of these delivery modalities. However, there appears to be a gap in the literature for their specific comparison. The purpose of this study was to ascertain how synchronous and asynchronous distance education delivery modalities were perceived among graduate students. The attitudes and perceptions of PhD nursing students concerning their education through different distance education modalities, synchronous and asynchronous at two different universities were researched in this study. Students have attended and completed coursework through synchronous videoconferencing at one university, and through asynchronous online learning at the other university. Potential differences in the attitudes and perceptions between PhD nursing students regarding their education through synchronous and asynchronous delivery modalities at the two different universities were identified.

Hypotheses

Null Hypothesis 1: There is no significant difference between the perceptions of PhD nursing students about whether asynchronous online learning delivery helps or hinders their educational pursuits.

Null Hypothesis 2: There is no significant difference between the perceptions of PhD nursing students about whether synchronous live videoconferencing delivery helps or hinders their educational pursuits.

Null Hypothesis 3: There is no significant difference between the preferences of PhD nursing students for synchronous or asynchronous distance delivery modalities.

Null Hypothesis 4: There is no significant difference between the preferences of PhD nursing students for synchronous live videoconference education delivery versus on-campus instruction.

Null Hypothesis 5: There is no significant difference between the preferences of PhD nursing students for asynchronous Internet-based education delivery versus on-campus instruction.

Research Methodology

The Primary Research Question driving this research study was, how are synchronous and asynchronous distance delivery modalities perceived by PhD nursing students at two separate universities? The two Sub-Questions were, (1) What contributing factors may lead students to select one delivery modality over the other? (2) To what extent do students perceive the different delivery modalities either help or hinder in their

educational pursuits? These questions were answered through the use of both quantitative and qualitative analysis.

When performing research, it is important for the researcher to determine the methodology to be used based on the goals of their research (Leedy & Ormrod, 2001). When performing educational research, epistemological assumptions are made that determine the type of research methodology to be used. "Positivist research is grounded in the assumption that features of the social environment constitute an independent reality and are relatively constant across time and settings" (Gall, Gall & Borg, 2003, p. 23). This type of research uses numerical data gathered from samples of observable behaviors, and these data are subjected to various statistical tests to determine validity, significance, and other analytical information. Positivist research is "…used to answer questions about relationships among measured variables with the purpose of explaining, predicting and controlling phenomena" (Leedy & Ormrod, 2001, p. 101). Positivist research is commonly known as quantitative research, and is also recognized as traditional or experimental research.

"Postpositivist research is grounded in the assumption that features of the social environment are constructed as interpretations by individuals and that these interpretations tend to be transitory and situational" (Gall, Gall & Borg, 2003, p. 23). This type of research is "…typically used to answer questions about the complex nature of phenomena, often with the purpose of describing and understanding the phenomena from the participants' point of view" (Leedy & Ormrod, 2001, p. 101). Data collected for this type of research is performed primarily using verbal information, and then subjecting

these data to analytic tests. Postpositivist research is commonly known as qualitative research, and is also similar to interpretative and constructivist research methodologies.

The principle tenets of each research methodology described above demonstrate the base differences between them. The choice of which method to use ultimately comes down to a question of which type of data the researcher wants to collect in order to answer a specific question related to a problem. "To some extent, the data dictate the research method" (Leedy & Ormrod, 2001. p. 100). There is no one true form of research that can answer all questions. Instead, the questions asked set the tone and the type of data to be collected, which in turn determines the research format to be used.

As a further means of differentiation between quantitative and qualitative approaches, Leedy and Ormrod (2001) provide the following direct comparisons regarding the purpose of research (p. 102):

Quantitative	Qualitative
To explain and predict	To describe and explain
To confirm and validate	To explore and interpret
To test theory	To build theory

A review of the literature demonstrates that similar research has been performed using various forms: quantitative (Cook-Wallace, 2007; Davis, 2007; Hughes, 2002; Kanuka, Rourke & Laflamme, 2007; Neuhauser, 2002; Rothmund, 2008; Shewchuck, 2006; Sweeney, 2007), qualitative (Dal Bello, Knowlton & Chaffin, 2007; Gale, Wheeler & Kelly, 2007; Hron et al., 2007; Kushniroff, 2008; Perez-Prado & Thirunarayanan, 2002), mixed methods including both quantitative and qualitative measures (Klingler,

2003; Offir, Bezalel & Barth, 2007), case study (Dye, 2007) and heuristic study (Leisure, 2007).

The primary question regarding student perception could call for either qualitative or quantitative data. The Sub-Questions asking *what* and *to what extent* tend to drive the need for quantitative data. The intent of this research was to explain, confirm, validate and test theory, as well as to provide insight to *why* and *how* student perceptions may be influenced. Therefore, to answer these questions, both quantitative and qualitative data analysis in a mixed-methods format was used.

Setting of the Study and Participants

This study involved students from two universities set within the Rocky Mountain area of the United States. Students were either currently attending or had completed PhD nursing education through distance learning mediums. One group had experienced their learning entirely through synchronous videoconferencing, while the other group had learned through asynchronous online courses. Although each distance PhD nursing program contained a brief portion of face-to-face contact on campus, this requirement was outside the curriculum delivery, and therefore was not considered as impacting student attitudes and perceptions toward the different distance delivery modalities.

Data Collection Procedures

Each university's graduate program cohorts completed questionnaires during and at the end of their matriculation gathering demographic student data, among other information. Each university was contacted and provided IRB approval for the use of this data as well as for the contact of their graduate students for the purposes of this study.

Demographic data were provided by each university and all data were de-identified as necessary to retain confidentiality and compliance with FERPA regulations.

Additionally, a separate questionnaire was used to gather information specifically relating to the research questions of this study. Invitations for participation in this study were sent to students by the individual university's registrars or designees, again to retain confidentiality and compliance with FERPA regulations. The questionnaire was provided electronically through SurveyMonkey and data was gathered to provide a comparative analysis of student perceptions surrounding each delivery modality, what factors may have led students to select one delivery modality over another, and to what extent students perceived the different modalities may have either helped or hindered their educational pursuits.

Students were sent an e-mail originating from each university's registrar or designee inviting them to the SurveyMonkey website. The first page of the survey included a statement indicating that by continuing with the questionnaire, they were providing consent. This statement also indicated that the questionnaire was completely voluntary and could be exited at any time. At the end of the data collection period, data were downloaded and removed from the site. Data will be retained for seven years per Capella IRB requirements.

Instrumentation

Information gathered from data already available at both universities was used to set the base for this research study. The intent of this data was to provide demographic information about students including student age, gender, ethnicity, marital status and income level. Targeted data were gathered through separate questionnaires sent to each

university's students. Students were invited to participate in a separate questionnaire specifically targeting the questions of this study, and based on their distance education modality, synchronous or asynchronous. The questions were primarily drawn from similar research literature (Beard, Harper & Riley, 2004; Cook-Wallace, 2007; Dal Bello, Knowlton & Chaffin, 2007; Jessup, 2007; Kostrzewski, 2007; Rothmund, 2008). Some questions were also developed by the researcher to target specific points addressing the research questions of this paper. Each questionnaire was peer reviewed for application to this research.

Additionally, a field test was performed seeking input from sample students in each program to determine the appropriateness of the survey questions and whether student responses would provide the desired data. Based on feedback from students involved in the field test, a single survey question was added in order to fine tune the research and provide additional insight to the data asking the length of time the student had been in the distance PhD nursing program, based on their own time reference.

The survey questionnaire contained 35 questions addressing attitudes and perceptions of students relating specifically to the different distance learning modalities, based on a 5-point Likert scale ranging from *Strongly Agree* (SA) to *Strongly Disagree* (SD). The questionnaire also contained seven open-ended questions seeking g

Greater detail regarding such items as challenges experienced, suggestions for future students, and strategies for success within their specific learning modality (see Appendix A for the individual questionnaires).

Participants

Participants in this study included existing and alumni PhD nursing students from two different universities. It was anticipated that these students would be able to draw on their prior traditional classroom and possibly other distance learning technology experiences as a foundation to determine their responses. This allowed their responses to be based upon their experience with more than a single delivery modality, providing greater depth to the data. It was also anticipated that student responses to the research questionnaire might be influenced by the length of time they had been in the PhD program. Students at these universities had either completed or were currently completing coursework through either entirely synchronous or asynchronous delivery methods. Although both universities' degree programs contained an on-campus requirement, the individual curriculum courses were delivered entirely through the distance delivery modality, either synchronous or asynchronous.

The two universities had different curriculum and different student acceptance criteria, which did not allow the researcher to compare student success rates or performance between the two programs. A study comparing students matriculated in the same university degree program, taking the same courses in alternate distance delivery modalities would provide a strong research comparison and allow for additional data to be analyzed such as student success rates, grades and retention. However, this type of research environment was not available. Therefore, the focus was on student demographics and characteristics as a base, and then a comparison of attitudes and perceptions from responses to the Internet-based questionnaire. The strength of the

comparative data in this study was in the commonality between the student level (PhD) and the educational degree topic (Nursing).

The program directors at each university provided approval for the study to be performed in conjunction with IRB approval. IRB approval was obtained from each university involved in the study, as well as IRB approval from Capella University as the oversight school. e-mails were sent by each university's registrar or designee to students targeted for the questionnaire with a link to the SurveyMonkey site and included an explanation of the survey and the university's involvement. A statement was included for each questionnaire on the SurveyMonkey site indicating that progressing further was an acknowledgement of consent on the part of the participant. No direct contact took place between the researcher and the participants. The questionnaire was initially open for a period of one month. The initial response rate was less than anticipated, so a follow-up invitation was sent through each university after the second week. At the end of the one-month period, the response rate from one of the two universities was still lower than anticipated, so the program director at that university requested that the survey remain open for one additional week. An additional invitation was then sent to the target participants at that university. The survey was closed at the end of that final week, having been open for a total of five weeks.

Data Analysis

The questionnaire described above gathered quantitative data using a Likert scale, and the results of this data were used to compare the specific attitudes and perceptions between the two learning modalities, live synchronous videoconferencing and asynchronous online classrooms, to determine if any significant differences existed. The

quantitative data were tallied and compared using a standard *t* test to see if there was a significant difference in the data results between methodologies used. Each of the initial 35 questions was compared side-by-side using the *t* test to determine if there was a significant difference.

Data gathered from the last seven open-ended questions were sorted and analyzed for common themes using the Constant Comparative method developed by Glaser and Strauss (Merriam, 1998). This method was used as a means of developing grounded theory consisting of "categories, properties, and hypotheses that are the conceptual links between and among the categories and properties" (p. 159). This method was appropriate because it allowed the researcher to "constantly compare" incidents within a set or between data, leading to tentative categories which could then also be compared with each other with the intent of formulating a theory (p. 159). This theory was then used to answer the driving questions contained in the research.

The anticipation of this data gathering and analysis methodology was that the graduate students would be able to draw from their personal educational experiences, both in traditional and distance learning formats to present a more accurate and descriptive picture of their attitudes and perceptions of the different learning modalities. Appendix C displays the questionnaire items that correspond to this study's primary and secondary research questions.

Ethical Considerations

IRB approval was obtained from Capella University as the oversight IRB for the study. IRB approval was also obtained from each of the participating universities involved in the study. All demographic data was de-identified by each university before

being sent to the researcher to retain confidentiality and compliance with FERPA and IRB regulations. Quantitative data is presented in summary format. Qualitative comments do not include the identity of individual participants. Data will be destroyed after 7 years of retention at the researcher's home office.

Remainder of the Study

Chapter four will present a report of the existent data as well as the data and analysis of the survey results. Comparisons will be drawn from the results between synchronous and asynchronous education delivery modalities, and the perceptions and attitudes of students identified.

Chapter five will evaluate the work produced and address the general implications of the study. This chapter will also make recommendations regarding the validity of the study, to what degree the results answer the research questions, and present recommendations for future studies. The information presented in this study will add to the existing body of knowledge regarding attitudes and perceptions of students in distance delivery modalities by offering a direct comparison between both synchronous and asynchronous modalities.

CHAPTER 4. DATA COLLECTION AND ANALYSIS

Introduction

The purpose of this study was to determine if there is a difference between the attitudes and perceptions of PhD nursing students learning at a distance through synchronous and asynchronous means. A mixed-methods research approach was used to ascertain the possible differences, and gather descriptive information regarding student attitudes and perceptions. De-identified demographic data was also gathered to describe the target participants.

Data Collection

Data were gathered through two primary means, electronically through SurveyMonkey.com, and manually using existent demographic information. Two surveys were used targeting each of the separate participant groups, (1) distance PhD nursing students attending courses through entirely online asynchronous means, and (2) distance PhD nursing students attending courses through entirely synchronous videoconferencing. The two target student groups were enrolled or graduated at two different universities located in the Rocky Mountain region of the United States.

De-identified demographic data were collected by the PhD nursing program director or designee at each university and then provided to the researcher. Target students were sent an invitation electronically to participate in the Survey. The invitation letter was then sent out by each university registrar's designee, which ultimately was the PhD nursing program director for each university. The researcher had no direct contact with the participants.

The surveys were open for a period of 37 days. A reminder e-mail was sent out to students after 15 days, and a second reminder was sent out to one of the individual schools for the final week of the survey. IRB approval was obtained for this study at each university, with IRB oversight provided by Capella University.

As described in chapter 3, the questionnaires used were primarily derived from several other studies (See Appendix B), and modified for the purposes of this research. The questionnaires each contained 35 quantitative questions, 7 qualitative questions and one general question. The questions were worded for the specific delivery modality. For example, question one for the synchronous questionnaire asked,

1. The class content lends itself easily for a live synchronous videoconferencing class.

Question one for the asynchronous questionnaire asks,

1. The class content lends itself easily for an Internet class.

Thus, each question in the questionnaire was directly comparable to that of the other questionnaire. Each of the qualitative questions was also worded in a similar manner. The single general question asked for the length of time the student has been enrolled in their degree program. The reason for the general question was to determine if there is a difference in student attitude or perception toward their delivery modality based on length of time in the program.

The target participants were chosen for this study because of their length of time in higher education. The hope was that by targeting this group of students, they would be able to base their answers on their past experience in higher education through traditional

in-house classes as well as potentially other distance learning programs. The distance PhD nursing degree programs at each of the comparative universities had been in existence for about the same amount of time at the time of data collection, about 1-1/2 years. Also, each had recently graduated their first set of students from these programs, the synchronous group graduating in spring, 2009, and the asynchronous group graduating summer, 2009. The number of students in each respective program was also similar with 55 targeted students enrolled or graduated in the synchronous program, and 50 enrolled or graduated in the asynchronous program. Although the two PhD nursing programs did not contain the same curriculum, the programs were very similar in nature and overall degree emphasis. Other data such as grades, course completion percentages, retention and other similar data were not gathered and compared because of the differences in the curriculum, and the results would not have been of value.

Each distance program delivered all coursework through the specified distance delivery medium. Each program also had an on-campus component, bringing students and faculty together for brief face-to-face interaction between semesters. The focus of this study was on the delivery medium and did not attempt to evaluate the face-to-face component of either program.

Demographic data gathered were placed in a Microsoft Excel spreadsheet and descriptive statistics used to determine the mean, median, max and min for each category: gender, age and race. Marital status and income level were also sought from each university, but unavailable, and therefore not used in this study. Data gathered through the online questionnaire were downloaded from the SurveyMonkey website at the end of the survey period and initially placed in an Excel spreadsheet. The quantitative data were

then moved to SPSS and *t* tests performed comparing each question directly, and in groups to determine statistical significance. The qualitative data from each questionnaire were compiled, sorted and analyzed for common themes using the Constant Comparative method developed by Glaser and Strauss (Merriam, 1998).

Of the target samples, 33 participants completed the synchronous questionnaire, and 16 participants completed the asynchronous questionnaire. Of the original target number of students from each program, the response rate represents 60% in synchronous and 32.0% in asynchronous. No information was available to explain the lower response rate among asynchronous participants. Using G*Power 3.0.10 for Windows, the minimum sample size for each of two independent groups needed for 2-tailed *t* test statistical significance is 26, for a total minimum sample size of 52, and a critical *t* value of 2.00856. The number of respondents for the synchronous group exceeded this minimum. The number of respondents for the asynchronous group did not meet this minimum. The total respondents combined between the two study groups was 49. Although this represents a potential weakness in the study, the number of respondents from both groups did provide enough data to perform a statistical analysis and evaluation of qualitative data.

The remainder of chapter 4 is organized in to three data analysis groups: demographic data, quantitative data, and qualitative data.

Demographic Data

The PhD nursing program directors at each of the participating universities were asked to gather and provide de-identified aggregate demographic information about the specific target students in their programs using already existent data gathered when

students entered their programs. The purpose for this information was to present a general picture about the types of students enrolled in each program. The initial requested demographics included student age, marital status, gender, income level and ethnicity.

Once final approvals were received from the IRB's at each university, and the data collection process began, it was immediately discovered that one of the participating universities did not gather marital status and income level demographics, although the PhD nursing program director thought these demographics were collected when asked during the approval process. These data were also not readily available through financial aid or other sources. The researcher therefore determined that, since the demographic data was not being used to answer the research questions, student age, gender and ethnicity would be sufficient for the purposes of this study.

Synchronous Videoconferencing University

At the university in which students attended courses through synchronous videoconferencing, there were 55 total students targeted. The demographics are below:

Table 1. Synchronous Group Demographics

Total # of students	55
Gender	
Female	51
Male	4
Ethnicity	
Arab American	1
Asian	2
Black	5
Native American	1
Hispanic	1
White	45
Age	
Average	47.64
Max	64.96
Min	26.92
Median	49.98

The ethnicity data reflect the population of the area in which the university is located. The ratio of female to male students reflects the current nursing industry. The age range may be considered typical of the education level of the students. No inference can be made from these data about student technical knowledge or ability, comfort level with technology, or affinity with taking courses through the distance medium versus a traditional in-class environment.

Asynchronous Online University

At the university in which students attended courses through asynchronous online means, there were 50 total students targeted. The demographics are below:

Table 2. Asynchronous Group Demographics

Total # of students	50
Gender	
Female	45
Male	5
Ethnicity	
Native American	1
Asian	4
Black	2
Hispanic	8
Other	1
White	34
Age	
Average	51.17
Max	67.78
Min	34.55
Median	51.63

The ethnicity data reflect the population of the area in which the university is located. The ratio of female to male students reflects the current nursing industry. The age range may be considered typical of the education level of the students. As with the data from the synchronous videoconference sample, no inference can be made from these data about student technical knowledge or ability, comfort level with technology, or affinity with taking courses through the distance medium versus a traditional in-class environment.

Quantitative Data

T Test Results

The data presented below draws from the *t* test comparisons between the same questions from each survey, synchronous and asynchronous.

Table 3. *T* Test Analysis

T Test Analysis					
Question/Group	Value	Sig/Not Sig	Question/Group	Value	Sig/Not Sig
1	.007	Sig	27	.078	Not Sig
2	.057	Not Sig	28	.103	Not Sig
3	.006	Sig	29	.018	Sig
4	.317	Not Sig	30	.018	Sig
5	.936	Not Sig	31	.101	Not Sig
6	.006	Sig	32	.685	Not Sig
7	.010	Sig	33	.024	Sig
8	.008	Sig	34	.143	Not Sig
9	.007	Sig	35	.040	Sig
10	.008	Sig	36	.883	Not Sig
11	.335	Not Sig	Communication	.002	Sig
12	.002	Sig	Isolation	.000	Sig
13	.063	Not Sig	Flexibility	.241	Not Sig
14	.014	Sig	Modality Effectiveness	.010	Sig
15	.101	Not Sig	Teacher	.083	Not Sig
16	.012	Sig	Help or Hinder	.052	Not Sig
17	.042	Sig	Discussion	.017	Sig
18	.023	Sig	Preference	.024	Sig
19	.025	Sig	Impact on education	.024	Sig
20	.013	Sig	Interaction	.010	Sig
21	.002	Sig	Effectiveness	.007	Sig
22	.000	Sig	Social	.914	Not Sig
23	.253	Not Sig	Technology	.235	Not Sig
24	.011	Sig	Perception	.026	Sig
25	.074	Not Sig	Recommend	.046	Sig
26	.003	Sig			

The designation of *Sig* or *Not Sig* indicates significance at a *t* test value above or below 0.05. Please reference the full surveys in Appendix A for the wording of each question.

Hypothesis Analysis

The study answers the following research hypotheses:

Null Hypothesis 1

There is no significant difference between the perceptions of PhD nursing students about whether asynchronous online learning delivery helps or hinders their educational pursuits.

Question 34 of the asynchronous survey asked, "I believe that taking courses in an asynchronous online classroom has helped me in my educational pursuits."

A Likert scale with 1 equaling *Strongly Agree,* 3 equaling *Neutral* and 5 equaling *Strongly Disagree*, was used for all quantitative data analysis. The average response among asynchronous participants for this question was 2.38. This value alone was not enough to disprove Null Hypothesis 1, although the values indicated a greater percentage of agreement with the statement.

Null Hypothesis 2

There is no significant difference between the perceptions of PhD nursing students about whether synchronous live videoconferencing delivery helps or hinders their educational pursuits.

Question 34 from the synchronous survey asked, "I believe that taking courses through the live synchronous videoconferencing modality has helped me in my educational pursuits." The average response for this question using the same Likert scale described above was 1.73, lying between agree and strongly agree. This value would appear to disprove Null Hypothesis 2.

The averages from the responses for question 34 described above do not appear adequate to disprove Null Hypothesis 1 or Null Hypothesis 2 alone, although the average for the synchronous group provides a stronger argument for Null Hypothesis 2. Further analysis shows that the *t* test comparing responses from these two questions provided a result of 0.134 indicating that there is not a statistically significant difference between the two groups. This data also appears inadequate to disprove null hypotheses one and two.

Other questions from the surveys also addressed the same topic, although approaching it from slightly different angles and wording. Questions 5, 6, 13, 30, 31 and 34, making up the group in the table above labeled "Help or Hinder," focused on determining student perceptions on whether the delivery method either helps or hinders their education. The *t* test analysis of this question group resulted in a value of 0.052. This result appears to be borderline significant at .05.

Null Hypothesis 3

There is no significant difference between the preferences of PhD nursing students for synchronous or asynchronous distance delivery modalities.

Question 11 from the synchronous survey asked, "I prefer to take synchronous videoconferencing classes to traditional classes." The average response for this question was 2.39. The same question from the asynchronous survey asked, "I prefer to take asynchronous online classes to traditional classes." The average for this question was 2.80. The *t* test analysis comparing these two questions resulted in a value of 0.335 indicating that there is not a statistically significant difference.

Question 31 from the synchronous survey asked, “I prefer the flexibility of taking a synchronous course to a traditional in-house course.” The average for this question was 1.91. The same question from the asynchronous survey asked, “I prefer the flexibility of taking an asynchronous course to a traditional in-house course.” The average for this question was 2.63. The *t* test analysis comparing these two questions resulted in a value of 0.101 indicating that there is not a statistically significant difference.

Individually, these two questions do not disprove Null Hypothesis three. However, these two questions are used to answer hypothesis three because of their use of the word “prefer.” The questions do not ask survey participants to provide their preference between synchronous and asynchronous modes of delivery because the targeted survey participants attended their PhD nursing courses entirely through one of the two modalities. Therefore, relying solely upon these two questions would not be adequate to disprove the Null Hypothesis.

Similar to the grouping of questions described above for hypotheses one and two, questions 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 29, 31, 34 and 35, making up the group “Preference,” asked questions that would also indicate a preference for survey participants’ specific distance delivery modality. A *t* test analysis comparing survey results on this question group resulted in a value of 0.024 demonstrating a statistical significance. This difference disproves Null Hypothesis 3.

Null Hypothesis 4

There is no significant difference between the preferences of PhD nursing students for synchronous live videoconference education delivery versus on-campus instruction.

Questions 6, 7, 11, 31, 32 and 35 each individually asked survey participants to provide their stance on taking courses through their distance modality versus a traditional in-house course.

Table 4. Null Hypothesis 4 Data

Question #	Question	Average
6	I learn as much from this synchronous videoconferencing class as I would have learned from a traditional lecture class	1.88
7	Synchronous delivery of courses is as effective as taking courses in the traditional classroom	1.91
11	I prefer to take synchronous videoconferencing classes to traditional classes	2.39
31	I prefer the flexibility of taking a synchronous course to a traditional in-house course	1.91
32	I feel more comfortable engaging in videoconferencing discussions with other students than through live in-class discussions	3.39
35	I am receiving/have received the same quality of education through live videoconferencing as I would have received in the traditional classroom	2.03

All of the response averages, with the exception of question 32, are in the *agree* to *strongly agree* range, indicating a positive perception of the synchronous distance delivery modality. The combined average of these questions is 2.25. Although this value

is closer to agree (2.00), it may not be enough to demonstrate statistical significance or disprove Null Hypothesis 4.

Null Hypothesis 5

There is no significant difference between the preferences of PhD nursing students for asynchronous Internet-based education delivery versus on-campus instruction.

The same questions used for Null Hypothesis 4 were used for Null Hypothesis 5. The table and questions are below.

Table 5. Null Hypothesis 5 Data

Question #	Question	Average
6	I learn as much from this asynchronous online class as I would have learned from a traditional lecture class.	3.19
7	Asynchronous delivery of courses is as effective as taking courses in the traditional classroom.	3.13
11	I prefer to take asynchronous online classes to traditional classes.	2.80
31	I prefer the flexibility of taking an asynchronous course to a traditional in-house course.	2.63
32	I feel more comfortable engaging in online discussions with other students than through live in-class discussions.	3.25
35	I am receiving/have received the same quality of education through an asynchronous online classroom as I would have received in the traditional classroom.	2.88

Each of the averages for these responses hovers around Neutral (3.00). The combined average of these questions is 2.98. This value appears to validate Null Hypothesis 5.

To better determine statistical significance and test Null Hypotheses 4 and 5, a *t* test was performed comparing each question outlined above between synchronous and asynchronous survey responses. The table of *t* test values is below.

Table 6. Null Hypothesis 5 *T* Test Data

Question	*T* Test Result
6	0.006
7	0.010
11	0.335
31	0.101
32	0.685
35	0.040

From the table above questions 6, 7 and 35 are statistically significant. However, with 3 of the 6 questions showing statistical significance, this is again not enough to invalidate Null Hypotheses 4 and 5.

Additional Data Analysis

The two independent surveys are directly comparable and can be used to determine if there is a significant difference between the two study groups. A *t* test performed comparing questions 1-35 of the quantitative data gathered from the survey between synchronous and asynchronous students resulted in a value of 0.033. This value shows that there is a statistically significant difference between the two data groups. This

information can be used as a basis from which to approach the Primary Research Questions of this study.

Data Supporting Research Questions

The Primary Research Question for this study was, how are synchronous and asynchronous distance delivery modalities perceived by PhD nursing students? Referring to Match of Research Questions table in Appendix C, all 35 quantitative questions contained within the surveys sought to answer this question. Subsidiary question one asked, what contributing factors may lead students to select one delivery modality over the other? This question was answered by the defined set of questions shown in the table in Appendix C. Subsidiary question two asked, to what extent do students perceive the different modalities either help or hinder in their educational pursuits? This question was also answered by the defined set of questions shown in the table in Appendix C. The group statistics and *t* test analysis summary for these Primary Research Questions are shown below:

Table 7. Primary Research Questions Group Statistics and T Test Summary

Group Statistics					
	Group1	*N*	Mean	Std. Deviation	Std. Error Mean
Primary Research Question	1.00	16	2.57776	1.04848	.26212
	.00	33	1.93725	.53072	.09239
Subsidiary Question 1	1.00	16	2.55635	1.00494	.25124
	.00	33	1.97846	.49620	.08638
Subsidiary Question 2	1.00	16	2.56217	.99726	.24931
	.00	33	1.97721	.50165	.08733

Primary Research Questions *T* Test Summary		
Question	Value	Sig/Not Sig
Primary Research Question 1	0.033	Sig
Subsidiary Question 1	0.043	Sig
Subsidiary Question 2	0.039	Sig

As indicated in the table above, there is a statistically significant difference demonstrated by the data for each of the research questions for this study. It was anticipated that there would be a statistically significant difference between the synchronous and asynchronous groups. It was also anticipated that these groups alone would not be sufficient to provide in-depth answers to the research questions. Therefore, the researcher analyzed the survey questions and determined 15 categorical groupings of questions aimed at providing greater details that could be used to answer the research questions and hypotheses. Two of these groupings have already been demonstrated in response to the research hypotheses: Help or Hinder and Preference.

Categorical Groupings

The intent of the quantitative data was to determine if there is a significant difference in student attitudes and perceptions of their respective distance learning modalities, and which factors may tend to impact those perceptions. Of the surveys, questions 1-35 collected quantitative data. These data were directly compared between synchronous and asynchronous groups. Additionally, to help answer the secondary questions of this study there were 15 categories derived from the questions and grouped for *t* test comparison. These specific categories and the questions making up the groups are listed below:

Table 8. Grouped Quantitative Questions

Category	Questions
Communication	2,4,15,16,17,18,19,20,21,23,24,25,26,32,33
Isolation	3,22
Flexibility	5,31
Modality Effectiveness	7,8,9,10,13,30
Teacher	23,27
Help or Hinder	5,6,13,30,31,34
Discussion	17,18,19,20,21,23,24,32,33
Preference	5,6,7,8,9,10,11,12,13,14,29,31,34,35
Impact on education	1,5,6,7,8,9,10,11,13,15,16,17,18,19,20,21,22,24,25,26,27,28, 30,32,33,34,35
Interaction	2,24,25,26
Effectiveness	1,6,7,8,9,27
Social	3,15,16,22,24,25
Technology	4,28,30,31
Perception	5,7,8,9,10,13,34,35
Recommend	6,11,12,14,29,31,32

T Test Results

Table 9. *T* Test Results by Group

Category	*T* Test	Sig/Not Sig
Communication	0.002	Sig
Isolation	0.000	Sig
Flexibility	0.241	Not Sig
Modality Effectiveness	0.010	Sig
Teacher	0.083	Not Sig
Help or Hinder	0.052	Not Sig
Discussion	0.017	Sig
Preference	0.024	Sig
Impact on education	0.024	Sig
Interaction	0.010	Sig
Effectiveness	0.007	Sig
Social	0.914	Not Sig
Technology	0.235	Not Sig
Perception	0.026	Sig
Recommend	0.046	Sig

The data indicates that of the 15 groupings, 10 are statistically significant. A deeper analysis of these results will be presented in chapter 5.

Question 36

The field test performed prior to approval and data collection of this study brought insight and the subsequent addition of question 36 to the survey. Question 36 asked:

At what point are you in the PhD Nursing program at your university?

A. Beginning

B. Middle

C. Approaching end

D. Graduated

This question was asked to determine if there was a potential significant change in student attitude and perception based on the length of time within the degree program. The number of respondents, particularly from the asynchronous group, was not significant enough to perform *t* test calculations to determine significance, and there was a greater need to do a cross-analysis between this question and all other questions in the survey. Therefore, a one-way anova was performed in conjunction with a Tukey test to determine if there was a significant shift based on the participants' length of time in the program. Due to the small number of responses, and the number of questions in the survey, it was determined that this test would focus on comparing the information gathered from question 36 against the 15 categorical groupings discussed above. It was anticipated that this would also provide greater insight to what areas of attitude and perception may be most affected over time. It is recommended that a longitudinal study be performed with a larger student base to gather more in-depth data.

Data showing the number of responses within question 36 is below.

Table 10. Question 36 Data

		Q36			
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	12	29.3	29.3	29.3
	2	7	17.1	17.1	46.3
	3	13	31.7	31.7	78.0
	4	9	22.0	22.0	100.0

In summary, using the 15 categories and a statistical significance of 0.05, the anova results show that isolation and flexibility are statistically significant. The communication, help or hinder, interaction and social groupings range between .05 and .07 and appear to be borderline significant. These will be discussed in greater detail in conjunction with qualitative data to better determine significance in chapter 5.

Within each of the 15 question groupings, the Tukey test was used to determine statistical significance between the different lengths of time indicated by students in question 36 for each category. This test was performed across both synchronous and asynchronous groups, and not compared between them. The values below are for the length of time the student indicated they have been in their degree program:

1 – Beginning

2 – Middle

3 – Approaching end

4 – Graduated

Table 11. Tukey Category Data Significance

Tukey Category Data Significance	
Communication	None
Isolation	(1, 2),(1,3),(2,4)
Flexibility	(2,3),(2,4)
Modality Effectiveness	None
Teacher	None
Help or Hinder	(2,4)
Discussion	None
Preference	(2,4)
Impact on education	None
Interaction	None
Effectiveness	None
Social	None
Technology	None
Perception	None
Recommend	(2,4)

The data above indicates that there is a significant difference in response based on length of time within the degree program for the categorical groupings of Isolation, Flexibility, Help or Hinder and Preference. Specifically, within the Isolation grouping there is a statistically significant difference in responses between students at the beginning and middle, beginning and approaching end, and middle and graduated. The Flexibility grouping shows significant differences between middle and approaching end, and middle and graduated. Both the Help and Hinder and Preference groupings show significant differences between middle and graduated. As indicated earlier, the number of responses for question 36 is not really adequate to make inferences and a larger longitudinal study is recommended.

Qualitative Data

Along with quantitative data, this study sought to gather qualitative data from survey participants. The last seven questions of the survey asked for open-ended responses regarding each student's experience with their distance learning program and modality. The received data was sorted and analyzed for common themes using the Constant Comparative method developed by Glaser and Strauss (Merriam, 1998). The results of this analysis are presented individually for each question below.

Question 37

"What were the biggest challenges you faced when you began taking e-learning courses?"

Common themes drawn from asynchronous survey responses centered on learning and dealing with the technology, learning how to study more independently, adjusting to the asynchronous nature of the class, feelings of isolation and the need to communicate more directly with teachers and other students. Common themes drawn from synchronous survey responses centered on learning and dealing with the technology, adjusting time/life management, taking statistics through this medium, and learning to communicate effectively in the synchronous videoconferencing environment.

Comparing the two sets of responses brought one commonality to the forefront, technology. It appeared from the responses that survey respondents felt there are challenges in acquiring, learning, using and dealing with the technologies necessary for both synchronous and asynchronous distance delivery. As an example, one asynchronous student responded, "Learn how to use the program. I did not get much help in terms of technical supports at the beginning of my study." A synchronous survey respondent

wrote, “Technology issues. I had limited experience with my computer.” Additionally, adjusting to the new learning environment and balancing time/life issues were common themes.

Question 38

“What tips or suggestions would you give to students who are just beginning to take courses through e-learning?”

Responses from the asynchronous survey included statements about needing to be disciplined, self-motivated and patient since this format will take more personal time than anticipated and students must be willing to basically teach themselves. Additionally, there were references made to the need for adequate technology, both computer and Internet. Two responses stood out specifically recommending that others “Don’t do it-physically go to an institution,” and “Transfer to a program where you are engaged in face-to-face interactions with peers.” These comments coincided with one additional comment regarding the need to make friends and keep in touch with the cohort. These statements appeared to indicate a need for more personal communication.

Responses from the synchronous group stressed the need for patience, time management, flexibility, and a good sense of humor. Many of the responses indicated a strong need for appropriate technology to effectively use the system. One survey response however was similar in nature to the two from the asynchronous group, “Don’t do it unless you are really desperate and it is your only option.” Two responses were in line with those of the asynchronous group stating, “Use the technology as much as possible to have face-to-face time both with teachers and with fellow students before and

after class," and "Meet in person first." Each of these indicated a strong need for more personal contacts and relationships.

Comparing these two groups showed that technology continued to be at the forefront as well as a need to adjust to the demands of distance education. Although there was one negative response from the synchronous group, the rest of the responses were more positive stressing that, "It will feel more comfortable as time goes on."

Question 39

"What types of things do you have to consider and plan for when taking e-learning courses that you don't have to consider when attending traditional instructor-led courses?"

Many asynchronous survey respondents commented on the significant amounts of time required to read all of the course materials, e-mails, and complete assignments. The intense time requirements lead to a need to work ahead, keep up with readings, and devote the time needed each week to the coursework. In addition, there were a few responses surrounding the need for a contingency plan in case there were technological difficulties or outages, so that you do not have something due such as a paper or quiz when an outage occurs.

Synchronous survey responses included the need to connect to class 30 minutes before start time in order to allow for technical difficulties, as well as to possibly interact with other students in the class. Several comments were made about needing to adjust expectations regarding the technology and making sure that all systems were working properly all the time such as the computer operating system, Internet connection, camera, audio, etc. The need for a contingency plan when there are technological difficulties,

outages or interruptions, was also mentioned frequently. There were a few responses regarding the need to have a clean room that is orderly, quiet, and safe from interruptions. One specific comment made that stands out is, "Build in far more time than you would for traditional courses."

In comparison, the common theme of dealing with technological issues remained. Even though the type of class and technology used was different, there was still a significant reliance on the computer and Internet connection. There was also a common factor regarding the amount of time spent on classes. Asynchronous students stressed working ahead and keeping up with the readings, while synchronous students stressed class attendance and logging in 30 minutes prior to each class session, as well as dealing with other technical challenges and outages.

Question 40

"How does your process for attending courses through e-learning differ from your process in traditional instructor-led courses?"

Asynchronous responses centered on the time taken for class attendance, such as in the middle of the night, on your own time, more frequently and for shorter time periods, and when there are often conflicting times at home. This issue was stressed with such comments as, "I have no down time. Class happens all the time," and "Family does not always respect that you are actually in class since you are 'home'." Other comments included a need for "human connection," and a need for non-verbal communication." One comment that stood out was, "I am usually excited and invigorated after a traditional class; I am bored and discouraged after yet another tedious correspondence class."

Synchronous survey responses were spread between different topics. One topic focused on the benefits such as easier time commitments, convenience, no need to travel, and "It was really as if you were in an actual classroom." Another topic focused on the difficulties such as having to take more time to make sure all the technical items were working, such as video, Internet and sound. Individual comments included, "Much more formal," "Note taking is completely different," and "National and international students and presenters enhance courses."

There did not appear to be any common themes between the two groups, however there was an opposition in responses between the conveniences mentioned with the synchronous group and the inconvenient times at which class is taken by the asynchronous group. One additional contrast was found between the individual asynchronous respondent comment, "It was a human connection I really needed; non-verbal communication," and the synchronous respondent, "It was really as if you were in an actual classroom." From these comments, it appeared that some of the things respondents were looking for or needing in the asynchronous environment were more present in the synchronous environment.

Question 41

"If you could change one thing about the asynchronous delivery of courses in your degree program to improve the program what would it be?"

Many asynchronous responses stressed the need for face-to-face time, personal interaction, the need to hear everyone's voices and adding a video component. Other responses mentioned better class organization, better trained faculty, and improved training for use of the delivery system.

Synchronous responses primarily centered around suggested improvements to the technologies used, as well as the need for improved support. Other comments included requests for improved "teaching capabilities of the professors," and changes to student expectations while in class and on-camera. Two responses mentioned that they would take the class "on ground" rather than at a distance. The request for better trained faculty and improved course coordination were common responses between the two groups.

Question 42

"Is there anything you would like to relate about your experience receiving program courses by asynchronous delivery methods?"

There was complete contrast within the asynchronous responses. Some responses were positive including, "Overall a very satisfying experience," and "I would have been unable to complete my PhD without this format." Other responses included, "I hated it," and "Online education is contributing to the dumbing down of nursing education." Other individual responses were varied with one response really standing out, "I feel the education I received was comparable to an in-house education."

All synchronous responses were very positive in nature and commending of the synchronous learning format. "Very effective," "Love it," "a true god-send," "It has actually exceeded my expectations," and "a tremendous opportunity" are some examples of responses received. Additionally, specific comments were made comparing synchronous to asynchronous education stating "Synchronous videoconferencing is FAR, FAR superior to asynchronous teaching/learning," and "I like synchronous much more than asynchronous." The overall tone between the two response groups appeared to be the only substantial comparison.

Question 43

"To what degree have you used Online Discussion Boards or Discussion Forums prior to taking this course?"

The majority of responses from both groups indicated that respondents had little to no experience in using synchronous or asynchronous technologies for education. Although there were a few respondents within both groups that expressed higher levels of experience with technology, they were in the minority.

Conclusion

The data presented and analyzed in this study answer the research questions and hypotheses put forth as described below.

Primary Research Question

How are synchronous and asynchronous distance delivery modalities perceived by PhD nursing students?

Both quantitative and qualitative data showed that there was a significant difference between the perceptions of synchronous and asynchronous distance education students regarding their respective education delivery mediums. Synchronous PhD nursing students demonstrated more positive attitudes toward the live videoconferencing environment because of the quasi face-to-face interaction and semblance to the traditional classroom. Asynchronous participants stressed a strong desire for some degree of face-to-face interaction and strongly noted the impacts the absence of this form of interaction had on their education.

Sub-Question 1

What contributing factors may lead students to select one delivery modality over the other?

The quantitative data for this question showed a statistically significant difference between the synchronous and asynchronous groups. Qualitative data shed light on some of the specific areas considered of greatest value to each survey group; however, this data did not specifically identify which factors led students to select one delivery medium over the other, or whether these factors played a part in their decision process when choosing a school. Further research is recommended in this area.

Sub-Question 2

To what extent do students perceive the different delivery modalities either help or hinder in their educational pursuits?

Quantitative results for this question were statistically significant between the study groups. The sub-group for this particular topic showed borderline statistical significance at .052. Qualitative data demonstrated that both study groups felt the distance education mediums were instrumental in their educational pursuits. The differences were shown in the perceived quality of the education received through the delivery mediums.

Null Hypothesis 1

There is no significant difference between the perceptions of PhD nursing students about whether asynchronous online learning delivery helps or hinders their educational pursuits.

Results for question 34 of the survey showed a likert scale response value of 2.38, indicating a perception closer to agreement with the question statement. This value and question alone was not enough to adequately disprove this Null Hypothesis. The average response for the Help or Hinder question grouping was 2.73 indicating closer to a neutral response with the positive nature of the question statements. These two averages were not strong enough to invalidate Null Hypothesis 1.

Null Hypothesis 2

There is no significant difference between the perceptions of PhD nursing students about whether synchronous live videoconferencing delivery helps or hinders their educational pursuits.

Results for question 34 of the survey showed a likert scale response value of 1.73, indicating a perception between agree and strongly agree with the question statement. Although this average would be enough to invalidate Null Hypothesis 2, more information is required. The average response for the Help or Hinder question grouping was 1.97 indicating agreement with the positive nature of the question statements. Combining these two values was enough to invalidate Null Hypothesis 2.

Null Hypothesis 3

There is no significant difference between the preferences of PhD nursing students for synchronous or asynchronous distance delivery modalities.

T test results from both questions 11 and 31 of the survey were not statistically significant between the synchronous and asynchronous groups. However, the larger

grouping of questions under the Preference category showed statistical significance regarding preference, and therefore invalidated Null Hypothesis 3.

Null Hypothesis 4

There is no significant difference between the preferences of PhD nursing students for synchronous live videoconference education delivery versus on-campus instruction.

Questions 6, 7, 11, 31, 32 and 35 were used to investigate this Null Hypothesis. The average response for this question group was 2.25, and although closer to agreement within the likert scale, was not enough to invalidate Null Hypothesis 4.

Null Hypothesis 5

There is no significant difference between the preferences of PhD nursing students for asynchronous Internet-based education delivery versus on-campus instruction.

Questions 6, 7, 11, 31, 32 and 35 were used to investigate this Null Hypothesis as well. The average response for this question group was 2.98 and showed a strong neutral position regarding the positive nature of the questions in the survey. Therefore Null Hypothesis 5 is validated.

As will be demonstrated in the next chapter, reliance on the quantitative data alone from this survey was not enough to fully answer the questions of the study. Significant value was also drawn from the qualitative responses and the goals of the research were more fully attained.

CHAPTER 5. RESULTS, CONCLUSIONS, AND RECOMMENDATIONS

As higher education institutions continue to rapidly adopt the use of technology in the classroom in support of the demand for student education at a distance, thought should be given to the appropriateness of the delivery modality used and its impact on students. Although the use of technology in the classroom can enhance content and learning, individual pedagogies can also be impacted.

> The recent interest in technology-supported collaborative learning in higher education represents a confluence of trends: the development of new tools to support collaboration, the emergence of constructivist-based approaches to teaching and learning, and the need to create more powerful and engaging learning environments (Resta & Laferrière, 2007, p. 65).

There appears to be a conflict between the need to deliver education to students using the technologies of *today*, and the need to maintain solid pedagogical structure. When providing education through distance delivery technologies, student attitude and perception toward the technology medium should also be considered.

Restatement of the Problem

The expansion of education through distance learning technologies has opened doors for learning that may have been closed for many individuals. Because of current technologies, students may have the opportunity to take courses and earn advanced degrees without having to relocate or deal with the expenses of commuting. However, there are also possible drawbacks in areas such as the costs of technology, as well as many of the technological challenges involved.

Although many research studies have been performed comparing synchronous and asynchronous distance education delivery modalities with on-campus delivery, there is a gap in the literature comparing different distance delivery modalities with each other. This study attempts to address the perceived differences between synchronous and asynchronous distance education delivery modalities from PhD nursing student perspectives at two different universities. The primary problem statement for this study was, it is not known how synchronous and asynchronous distance education delivery modalities are perceived by PhD nursing students.

Restatement of Research Questions

The Primary Research Question for this study was, how are synchronous and asynchronous distance delivery modalities perceived by PhD nursing students? This research question was then broken down further by two Sub-Questions:

Sub-question 1: What contributing factors may lead students to select one delivery modality over the other?

Sub-question 2: To what extent do students perceive the different delivery modalities either help or hinder in their educational pursuits?

What follows is a discussion of the quantitative data addressing each question as well as the recurrent themes that became present from an analysis of the qualitative data gathered in this study.

Discussion of the Findings

The literature reviewed and presented within this study provided a refined definition of distance education and then discussed the theoretical framework

surrounding this topic from four key perspectives: distance education, adult learning theories applied in distance learning, synchronous education through live videoconferencing, and asynchronous education through Internet-based applications. These perspectives provided the researcher with the basis for describing the findings presented here.

To begin, the distance education technologies utilized by the different study groups were live synchronous videoconferencing and asynchronous online education. The technologies used in these two different delivery mediums tend to demand slightly different skills from the students in order to be successful. According to Simonson et. al. (2006), there are two conflicting pressures facing distance educators today. First is the increasing demand for students to be allowed to learn at a distance. "They want to be able to supplement, and even replace, conventional learning experiences with distance education experiences" (p. 5).

The second conflicting pressure facing educators is that students indicate a preference to not learn at a distance. "When asked, they say they prefer meeting with the learning group and the instructor in the classroom…they value the presence of a learning group, and that the informal interactions that occur before and after, and sometimes during, a formal class are valuable components of the total learning experience" (Simonson et al., 2006, p. 5). As the findings of this study demonstrate, these two conflicting pressures continue to exist. Students indicate the positive value they place on the flexibility of taking courses at a distance, and at the same time, feedback from both study groups indicate the need for and benefits of having some degree of face-to-face interaction.

The two different target groups used in this study were selected because each group had elected to pursue their PhD nursing degrees entirely through either synchronous or asynchronous means. Pursuant to the goals of this study, the researcher sought to ascertain the attitudes and perceptions of these students and some of the possible reasons why a particular delivery medium was chosen. One of the underlying assumptions made by the researcher was that students at the PhD level would already have a good idea of what to expect when taking their education through either synchronous or asynchronous delivery mediums, and that this would therefore influence their decision. It was rather surprising for the researcher to see some of the feedback provided primarily by the asynchronous group indicating the difficulty they had in taking courses online, specifically mentioning time-management and self-directed learning requirements. Primarily for the asynchronous study group, the preferences indicated appear to demonstrate the desire for both the flexibility of taking courses online and the need for face-to-face interaction—this leads to a more hybrid or mixed learning environment.

Rothmund's (2008) study sought to investigate the impact of using hybrid courses to improve student satisfaction and retention. One of the results of Rothmund's study was that students demonstrated greater course satisfaction with increased interaction between students and with the faculty, both through the face-to-face classroom as well as online. Although the study presented here did not evaluate hybrid learning environments, feedback received primarily from the asynchronous group would appear to support Rothmund's results. Feedback received from the synchronous group demonstrated that

there was a sense of both the flexibility of taking education at a distance and the positive benefits of face-to-face interaction in their learning medium.

King's (2001) study addressed "student relationships and face-to-face classroom interaction" (p. 349). The results of King's (2001) study indicated that the dynamics of the classroom were greatly enhanced through increased online interaction, and relationships thrived in the face-to-face environment as a result. However, a few questions remained unanswered: Do students have the same ability to create and build relationships through both synchronous and asynchronous learning environments? Or does one distance delivery method provide a more conducive environment for relationship building? The results of this study appear to indicate that there is a greater sense of community and stronger relationships within the synchronous environment than within the asynchronous environment. Some of the respondent comments attribute this to the face-to-face interaction, supporting Rothmund's (2008) and King's (2001) results. Further discussion on these findings will be presented throughout the rest of this chapter.

Primary Research Question

How are synchronous and asynchronous distance delivery modalities perceived by PhD nursing students? As shown in chapter 4 using all quantitative survey questions 1-35, the data demonstrates that overall there is a statistically significant difference between the synchronous and asynchronous groups. However, this alone is not sufficient to truly address the question. To more fully answer the question of *How*, the researcher broke the survey questions down in to 15 different categories, each attempting to determine if there is a significant difference between the two groups.

Communication

The group of questions selected for the Communication group were broadly determined to contain wording that included some form of interpersonal communication, either student-student or student-teacher through the delivery medium. There were 15 total questions selected from the quantitative portion of the survey for this grouping. Using a Likert scale with 1 equaling strongly agree and 5 equaling strongly disagree, the average for all questions in this grouping for each survey was 2.47 for the asynchronous group versus 1.78 for the synchronous group. The *t* test result comparing the synchronous and asynchronous participants on this grouping was statistically significant at .002. This indicates that there is a difference in student perception regarding their ability to communicate through the different delivery mediums.

The Communication category was still somewhat broad and encompassed a large number of survey questions. Therefore the researcher broke this down in to two additional sub-groups: Interaction and Discussion.

Interaction

There were four specific quantitative questions in the survey which contained the words “interact” or “interaction.” These questions sought to determine student satisfaction with their interaction ability through the delivery medium. The average for all questions in this grouping for each survey was 2.46 for the asynchronous group versus 1.64 for the synchronous group. *T* test results comparing this grouping were .010 showing a statistical significance between the two groups.

Discussion

There were nine specific quantitative questions in the survey which contained the word "discussion." These questions sought to determine student satisfaction with their ability to have effective discussions through the delivery medium. The average for all questions in this grouping for each survey was 2.54 for the asynchronous group versus 1.81 for the synchronous group. *T* test results comparing this grouping were .017 showing a statistical significance between the two groups.

Although the *t* test data presented for these three categories demonstrates statistical significance, this does not help us determine student perception of their communication ability.

Referring then to the qualitative data for more detailed information, a recurrent theme that appeared was a more positive overall attitude among the synchronous videoconferencing students toward their delivery medium. There were recurring expressions of gratitude for their ability to speak with teachers and other students in a pseudo face-to-face live format. The common theme among asynchronous respondents was a strong need or desire to have some form of face-to-face interaction with both teachers and other students, and a strong feeling of dissatisfaction because this was not present in their delivery medium.

These results do not support those of Fortune, Shifflett and Sibley (2006), in that there appears to be a stronger desire for face-to-face interaction among the online students in this study group, and there is a significant value placed on relationships that can be built through live interaction. One response given by an asynchronous respondent suggested that nurses may really need more face-to-face interaction in the learning

environment because that skill is required in their profession. These results also support the literature indicating that the online learning environment may not work for all students, and that there may be several varying factors impacting their individual success (Edmonds, 2006; Sheetz & Gunter, 2004). This leads us to the next question grouping, Isolation.

Isolation

The Isolation grouping consisted of just two specific questions asking if the students themselves felt isolated, and if they perceived others in their program felt isolated. The averages for this grouping were 2.09 for the asynchronous group and 3.39 for the synchronous group. The *t* test result comparing the two groups was .000, indicating a strong statistical significance.

Looking more deeply at the concept of isolation in distance education, the average for question 3 which stated, "Some students feel isolated at their distance site" was 2.13 for the asynchronous group indicating that students generally agreed with this statement. In contrast, the average for the synchronous group for this question was 3.24, indicating a general feeling of neutral to disagree.

Additionally, question 22 which stated, "I sometimes feel isolated in my courses" generated an average response of 2.06 within the asynchronous group and 3.55 in the synchronous group. This difference appears to indicate that isolation is felt more strongly among asynchronous students. *T* test results between the two groups were .006 for question 2, and .025 for question 22, indicating strong statistical significance.

The greater feeling of isolation among asynchronous students is understandable given the more self-directed learning that takes place in this environment, and the general

lack of live face-to-face interaction. Responding to the qualitative survey question asking the biggest challenges faced when taking e-learning courses, feedback given by survey participants also reflects this feeling. Some of the more poignant responses were, "I felt I lost a sense of community," "Overcoming feelings of isolation," "Knowing that people were not present at the exact moment that I was conceiving and communicating my ideas," "Feeling disconnected," and "Not having the benefit of in-class discussions with peers." In contrast, only one statement was made regarding feelings of isolation in response to this question by synchronous survey respondents, "Sometimes it is a little lonely being off-site." This statement was qualified by indicating that others from the class were local to the city where the school is physically located and that this individual respondent felt as though they were truly attending the class at a distance, residing in another state. Beyond this statement, the strong theme within the synchronous group was about challenges with the technology, and not about isolation.

These results also support the literature. One factor demonstrated in the literature is the need for responsiveness and interaction from both the teacher and other students in the distance environment (Beard & Harper, 2002; Beard, Harper & Riley, 2004). Responses from the asynchronous group supported the need for faster and more responsive interaction, and synchronous student responses demonstrated the perceived benefits of live interaction. Both of these pointed to the social aspects of distance education.

Social

The social nature of education, primarily graduate level education, tends to rely on the ability to openly express and discuss concepts thereby learning not only from the

teacher, but also from peers. Six questions were identified from the survey that fit this general category. The included questions sought feelings regarding isolation, comfort level with discussions, and the ability to interact with faculty through the delivery medium. The average responses for this question grouping were 2.21 for the asynchronous group and 2.22 for the synchronous group. Obviously, the two averages are nearly identical. *T* test results between the two groups were .914, indicating that there is not a significant difference between them. These results tend to indicate that the delivery medium does not impact the student's ability to maintain connection with faculty and peers.

Qualitative responses from both groups seem to tell a different story. Within the asynchronous group, one respondent indicated that they "did not receive the quality of education [they] could [have] if [they] were able to interact with the instructor and peers in vivo." Another respondent indicated that a challenge for them was "Trying to feel 'engaged' in the classroom setting." Another stated, "An in-class discussion would have expedited understanding and identified common concerns." Some responses encouraged others to make friends and keep in touch with their cohort, or simply transfer to a program with face-to-face interaction with peers. These comments strongly suggest that students within the asynchronous program had a strong need for more face-to-face interaction with peers and a greater social connection.

Comments made within the synchronous group include, "Attend in-person opportunities such as meetings, use video technology as much as possible to have face-time," "Be respectful of your colleagues and professors' 'personal' space, even though it's a different, alternate space," "Utilize opportunities to video conference with

classmates rather than e-mail or phone," "It felt like you had just seen your colleagues from all 3 time zones in the flesh the evening before." These comments reflected the synchronous videoconferencing environment and the ability to interact live with peers, and also appeared more positive in nature. Two comments were contrary however, "Sometimes you want to have private conversations with your classmates, but you really can't—everything you say is to the entire group and the instructor," "The biggest problem is with discussion. In videoconferencing, there is no back and forth in discussion. Instead, each student gets a turn to make a comment." The respondent that made the latter comment reasoned that this may be due to the delay in audio present through the technology, and that it creates pauses in conversation. Their overall feeling however, was that, "This compromises the richness of discussion."

Responses given by both study groups indicated that there was a need for social interaction among students. The quantitative data did not show a significant difference between the two groups. Qualitative responses tended to indicate that there were concerns within both groups regarding the quality of social interaction through the distance delivery medium.

Additional Considerations

These results also support the literature discussed within the Isolation category, and lead us to a discussion of the literature supporting adult learning styles and needs in education. Following the theory presented by Knowles (1989, as cited in Merriam, 2001a) and discussed by other researchers (Houle, 1996, as cited in Merriam, 2001a; Kerka, 2002; Merriam, 2001a; Ozuah, 2005), adults feel that the experience and knowledge they bring to the classroom should be valued and utilized. Therefore, the need

for socialization and the ability to discuss how personal experience relates to the current learning experience may be of value to adult distance students. Social interaction and discussion may also be factors allowing students to focus on relevant problems and practical applications of concepts. The ability to discuss these concepts in vivo appears to be of great importance to the study groups presented in this research.

Merriam (2001a) indentifies the third goal of self-directed learning as, "the promotion of emancipatory learning and social action" (p. 9). Comments made by some of the asynchronous students demonstrated a need for the regular classroom environment because they felt the regular classroom forced them to follow through on their coursework. Whereas, the online learning environment forced them to be more self-disciplined, which some students indicated they did not have as a strong skill. In contrast, responses from some of the synchronous students indicated that since the class was live, they were still forced to be in their *seats* and follow the assigned class schedule rather than work at a more self-directed pace.

As discussed by Kerka (2002), the goal of all education is to get adult students to the point where they rely on their own drive and desire for further education and search for knowledge without the control of an instructor. However, as discussed thus far from the standpoint of adult distance education in general, this goal is difficult to fathom as achievable for everyone because not all adult learners exhibit the described qualities assumed in self-directed learning, andragogy, and other adult learning theories (Kerka, 2002).

Miflin (2004) focused on the use of problem-based learning and self-directed learning from the standpoint of medical education, and expressed that learning in this

manner may reduce the quality of education and subsequently, medical practice. One specific response given by an asynchronous student in this study was, "I believe that online education is contributing to the dumbing down of nursing education." This statement would certainly support Mifflin's (2004) argument. However, it must be understood that the students in this study were at the PhD level, and studying to be nurse educators. They were not studying how to apply specific clinical nursing skills, but instead how to teach them. Therefore, although relevant, this statement must be considered in context.

Merriam (2004) stated that "Adults who are able 'to participate freely and fully in critical-dialectical discourse' exhibit highly developed metacognitive skills of critical self-reflection and reflective judgment" (Mezirow, 2003, p. 61, as cited in Merriam, 2004, p. 63). Comments given by asynchronous respondents appear to indicate that several students felt somewhat restricted in their ability "to participate freely and fully in critical-dialectical discourse" with other students and the teacher in the online environment. This did not appear to be the case with the synchronous students as positive comments were made about their ability to communicate with others in the live videoconferencing classroom.

Flexibility

Two questions were determined to address flexibility within the delivery medium. Question 5 asked about the ability to proceed at an individualized pace, and question 31 asked the student's preference for the flexibility of taking their courses through the specific distance delivery medium. The average responses to this question grouping were

2.78 for the asynchronous group and 2.41 for the synchronous group. *T* test results between the two groups were .241, indicating that there is not a statistical difference.

Qualitative responses from both groups give accolades to both delivery mediums for the ability to pursue their degrees because of the flexibility offered through the use of the education mediums. Respondents from both groups also indicate that there are significant challenges to pursuing their education at a distance such as creating a separate learning space while at home, and facing technical challenges connecting to class from other remote sites.

Pursuant to answering Sub-Question 2 of this study, flexibility does not appear to be a reason that would differentiate why students would take their education through one distance modality over the other. However, based on the discussion above regarding the social, isolation, discussion and interaction groups, both the statistical significance and qualitative responses provided by study participants may indicate that the need to develop more personal relationships with peers may be a guiding factor. These data also support the literature indicating that flexibility in taking courses at a distance, primarily online, is a student satisfaction factor (Beard & Harper, 2002; Beard, Harper & Riley, 2004; Cook-Wallace, 2007; Kushniroff, 2008; McFarland & Hamilton, 2005; Neuhauser, 2002).

Modality Effectiveness

Six questions were determined to address the question of student perception toward the effectiveness of the delivery modality. All but question 13 contained the word "Effective." Question 13 stated, "[Synchronous/Asynchronous] course delivery meets my expectations." The average responses for this question group were 2.86 for the asynchronous group and 1.75 for the synchronous group. These averages indicate a

general feeling near neutrality for the asynchronous group, and a feeling between agree and strongly agree for the synchronous group. *T* test results were .010, showing statistical significance. *T* test results for each individual question were also statistically significant. These results appear to indicate that there is a difference in perception of modality effectiveness between the synchronous and asynchronous groups, with a stronger feeling of effectiveness among the synchronous videoconferencing participants.

The primary theme that emerged regarding this topic from the qualitative portion of the survey focused on adapting to technological challenges. This was consistent between both survey groups. In addition, both groups also made statements about adjusting to time/life demands while going to school. Asynchronous student responses focused on adjusting to the more self-directed learning approach prevalent in the system, while synchronous students focused more on adjusting their personal home and work environments to be more conducive to learning. Final statements from both groups were also consistent expressing that degrees could not be sought without the specific distance learning medium. These statements do not necessarily indicate that the specific delivery modality was deemed to be effective, as much as a degree of satisfaction for the ability to complete their graduate degrees at a distance.

There is an absence of literature comparing student attitudes and perceptions between online and videoconferencing students, therefore these results help fill that gap. Of note, however, is the indication of what students do differently in the distance environment to be successful in comparison to the traditional classroom. A study performed by Weisenberg and Stacey (2005) found that the standard curriculum designed for the traditional classroom cannot be delivered in the same format at a distance. King

(2001) indicated that there is a strong need to meet the technological needs of the adult learner, and that not all students possess the ability to use technology effectively. Other disadvantages surrounding the technology found in the literature include Internet connection speed, connection performance, video speed and performance (Dye, 2007; Gillies, 2008; Hron, et. al., 2007; Shewchuck, 2007). Results from this study also support these challenges.

Effectiveness

Looking at effectiveness from a slightly different perspective, a second group of questions was used. Of the six questions used, three common questions existed between this set and the modality effectiveness category: 7, 8 and 9. The averages for this group were 2.86 for the asynchronous group and 1.75 for the synchronous group. *T* test results were .007, again showing statistical significance between the two study groups.

The three different questions used were 1, 6 and 27. These three questions addressed the content, comparison with the traditional classroom, and the effectiveness of the instructors through the delivery medium. Addressing the *t* tests for each individual question from both groups (1, 6, 7, 8, 9, 10, 13, 27, and 30), each showed statistical significance except questions 13 and 27. As indicated in the Modality Effectiveness category, question 13 addressed expectations regarding the delivery medium. Question 27 stated, "The instructors use effective teaching methods for [synchronous/asynchronous] course delivery." *T* test results for these two questions were .063 for question 13, and .078 for question 27. The results for these two questions did not fall within the .05 range for statistical significance. A detailed discussion of whether the teacher has a significant impact on student attitude and perception in distance education is below.

Teacher

In order to help determine if the distance learning teachers may be factors in student perception of modality effectiveness, two questions were asked in the survey. These two questions asked about teacher encouragement and teaching methods in the distance medium. The averages for this grouping were 2.28 for the asynchronous group and 1.82 for the synchronous group. *T* test results were .083 indicating that this was not statistically significant. It is interesting to note that the average responses for each individual question were 1.94 versus 1.70 for question 23, and 2.63 versus 1.94 for question 27. *T* test results for each individual question were also not statistically significant. However, the averages for question 27 demonstrate that there may appear to be a difference in the perception of the use of effective teaching methods for the respective delivery modalities. Average responses for both survey groups fell on the side of agreement, possibly indicating that although there is not a statistical significance between the two groups, the teacher may still have an impact on student satisfaction in both synchronous and asynchronous learning environments.

Three different comments were made by synchronous students regarding teachers. "Improve the teaching capabilities of the professors. Teaching synchronously is a skill that must be learned. Sometimes I felt that the professors took their live classroom and plopped it in to a synchronous method." "Most instructors have worked to develop courses that match videoconferencing. One professor, however, was not comfortable with the technology and simply lectured for three hours in most of the course." "I think faculty need to be more prepared as it is a learning curve for them as well." These comments indicate that students had at least one instructor that may have struggled in the distance

delivery medium. This experience may have impacted their perception of the learning environment. However, in comparison with responses from the asynchronous group, there is not a significant difference in this perception.

One survey participant response embodied the theme of comments made by this study group regarding instructors, "Some instructors had no requirements outside of the regular classroom meetings, other[s] required synchronous chats at set times, while still others required asynchronous discussion and interaction." In essence, comments made by this group surrounded the many differences in the delivery techniques used by instructors through this medium. These differences appeared to have frustrated students to some degree. This frustration may also have had an impact on their perception of the delivery medium and its overall effectiveness in their education.

These responses demonstrated perceptions that may have been impacted after students had already started their degree programs. Therefore, the teacher may not have been a factor students used to determine which delivery method would meet their needs.

Within the literature, much is said about the need for student-teacher interaction and the value placed on this interaction by students (Battalio, 2007; Beard & Harper, 2002; Beard, Harper & Riley, 2004; Gillies, 2008; King, 2001; Kushniroff, 2008; Scheetz & Gunter, 2004). Findings from this study support the literature indicating that, for a course to be successful online, a different course of action must be taken than simply transferring all of the instructor's instructional materials such as PowerPoint presentations and notes to the electronic courseroom. (Miller & King, 2003; Poirier & Feldman, 2004; Scheetz & Gunter, 2004; Summers, Waigandt & Whittaker, 2005).

Technology

Technology plays a major role in distance education, and its impact on student perception as well as its role in either helping or hindering students in their education, is a matter of importance in this study. Four questions within the survey were used to broadly address the technological impact on student education in each medium. The average responses for each group were 2.50 for the asynchronous group and 2.14 for the synchronous group. *T* test results were .235, indicating that there is not a statistically significant difference between the two groups. Of the four questions, only question 30 showed a statistically significant difference between the two study groups. This question asked, "[Synchronous/Asynchronous] methods facilitate effective learning of the material." The comparative differences do not necessarily indicate that technology does or does not play a significant role in student perception. Therefore, qualitative data is used to enhance the picture.

Many responses were given by survey participants regarding challenges with the technology from both the synchronous and asynchronous groups. Comments from both groups indicated "Trouble with technology," "Feeling comfortable with technology," and "Not having computer skills that matched the systems." Suggestions were made by both groups to "Have a high quality computer," have the fastest and most stable Internet connection possible, "ensure [the] technology is working," and have adequate technical support. Finally, responses from both groups indicated a need for patience with the technology because "it gets easier as you go."

It was quite apparent from the qualitative data that technology plays a significant role in student perception of the delivery modality. Expressions of frustration were quite

present in dealing with technological problems, disconnects, firewall issues, technical support availability, and general comfort levels in use of the technology. It can be reasoned from these responses that student perceptions and attitudes toward the distance delivery medium can be greatly impacted by the amount of difficulty they have setting up, connecting, using, or troubleshooting the technology. Several recommendations were made as well to help students adapt to using the technology for their education.

These results helped answer the Primary Research Question and Sub-Question 2 of this study. The data indicated that there was not a statistically significant difference in student perception between the two delivery modalities from a technology standpoint. However, the qualitative data appeared to indicate that there was a significant feeling within both groups about the impact technology had on their ability to be successful through the distance delivery medium.

Learning is becoming more student-centered as learners become more self-directed, especially in the distance learning environment (Weisenberg & Stacey, 2005). Both synchronous and asynchronous education environments pose significant challenges for instructional designers as they work to adjust curriculum to meet the different needs in these environments (King, 2001; McLoughlin, 2002). Additionally, the mix of multiple learning styles existent among students must also be addressed (Neuhauser, 2002; Slick, 2008). However, within the feedback received from both synchronous and asynchronous groups in this study, the technological challenges really focused on the use of the technology itself: Internet connection speed and stability, the speed and performance of the personal computer, the quality of the monitor, camera, sound, and the trouble of getting through firewalls for connectivity to the classroom. The rapidly moving target of

technology poses a major challenge to distance education because it is nearly impossible for schools to keep up with the speed of technological change. To do so is not only cost-prohibitive, but also functionally and systemically unrealistic. Instead, as indicated by feedback in this study, a more stable and functional environment may be desired by students over the use of newer and *better* technologies. To explore this more fully, we look to the next question grouping-help or hinder.

Help or Hinder

Six questions were used to determine student perception about whether the distance delivery medium helps or hinders their educational pursuit. The average responses for each survey group were 2.73 for the asynchronous group versus 1.97 for the synchronous group. *T* test results were .052 indicating that there is not a statistical significance, however this value appears to be borderline significant. The questions used were worded from the positive perspective. For example, question 5 stated, "The class allows me to proceed at an individualized pace." This wording is important in understanding the average responses for the group. The synchronous group more strongly agreed with the positive statements regarding videoconferencing delivery, whereas the asynchronous group appeared to be more neutral regarding online delivery when looking solely at the average responses.

T test comparisons of individual questions between the two study groups showed questions 6 and 30 as statistically significant. Question 6 asked, "I learn as much from this [synchronous videoconferencing/asynchronous online] class as I would have learned from a traditional lecture class." The average responses for this question were 3.19 for the asynchronous group versus 1.88 for the synchronous group. *T* test results for this question

were .006. Individually, this question indicated that there was a stronger sense of approval for the use of synchronous videoconferencing in place of a traditional classroom setting than there was for asynchronous online learning.

Likewise, question 30 stated, "[Synchronous/Asynchronous] methods facilitate effective learning of the material." The average responses for this question were 2.69 for the asynchronous group versus 1.72 for the synchronous group. *T* test results were .018. These results also indicated a significantly stronger agreement with the statement for the synchronous videoconferencing group.

Question 34 stated, "I believe that taking courses through the [live synchronous videoconferencing/asynchronous online] modality has helped me in my educational pursuits." This question embodied one of the Sub-Questions of this study: to what extent do students perceive the different delivery modalities either help or hinder in their educational pursuits? Average responses for this question were 2.38 for the asynchronous group and 1.73 for the synchronous group. *T* test results for this specific question were .143, indicating that there was not a significant difference between the two study groups relating to this particular question. It is interesting to note that the averages for both study groups were on the side of agreement, indicating that both groups felt the distance learning environment aided in the pursuit of education.

Qualitative data gathered demonstrates a strong need among the asynchronous group for live face-to-face interaction. Several comments were made demonstrating the significant impact the absence of live interaction had. No specific statements were made indicating that the delivery medium was a hindrance to their educational pursuit, but several statements were made by both study groups that they could not have completed

their education without the distance technologies. One particular statement is reflective of several responses from both groups, "I do not believe that every course can be taught online." The specific class referred to by both study groups was statistics. Both groups had students that expressed frustration with learning statistics through the distance learning medium. The study by Summers, Waigandt and Whittaker (2005) sought to compare student achievement and satisfaction online versus in-house for an introductory undergraduate statistics course, and found that, "students enrolled in the online course were significantly less satisfied with the course than the traditional classroom students on several dimensions" (p. 233). Findings from this study indirectly support this same finding at the PhD level, although indirectly because this was not the intentional focus of the study. No judgment or inference can be made about whether the course itself is not appropriate for distance education, if there are adjustments that can/should be made to the course to make it work better in the distance environment, or if the students are simply expressing the difficulties they had in learning the material. No other classes were specifically mentioned by survey respondents.

When looking at student attitude and perception toward distance education, the literature focuses on asynchronous education, and primarily attempts to determine what factors have an affect (Beard & Harper, 2002; Beard, Harper & Riley, 2004; McFarland & Hamilton, 2005; Poirier & Feldman, 2004; Summers, Waigandt & Whittaker, 2005). There is an absence of literature specifically asking student perception on whether the distance learning mediums help or hinder their educational pursuits. Therefore, this study helps to fill this gap in the literature.

Impact on Education

27 of the 35 quantitative questions from the survey were used to determine the respondents' perceptions of the impact the distance learning medium had on their education. The average responses for this group were 2.62 for the asynchronous group versus 1.93 for the synchronous group. *T* test results were .024, showing that there is a statistical significance between the two groups. Overall, the averages indicate that the synchronous group sensed that the videoconferencing environment or mode of education had a stronger impact on their education than the asynchronous group.

Although there were positive statements made by survey respondents in both groups regarding the distance learning medium, there were more negative comments made by those in the asynchronous group. Comments among asynchronous respondents such as, "I hated it," "I believe that online education is contributing to the dumbing down of nursing education," and "It's been a steep learning curve," were countered by comments such as, "Overall was a very satisfying experience in learning," "I feel the education I received was comparable to an in-house education," and "Certainly I would not have been able to pursue a PhD if it were not for the asynchronous delivery methods." Synchronous respondent comments included, "This was a very effective way for me to earn a PhD while continuing to work full time," "The flexibility of this method of classroom instruction really appeals to me," and "In my opinion, synchronous videoconferencing is FAR, FAR superior to asynchronous teaching/learning." One additional comment of interest from a synchronous respondent was, "I believe that our class actually developed closer personal relationships than traditional classes." This comment encourages thought about how relationships are fostered and developed in

distance learning environments and the value such personal relationships have in higher education.

The consistent comments made by respondents in both groups about the ability to complete their education because of the availability of these two distance delivery mediums indicated that there was a very strong impact on student education. The same literature used in analyzing the Help or Hinder group can be applied here, having the same results. There was no indication of why students would choose to pursue their education through one distance modality over the other. Therefore, we turn to more specifics regarding student perception and preference.

Perception

Eight questions from the survey were deemed to demonstrate participants' perception of the distance delivery medium. The averages for this category were 2.75 for the asynchronous group and 1.87 for the synchronous group. *T* test results comparing the two were .026 indicating a significant statistical difference. Individually, five of the eight questions had *t* test results with statistical significance. The three that did not were questions 5, 13 and 34.

Question 5 stated, "The class allows me to proceed at an individualized pace. The averages from both of the study groups were near 3, indicating neutrality on the question. This may be an indicator of the structure set up for the curriculum delivery through both mediums. Statements from the asynchronous group associated with this question indicated that they felt challenged at keeping up with the pace of required readings and required strong discipline and self-motivation. Related responses from the synchronous group included recommendations for patience, time management and self-discipline.

Some of these responses were also indicative of the difficulty of the level of education being pursued.

Question 13 stated, "[Synchronous/Asynchronous] course delivery meets my expectations." Average responses for this question were 2.56 for the asynchronous group and 1.70 for the synchronous group. *T* test results were not significant at .063. However, the averages indicate that the synchronous group more strongly agreed with the statement, while the asynchronous group was closer to neutral.

As indicated by the responses above under the Impact on Education, very strong statements were made by survey participants in both groups regarding their impressions on how the technology has enabled them to pursue their education. There were a few comments made by asynchronous participants indicating strong feelings of dissatisfaction, and a desire to pursue their education through traditional or face-to-face means.

Question 34 stated, "I believe that taking courses through the [live synchronous videoconferencing/asynchronous online] modality has helped me in my educational pursuits." Average responses for this question were 2.38 for the asynchronous group and 1.73 for the synchronous group. *T* test results were .143. These results indicate that there is not a statistically significant difference between the two study groups in response to this question. However, the average responses indicate agreement with the statement. In conjunction with the average responses for the Perception category, it appears that, aside from the 2-3 outliers indicated above, distance delivery helps students in their educational pursuit, and students perceive both delivery modalities as effective in completing their education. As indicated by a particular respondent, "It really doesn't feel that different.

I'm just in front of my computer vs. in a traditional classroom. Everything else feels the same."

As with the previous two groupings, the literature seeks to determine what factors may have an impact on student attitudes and perceptions in distance education (Beard & Harper, 2002; Beard, Harper & Riley, 2004; McFarland & Hamilton, 2005; Poirier & Feldman, 2004; Summers, Waigandt & Whittaker, 2005). This study helps provide a broader perspective of student perceptions regarding the different distance delivery mediums.

Preference

Between the two distance delivery modalities, this study has addressed the questions of student perception regarding effectiveness, impact, flexibility, technology and more, but thus far has skirted the question of which delivery modality is more preferred by students. Regarding student preference for synchronous or asynchronous distance delivery, 14 questions from the survey were used to address this category. Average responses for this question were 2.79 for the asynchronous group and 1.87 for the synchronous group. *T* test results were .024 indicating a significant difference between the two groups from an overarching perspective.

Question 11 specifically stated, "I prefer to take [synchronous videoconferencing/asynchronous online] classes to traditional classes. Although this question does not ask survey participants to directly compare their preference between synchronous and asynchronous distance delivery methods, it was thought that the strength of the answer may be an indicator of the preference for one particular modality versus the other. Average responses for this question were 2.80 for the asynchronous

group and 2.39 for the synchronous group. *T* test results were .335, indicating that there was not a statistically significant difference between the two groups on this individual question. The answer to the question of preference may also be present within the question grouping for the recommendation topic. Therefore, we will analyze the topic of recommendation more specifically.

Recommend

Seven questions were used to determine which modality demonstrated a stronger recommendation by survey participants. The averages for this category were 2.91 for the asynchronous group and 2.08 for the synchronous group. *T* test results were .046, indicating a statistically significant difference. As we have seen thus far in the analysis, there is generally greater value placed on the face-to-face interaction by both groups. This value is represented by comments made about how the synchronous face-to-face interaction has benefitted their education, and how the lack of this form of interaction was missed in the asynchronous delivery format. Therefore, the difference appearing in this category may be indicative of the perceived need for live face-to-face interaction and the quality of education this format may bring.

Of the seven questions used in this category, questions 12 and 14 specifically contained the word "recommend." Question 12 stated, "I would recommend this class format to my friends." Average responses for this question were 2.93 for the asynchronous group and 1.73 for the synchronous group. *T* test results were .002, indicating a strong significant difference between the two study groups. Additionally, question 14 stated, "I recommend that PhD education continue to be delivered by [synchronous/asynchronous] methods." Average responses for this question were 2.75 for

the asynchronous group and 1.50 for the synchronous group. *T* test results were .014, also indicating a strong significant difference between the two study groups.

The averages for these two questions were between agree and strongly agree for the synchronous group, and closer to Neutral for the asynchronous group. This speaks to the significance between preferences for the different distance delivery modalities. Although there were two responses from the asynchronous group stating that, "Overall [it] was a satisfying experience in learning," and "I feel the education I received was comparable to an in-house education," these were countered by several more negative comments indicating strong disapproval for the asynchronous learning format.

Among the synchronous group respondents there were no responses indicating a negative feeling toward the delivery modality. Several specifically stated that they felt synchronous distance education was superior to asynchronous. One respondent stated, "My first preference would be to be in a 'live' traditional classroom, but synchronous education is the next best thing." Another responded, "I like synchronous much more than asynchronous." The strongest response was, "In my opinion, synchronous videoconferencing is FAR, FAR superior to asynchronous teaching/learning."

As indicated throughout this analysis, many of the findings of this study support existing literature surrounding distance education. All other literature reviewed in this study compare either synchronous, asynchronous or mixed/hybrid education with the traditional classroom (Beard & Harper, 2002; Beard, Harper & Riley, 2004; Dal Bello, Knowlton & Chaffin, 2007; Davis, 2007; Dye, 2007; Gillies, 2008; Hron et al., 2007; King, 2001; Koenig, 2007; Kushniroff, 2008; McFarland & Hamilton, 2005; O'Rourke, 2007; Poirier & Feldman, 2004; Rothmund, 2008; Shewchuck, 2007; Summers,

Waigandt & Whittaker, 2005). The findings of this study comparing student attitudes and perceptions in synchronous and asynchronous education fill gaps in the literature.

Limitations

This study compared the attitudes and perceptions of two separate groups of PhD nursing students at different universities. Each group was either currently enrolled or recently graduated from their respective programs. One group took courses entirely through synchronous videoconferencing, and the other group took courses entirely through asynchronous online means. The study sought to determine how synchronous and asynchronous distance delivery modalities are perceived, which contributing factors may lead students to select one delivery modality over the other, and to what extent students perceive the different distance delivery modalities either help or hinder in their educational pursuits.

According to the G*Power 3.0.10 Statistical Significance Calculator, using a two-tailed *t* test with an effect size d of .08, and an error probability of .05, the minimum sample size recommended for each group is 26. Of the total target participants for the synchronous group of 55, there were 33 respondents meeting the minimum recommendation. Of the total target participants for the asynchronous group of 50, there were 16 respondents, not meeting the minimum recommendation. This represents a potential limitation in the study. However, the total respondents are ample enough to derive significant information and make future study recommendations. There was no data available to help explain the lower response rate among asynchronous participants.

Recommendations

This study stemmed from a gap in the literature comparing synchronous distance education with asynchronous. In the process of performing the literature review and the study itself, several other gaps were found and lessons learned leading to future study recommendations.

Much of the literature on the topic of distance education addresses the quality of education through distance technologies in comparison with the traditional classroom. Several of these studies focus on assessing student performance in the distance environment when compared to the traditional classroom (Edmonds, 2006; Fortune, Shifflett & Sibley, 2006; Poirier & Feldman, 2004; Scheetz & Gunter, 2004; Summers, Waigandt & Whittaker, 2005). A few studies address student satisfaction, attitudes and perceptions regarding the distance delivery technologies in comparison to the traditional classroom (Beard & Harper, 2002; Beard, Harper & Riley, 2004; Cook-Wallace, 2007; Kushniroff, 2008; McFarland & Hamilton, 2005; Neuhauser, 2002).

Learning Styles

One assumption made in this study was that adult students have different learning styles and may therefore elect to pursue their education through specific mediums based on their learning needs. For example, it was thought that a student who tends to be more self-directed and enjoys reading without a high need for face-to-face contact would elect the asynchronous delivery model for their education. In contrast, it was thought that a student who requires more direct social contact and learns through discussion and visual representations would elect to take their education through synchronous means. It was also thought that learning style preferences may also affect student success, attitudes and

perceptions within their respective distance delivery mediums. The questionnaire used in this study asked a few questions on this topic, but did not go in to depth. Further research is recommended to better determine the differences in these factors between students in synchronous and asynchronous distance delivery education models.

Hybrid Education

Within the literature review, a single study was identified comparing asynchronous students with students in a hybrid environment (Davis, 2007). The study focused on student performance in the form of grades and success rates, but did not ascertain student attitudes or perceptions of the two learning environments to determine student preference. Based on the findings of this study, with the statistically significant differences in attitudes and perceptions between synchronous and asynchronous students, it is recommended that further studies be performed comparing hybrid environments with both synchronous and asynchronous-only distance education environments.

Additional Research Questions

Following this line of thought, the hope of this study was to help colleges and universities have more information in hand when deciding to implement distance education so that they can be more successful and provide better education. At the same time, students can hope for improved distance delivery systems, educational models, and better trained faculty with adequate skills for the specific distance delivery medium used. Additional research recommended in support of this overarching goal includes answering the following questions: What factors are considered by individual colleges and universities when electing to instigate a distance delivery model? What is the general perception in the corporate world of the quality of student produced in the different

distance delivery educational systems? Is there a general perception that the traditional face-to-face classroom delivery model is superior to synchronous and/or asynchronous distance delivery models? To what extent are schools successful in reaching rural students through distance education delivery systems? Do students elect to take courses from a certain school in a specific subject area because of the type of delivery method offered or the particular adult learning methodology employed? Does the specific subject matter play a role in students' decisions to take courses through a certain distance delivery modality?

Conclusion

This study sought to ascertain and compare the attitudes and perceptions of PhD nursing students attending their coursework through synchronous and asynchronous means at two different universities. Supporting the goal of this study, analysis was performed to determine what factors may lead students to pursue their education through one distance delivery medium over the other and to what degree students feel the distance delivery medium either helps or hinders their educational pursuits. Results of the study indicated that there was a statistical significance between the attitudes and perceptions of synchronous and asynchronous PhD nursing students. Findings from this study also indicated areas of stronger importance to PhD nursing students in the distance education mediums. Those areas include technology challenges, satisfaction concerns, and recommendations for future student success in each modality. The primary theme that emerged from this study was that, although both study groups mentioned many of the benefits of being able to pursuer higher education at a distance, both synchronous and

asynchronous PhD nursing students expressed a desire for and are happier with some degree of face-to-face interaction.

It is this researcher's opinion that the results of this study can be generalized outside the PhD nursing education arena primarily to other PhD-level distance education environments. Additionally, as demonstrated in the analysis of the data compared to existing literature, many areas of this study can also be related to all levels of adult distance education: synchronous, asynchronous and mixed.

REFERENCES

Adams, A. (2004, April). Issues and innovations in nursing education: Pedagogical underpinnings of computer-based learning. *Journal of Advanced Nursing, 46*(1), 5-12. Retrieved August 22, 2008, doi:10.1111/j.1365-2648.2003.02960.x.

Aragon, S., Johnson, S., & Shaik, N. (2002). The influence of learning style preferences on student success in online versus face-to-face environments. *American Journal of Distance Education, 16*(4), 227. Retrieved Wednesday, July 05, 2006 from the Academic Search Premier database.

Barrington, E. (2004, October). Teaching to student diversity in higher education: How multiple intelligence theory can help. *Teaching in Higher Education, 9*(4), 421-434. Retrieved September 4, 2007, doi:10.1080/1356251042000252363

Battalio, J. (2007, Winter). Interaction online: A reevaluation. *Quarterly Review of Distance Education*, *8*(4), 339-352. Retrieved June 23, 2008, from Academic Search Premier database.

Beard, L., & Harper, C. (2002). Student perceptions of online versus on campus instruction. *Education*, *122*(4), 658. Retrieved Wednesday, July 05, 2006 from the Academic Search Premier database.

Beard, L., Harper, C., & Riley, G. (2004). Online versus on-campus instruction: Student attitudes & perceptions. *TechTrends: Linking Research & Practice to Improve Learning*, *48*(6), 29-31. Retrieved Wednesday, July 05, 2006 from the Academic Search Premier database.

Boyatzis, R., & Kolb, D. (1991). Assessing individuality in learning: The learning skills profile. *Educational Psychology, 11*(3/4), 279. Retrieved November 20, 2007, from Academic Search Premier database.

Candy, P. C. (1991). *Self-direction for lifelong learning*. San Francisco, CA: Jossey-Bass.

Chung, I. (2004, Winter). A comparative assessment of constructivist and traditionalist approaches to establishing mathematical connections in learning multiplication. *Education*, *125*(2), 271-278. Retrieved November 25, 2007, from Academic Search Premier database.

Cook-Wallace, M. K. (2007). *Perceptions of university-level distance education agents with respect to commitment, administration and technology*. PhD Dissertation, Southern Illinois University at Carbondale, United States -- Illinois. Retrieved July 31, 2008, from Dissertations & Theses: Full Text database. (Publication No. AAT 3264790)

Dal Bello, A., Knowlton, E., & Chaffin, J. (2007, September). Interactive videoconferencing as a medium for special education: Knowledge acquisition in preservice teacher education. *Intervention in School & Clinic*, *43*(1), 38-46. Retrieved June 23, 2008, from Academic Search Premier database.

Davies, J., & Graff, M. (2005, July). Performance in e-learning: Online participation and student grades. *British Journal of Educational Technology*, *36*(4), 657-663. Retrieved September 30, 2006, doi:10.1111/j.1467-8535.2005.00542.x.

Davis, D. E. (2007). *Best of both worlds: Do hybrid courses have better outcomes than distance only courses in the North Carolina Community College system?* Ed.D. dissertation, North Carolina State University, United States -- North Carolina. Retrieved July 31, 2008, from Dissertations & Theses: Full Text database. (Publication No. AAT 3279320)

DiBisceglie, L. A. (2002). *The relationship of prior academic credit to student persistence in the Caldwell College External Degree Program.* Ed.D. dissertation, Seton Hall University, College of Education and Human Services, United States -- New Jersey. Retrieved December 31, 2006, from ProQuest Digital Dissertations database. (Publication No. AAT 3066131)

Doering, A. (2006, August). Adventure learning: Transformative hybrid online education. *Distance Education*, *27*(2), 197-215. Retrieved July 31, 2008, doi:10.1080/01587910600789571.

Dye, K. G. (2007). *Applied music in an online environment using desktop videoconferencing.* Ed.D. dissertation, Teachers College, Columbia University, United States -- New York. Retrieved July 31, 2008, from Dissertations & Theses: Full Text database. (Publication No. AAT 3259242)

Edmonds, C. (2006). The inequivalence of an online and classroom based general psychology course. *Journal of Instructional Psychology*, *33*(1), 15-19. Retrieved Wednesday, July 05, 2006 from the Academic Search Premier database.

Ertmer, P. A., & Newby, T. J. (1993). Behaviorism, cognitivism, constructivism: Comparing critical features from an instructional design perspective. *Performance Improvement Quarterly*, 6(4), 50-72. Retrieved April 17, 2007, from Academic Search Premier database.

Fortune, M., Shifflett, B., & Sibley, R. (2006). A comparison of online (high tech) and traditional (high touch) learning in business communication courses in silicon valley. *Journal of Education for Business*, *81*(4), 210-214. Retrieved Wednesday, July 05, 2006 from the Academic Search Premier database.

Galbraith, D., & Fouch, S. (2007, September). Principles of adult learning. *Professional Safety*, *52*(9), 35-40. Retrieved October 17, 2007, from Academic Search Premier database.

Gale, K., Wheeler, S., & Kelly, P. (2007, Winter). Learning in cyberspace: An examination of changes in professional identity and practice style in an online problem-based learning environment. *Quarterly Review of Distance Education, 8*(4), 297-307. Retrieved June 23, 2008, from Academic Search Premier database.

Gall, M. D., Gall, J. P., & Borg, W. R. (2003). *Educational research: An introduction* (7th ed.). White Plains, NY: Longman.

Gardner, H. (1983). *Frames of mind: The theory of multiple intelligences*. NY: Basic Books.

Gillies, D. (2008, May). Student perspectives on videoconferencing in teacher education at a distance. *Distance Education, 29*(1), 107-118. Retrieved June 23, 2008, doi:10.1080/01587910802004878

Gömleksız, M., & Bulut, İ. (2007, January). An evaluation of the effectiveness of the new primary school mathematics curriculum in practice. *Educational Sciences: Theory & Practice, 7*(1), 81-94. Retrieved November 25, 2007, from Academic Search Premier database.

Guiliano, E. C. (2001). *Staying the course: The potential for student success in distance education composition courses.* D.A. dissertation, George Mason University, United States -- Virginia. Retrieved December 31, 2006, from ProQuest Digital Dissertations database. (Publication No. AAT 3003732)

Haggis, T. (2002, May). Exploring the 'black box' of process: A comparison of theoretical notions of the 'adult learner' with accounts of postgraduate learning experience. *Studies in Higher Education, 27*(2), 207-220. Retrieved August 6, 2008, doi:10.1080/03075070220119986

Hansen, B. A. (2000). *Increasing person-environment fit as a function to increase adult learner success rates in distance education.* PhD dissertation, University of Wyoming, United States -- Wyoming. Retrieved December 31, 2006, from ProQuest Digital Dissertations database. (Publication No. AAT 9993734)

Heiman, T. (2006). Assessing learning styles among students with and without learning disabilities at a distance-learning university. *Learning Disability Quarterly, 29*(1), 55-63. Retrieved Wednesday, July 05, 2006 from the Academic Search Premier database.

Hiemstra, R. (2003, Fall). More than three decades of self-directed learning: From whence have we come?. *Adult Learning, 14*(4), 5-8. Retrieved December 9, 2007, from Academic Search Premier database.

Hmelo-Silver, C. E. (2004, September). Problem-based learning: What and how do students learn? *Educational Psychology Review, 16*(3), 235-266. Retrieved Sunday, May 14, 2006 from the Academic Search Premier database.

Houle, B. J. (2004). *Adult student persistence in web-based education.* PhD dissertation, New York University, United States -- New York. Retrieved December 31, 2006, from ProQuest Digital Dissertations database. (Publication No. AAT 3124949)

Hron, A., Cress, U., Hammer, K., & Friedrich, H. (2007, March). Fostering collaborative knowledge construction in a video-based learning setting: Effects of a shared workspace and a content-specific graphical representation. *British Journal of Educational Technology*, *38*(2), 236-248. Retrieved June 23, 2008, doi:10.1111/j.1467-8535.2006.00619.x

Hughes, D. J. (2002). *A comparison of student learning styles and retention in on-line and on-campus courses at a community college.* PhD dissertation, University of South Carolina, United States -- South Carolina. Retrieved December 31, 2006, from ProQuest Digital Dissertations database. (Publication No. AAT 3076772)

Jessup, S. A. (2007). *Processes used by instructional designers to create e-learning and learning objects.* PhD dissertation, Capella University, United States -- Minnesota. Retrieved October 6, 2008, from Dissertations & Theses @ Capella University database. (Publication No. AAT 3264304).

Kanuka, H., Rourke, L., & Laflamme, E. (2007, March). The influence of instructional methods on the quality of online discussion. *British Journal of Educational Technology*, *38*(2), 260-271. Retrieved June 23, 2008, doi:10.1111/j.1467-8535.2006.00620.x.

Kerka, S., & ERIC Clearinghouse on Adult, C. (2002, January 1). *Teaching adults: Is it different? Myths and realities*. . (ERIC Document Reproduction Service No. ED468614) Retrieved November 19, 2007, from ERIC database.

Kiely, R., Sandmann, L., & Truluck, J. (2004, Fall). Adult learning theory and the pursuit of adult degrees. *New Directions for Adult & Continuing Education*, Retrieved November 26, 2007, from Academic Search Premier database.

King, K. P. (2001, Summer). Educators revitalize the classroom "bulletin board": A case study of the influence of online dialogue on face-to-face classes from an adult learning perspective. *Journal of Research on Computing in Education, 33*(4). Retrieved May 14, 2006 from Academic Search Premier database.

Klingner, B. G. (2003). *The relationship between learning styles of adult learners enrolled in online courses at Pace University and success and satisfaction with online learning.* PhD dissertation, Walden University, United States -- Minnesota. Retrieved December 31, 2006, from ProQuest Digital Dissertations database. (Publication No. AAT 3088101)

Koenig, R. J. (2007). *Comparing cost-effectiveness of undergraduate course delivery: Classroom, online, and video conference at a technical institute in a mid-Atlantic state.* Ed.D. dissertation, Johnson & Wales University, United States -- Rhode Island.

Retrieved July 31, 2008, from Dissertations & Theses: Full Text database. (Publication No. AAT 3286638)

Kolb, D.A. (1984). *Experiential learning: Experience as the source of learning and development*. Englewood Cliffs, N.J.: Prentice-Hall.

Kolb, A. Y., & Kolb, D. A. (2005). Learning styles and learning spaces: Enhancing experiential learning in higher education. *Academy of Management Learning & Education, 4*(2), 193-212. Retrieved November 19, 2007 from Academic Search Premier database.

Kostrzewski, D. L. (2007). *Evaluation of an associate degree nursing program delivered by interactive television.* Ph.D. dissertation, Capella University, United States -- Minnesota. Retrieved July 31, 2008, from Dissertations & Theses @ Capella University database. (Publication No. AAT 3284071).

Kushniroff, M. C. (2008). *Examination and survey of user satisfaction with internet-based learning compared to traditional classroom-based learning.* Ed.D. Dissertation, Liberty University, United States -- Virginia. Retrieved July 31, 2008, from Dissertations & Theses: Full Text database. (Publication No. AAT 3297842)

Leedy, P. D., & Ormrod, J. E. (2001). *Practical research: Planning and design,* (7th ed). Upper Saddle River, NJ: Prentice Hall.

Leisure, T. M. (2007). *Female graduate students' experiences in an online doctoral degree program: A heuristic inquiry.* PhD dissertation, Capella University, United States -- Minnesota. Retrieved July 31, 2008, from Dissertations & Theses @ Capella University database. (Publication No. AAT 3251343)

McClure, J. L. (2006). *Hybrid instruction in higher education: Student characteristics, motivations, expectations, and experiences.* PhD dissertation, Loyola University Chicago, United States -- Illinois. Retrieved December 31, 2006, from ProQuest Digital Dissertations database. (Publication No. AAT 3212977)

McCoog, I. (2007, September). Integrated instruction: Multiple intelligences and technology. *Clearing House*, *81*(1), 25-28. Retrieved June 23, 2008, from Academic Search Premier database.

McFarland, D., & Hamilton, D. (2005). Factors affecting student performance and satisfaction: Online versus traditional course delivery. *Journal of Computer Information Systems, 46*(2), 25-32. Retrieved Thursday, April 13, 2006 from the Business Source Premier database.

McLoughlin, C. (2002). Learner support in distance and networked learning environments: Ten dimensions for successful design. *Distance Education, 23*(2). Retrieved April 12, 2006 from Academic Search Premier database.

Merriam, S. B. (1998). *Qualitative research and case study applications in education*. San Francisco, CA: Jossey-Bass.

Merriam, S. (2001a, Spring). Andragogy and self-directed learning: Pillars of adult learning theory. *New Directions for Adult & Continuing Education*, Retrieved November 26, 2007, from Academic Search Premier database.

Merriam, S. (2001b, Spring). Something old, something new: Adult learning theory for the twenty-first century. *New Directions for Adult & Continuing Education*, Retrieved November 26, 2007, from Academic Search Premier database.

Merriam, S. (2004, November). The role of cognitive development in Mezirow's transformational learning theory. *Adult Education Quarterly*, *55*(1), 60-68. Retrieved November 26, 2007, from Academic Search Premier database.

Miflin, B. (2004, January). Adult learning, self-directed learning and problem-based learning: Deconstructing the connections. *Teaching in Higher Education*, *9*(1), 43-53. Retrieved November 26, 2007, from Academic Search Premier database.

Miller, T., & King, F. (2003, July). Distance education: Pedagogy and best practices in the new millennium. *International Journal of Leadership in Education*, *6*(3), 283-297. Retrieved August 4, 2008, from Academic Search Premier database.

Morrison, G. & Guenther, P. F. (2000). Designing instruction for learning in electronic classrooms. *New Directions for Teaching and Learning*, 84, pp. 15-22.

Mvududu, N. (2005, Summer). Constructivism in the statistics classroom: From theory to practice. *Teaching Statistics, 27*(2), 49-54. Retrieved November 25, 2007, from Academic Search Premier database.

Neuhauser, C. (2002). Learning style and effectiveness of online and face-to-face instruction. *American Journal of Distance Education, 16*(2), 99. Retrieved Wednesday, July 05, 2006 from the Academic Search Premier database.

Offir, B., Bezalel, R., & Barth, I. (2007, March). Introverts, extroverts, and achievement in a distance learning environment. *American Journal of Distance Education*, *21*(1), 3-19. Retrieved June 23, 2008, doi:10.1080/08923640701298613.

Ormrod, J. (2004). *Learning theory and the educational process*, (4th ed.). Boston: Pearson Custom Publishing.

O'Rourke, J. (2007, March). Small group learning and videoconferencing: Are they compatible?. *Education for Primary Care, 18*(2), 192-195. Retrieved June 23, 2008, from Academic Search Premier database.

Ozuah, P. (2005). First, there was pedagogy and then came andragogy. *Einstein Journal of Biology & Medicine, 21*(2), 83-87. Retrieved Monday, May 15, 2006 from the Academic Search Premier database.

Perez-Prad, A., & Thirunarayanan, M. (2002). A qualitative comparison of online and classroom-based sections of a course: Exploring student perspectives. *Educational Media International*, *39*(2), 195. Retrieved Saturday, August 12, 2006 from the Academic Search Premier database.

Plotnick, E. (2003a). Research abstracts. *Quarterly Review of Distance Education*, *4*(1), 65. Retrieved Wednesday, July 05, 2006 from the Academic Search Premier database.

Plotnick, E. (2003b). Research abstracts. *Quarterly Review of Distance Education*, *4*(4), 467-469. Retrieved Wednesday, July 05, 2006 from the Academic Search Premier database.

Poirier, C., & Feldman, R. (2004). Teaching in cyberspace: Online versus traditional instruction using a waiting-list experimental design. *Teaching of Psychology*, *31*(1), 59-62. Retrieved Wednesday, July 05, 2006 from the Academic Search Premier database.

Ramsay, J., & Sorrell, E. (2007, September). Problem-based learning. *Professional Safety*, *52*(9), 41-46. Retrieved December 9, 2007, from Academic Search Premier database.

Resta, P., & Laferrière, T. (2007, March). Technology in support of collaborative learning. *Educational Psychology Review*, *19*(1), 65-83. Retrieved June 23, 2008, doi:10.1007/s10648-007-9042-7.

Rothmund, C. A. (2008). *Correlation between course interactivity and reported levels of student satisfaction in hybrid courses.* PhD Dissertation, Capella University, United States -- Minnesota. Retrieved July 31, 2008, from Dissertations & Theses @ Capella University database. (Publication No. AAT 3297548)

Sawaan, S. Y. M. (2006). *Studying the implications of hidden learning styles by tracing learners' behaviors in an e-learning system.* M.S. dissertation, University of Louisville, United States -- Kentucky. Retrieved February 7, 2008, from Dissertations & Theses: Full Text database. (Publication No. AAT 1448633)

Scheetz, N., & Gunter, P. (2004). Online versus traditional classroom delivery of a course in manual communication. *Exceptional Children*, *71*(1), 109-120. Retrieved Wednesday, July 05, 2006 from the Academic Search Premier database.

Shewchuk, L. B. (2007). *Synchronous communication: An analysis of videophone-mediated two-way audio/video learning environments with university students.* PhD dissertation, University of Calgary (Canada), Canada. Retrieved July 31, 2008, from Dissertations & Theses: Full Text database. (Publication No. AAT NR26253)

Shelton, K., & Saltsman, G. (2005). *An administrator's guide to online education*. Charlotte, NC: Information Age.

Sher, M., & Flinders, D. (2006, October). Book review of the false promises of constructivist theories of learning: A global and ecological critique. *Educational Studies, 40*(2), 164-168. Retrieved November 25, 2007, from Academic Search Premier database.

Shore, J. (2004, January). Teacher education and multiple intelligences: A case study of multiple intelligences and teacher efficacy in two teacher preparation courses. *Teachers College Record, 106*(1), 112-139. Retrieved May 14, 2006, doi:10.1111/j.1467-9620.2004.00323.x.

Simonson, M., Smaldino, S., Albright, M., & Zvacek, S. (2006). *Teaching and learning at a distance: Foundations of distance education* (3rd ed.). Upper Saddle River, NJ: Merrill Prentice Hall.

Slick, T. H. (2008). *Do learning styles matter?* Ed.D. dissertation, University of La Verne, United States -- California. Retrieved July 31, 2008, from Dissertations & Theses: Full Text database. (Publication No. AAT 3301965)

Stansberry, S., & Kymes, A. (2007, March). Transformative learning through teaching with technology electronic portfolios. *Journal of Adolescent & Adult Literacy, 50*(6), 488-496. Retrieved October 20, 2007, from Academic Search Premier database.

Storrings, D. A. (2005). *Attrition in distance education: A meta-analysis.* PhD dissertation, Syracuse University, United States -- New York. Retrieved December 31, 2006, from ProQuest Digital Dissertations database. (Publication No. AAT 3194024)

Summers, J., Waigandt, A., & Whittaker, T. (2005). A comparison of student achievement and satisfaction in an online versus a traditional face-to-face statistics class. *Innovative Higher Education, 29*(3), 233-250. Retrieved Wednesday, July 05, 2006 from the Academic Search Premier database.

Sungur, S., & Tekkaya, C. (2006). Effects of problem-based learning and traditional instruction on self-regulated learning. *Journal of Educational Research, 99*(5), 307-317. Retrieved Wednesday, August 02, 2006 from the Academic Search Premier database.

Sweeney, M. A. (2007). *The use of videoconferencing techniques which support constructivism in K-12 education.* Ed.D. Dissertation, University of Massachusetts Lowell, United States -- Massachusetts. Retrieved July 31, 2008, from Dissertations & Theses: Full Text database. (Publication No. AAT 3257352)

Unal, G., & Akpinar, E. (2006). To what extent science teachers are constructivist in their classrooms? *Journal of Baltic Science Education, 2*(10), 40-50. Retrieved November 25, 2007, from Academic Search Premier database.

Wansick, J. (2007). *Transformative learning in online courses.* Ed.D. dissertation, Oklahoma State University, United States -- Oklahoma. Retrieved July 31, 2008, from Dissertations & Theses: Full Text database. (Publication No. AAT 3259579)

Wink, D. (2006). Connections between pedagogical and epistemological constructivism: Questions for teaching and research in chemistry. *Foundations of Chemistry*, *8*(2), 111-151. Retrieved November 25, 2007, from Academic Search Premier database.

Zapantis, A., & Maniscalco-Feichtl, M. (2008, May 15). Teaching in a distance education program. *American Journal of Health-System Pharmacy*, *65*(10), 912-920. Retrieved June 23, 2008, doi:10.2146/ajhp070509

APPENDIX A. SURVEY QUESTIONS

Directions: To help the higher education community learn more about student and faculty perceptions related to the delivery of education through synchronous and asynchronous delivery modalities, we are asking current students and program graduates to respond to the following items pertaining to their experience in the distance delivery PhD program at their respective universities. All data is anonymous and confidential, and will be used in aggregate (combined group data) for research purposes. It will take less than 15 minutes to complete the survey. Please do not put your name on this survey. Completion of this survey indicates your informed consent to participate in this study. If you are interested in receiving the results of this study, please contact the PhD program director at your university or college.

Note: There are two distinct groups targeted for this study: synchronous videoconferencing students and asynchronous online students. Each group is asked to complete their own respective survey, and to be open and honest in their responses. Most questions in each survey are the same or similar, with only the distinguishing difference relating to the delivery method or faculty/student role. All questions target perception and attitude toward the distance delivery modality. Each survey also contains a few questions for qualitative commentary.

Please answer all questions using the following scale:

SA = Strongly agree

A = agree

N = Neither agree nor disagree

D = disagree

SD = Strongly disagree

Synchronous Videoconferencing Students

1. The class content lends itself easily for a live synchronous videoconferencing class.

SA A N D SD

2. I have the opportunity to interact with other people in the class.

SA A N D SD

3. Some students feel isolated at their distance site.

SA A N D SD

4. I experience minimal communication problems with students related to the synchronous delivery of courses.

SA A N D SD

5. The class allows me to proceed at an individualized pace.

SA A N D SD

6. I learn as much from this synchronous videoconferencing class as I would have learned from a traditional lecture class.

SA A N D SD

7. Synchronous delivery of courses is as effective as taking courses in the traditional classroom.

SA A N D SD

8. Synchronous delivery of courses is effective in preparing me as a graduate student.

SA A N D SD

9. Synchronous delivery of courses is effective for student learning.

SA A N D SD

10. I rate the overall synchronous delivery of courses during my education as effective.

SA A N D SD

11. I prefer to take synchronous videoconferencing classes to traditional classes.

SA A N D SD

12. I would recommend this class format to my friends.

SA A N D SD

13. Synchronous course delivery meets my expectations.

SA A N D SD

14. I recommend that PhD education continue to be delivered by synchronous methods.

SA A N D SD

15. I feel comfortable participating in course discussions with students in my distance delivery course.

SA A N D SD

16. Students in synchronous videoconferencing classrooms feel comfortable participating in course discussions with other students.

SA A N D SD

17. I am able to communicate with other students during the discussion activities.

SA A N D SD

18. I am able to share learning experiences with other students during the discussion activities.

SA A N D SD

19. Live contact with fellow students helps me get more out of the discussion activities.

SA A N D SD

20. A sense of community exists with fellow students during the discussion activities.

SA A N D SD

21. The discussion activities enable me to collaborate with other students.

SA A N D SD

22. I sometimes feel isolated in my courses.

SA A N D SD

23. The instructor encourages me to become actively involved in class discussions.

SA A N D SD

24. I am able to interact with the instructor during the discussion activities.

SA A N D SD

25. I am able to interact with the instructor outside of the regular class time.

SA A N D SD

26. I am satisfied with the level of interaction during the course.

SA A N D SD

27. The instructors use effective teaching methods for synchronous course delivery.

SA A N D SD

28. Technical problems with the distance delivery system seldom interfere with my learning.

SA A N D SD

29. Synchronous delivery should have wider use in higher education programs.

SA A N D SD

30. Synchronous methods facilitate effective learning of the material.

SA A N D SD

31. I prefer the flexibility of taking a synchronous course to a traditional in-house course.

SA A N D SD

32. I feel more comfortable engaging in videoconferencing discussions with other students than through live in-class discussions.

SA A N D SD

33. I appreciate the live discussions that take place in the synchronous videoconferencing classroom.

SA A N D SD

34. I believe that taking courses through the live synchronous videoconferencing modality has helped me in my educational pursuits.

SA A N D SD

35. I am receiving/have received the same quality of education through live videoconferencing as I would have received in the traditional classroom.

SA A N D SD

36. At what point are you in the PhD Nursing program at your university?

A. Beginning

B. Middle

C. Approaching end

D. Graduated

Please provide your comments for the following questions:

37. What were the biggest challenges you faced when you began taking synchronous videoconferencing courses?

38. What tips or suggestions would you give to students who are just beginning to take courses through synchronous videoconferencing?

39. What types of things do you have to consider and plan for when taking synchronous videoconferencing courses that you don't have to consider when attending traditional instructor-led courses?

40. How does your process for attending courses through synchronous videoconferencing differ from your process in traditional instructor-led courses?

41. If you could change one thing about the synchronous delivery of courses in your degree program to improve the program what would that be?

42. Is there anything you would like to relate about your experience receiving program courses by synchronous delivery methods?

43. To what degree have you used synchronous videoconferencing prior to taking this course?

Asynchronous Online Students

1. The class content lends itself easily for an Internet class.

SA A N D SD

2. I have the opportunity to interact with other people in the class.

SA A N D SD

3. Some students feel isolated at their distance site.

SA A N D SD

4. I experience minimal communication problems with students related to the asynchronous delivery of courses.

SA A N D SD

5. The class allows me to proceed at an individualized pace.

SA A N D SD

6. I learn as much from this asynchronous online class as I would have learned from a traditional lecture class.

SA A N D SD

7. Asynchronous delivery of courses is as effective as taking courses in the traditional classroom.

SA A N D SD

8. Asynchronous delivery of courses is effective in preparing me as a graduate student.

SA A N D SD

9. Asynchronous delivery of courses is effective for student learning.

SA A N D SD

10. I rate the overall asynchronous delivery of courses during my education as effective.

SA A N D SD

11. I prefer to take asynchronous online classes to traditional classes.

SA A N D SD

12. I would recommend this class format to my friends.

SA A N D SD

13. Asynchronous course delivery meets my expectations.

SA A N D SD

14. I recommend that PhD education continue to be delivered by asynchronous methods.

SA A N D SD

15. I feel comfortable participating in course discussions with students in my distance delivery course.

SA A N D SD

16. Students in asynchronous online classrooms feel comfortable participating in course discussions with other students.

SA A N D SD

17. I am able to communicate with other students during the discussion activities.

SA A N D SD

18. I am able to share learning experiences with other students during the discussion activities.

SA A N D SD

19. Asynchronous contact with fellow students helps me get more out of the discussion activities.

SA A N D SD

20. A sense of community exists with fellow students during the discussion activities.

SA A N D SD

21. The discussion activities enable me to collaborate with other students.

SA A N D SD

22. I sometimes feel isolated in my courses.

SA A N D SD

23. The instructor encourages me to become actively involved in class discussions.

SA A N D SD

24. I am able to interact with the instructor through the discussion activities.

SA A N D SD

25. I am able to interact with the instructor outside of the regular class time.

SA A N D SD

26. I am satisfied with the level of interaction during the course.

SA A N D SD

27. The instructors use effective teaching methods for asynchronous course delivery.

SA A N D SD

28. Technical problems with the distance delivery system seldom interfere with my learning.

SA A N D SD

29. Asynchronous delivery should have wider use in higher education programs.

SA A N D SD

30. Asynchronous methods facilitate effective learning of the material.

SA A N D SD

31. I prefer the flexibility of taking an asynchronous course to a traditional in-house course.

SA A N D SD

32. I feel more comfortable engaging in online discussions with other students than through live in-class discussions.

SA A N D SD

33. I appreciate having the time to think about my responses to questions through asynchronous discussions.

SA A N D SD

34. I believe that taking courses in an asynchronous online classroom has helped me in my educational pursuits.

SA A N D SD

35. I am receiving/have received the same quality of education through an asynchronous online classroom as I would have received in the traditional classroom.

SA A N D SD

36. At what point are you in the PhD Nursing program at your university?

A. Beginning

B. Middle

C. Approaching end

D. Graduated

Please provide your comments for the following questions:

37. What were the biggest challenges you faced when you began taking e-learning courses?

38. What tips or suggestions would you give to students who are just beginning to take courses through e-learning?

39. What types of things do you have to consider and plan for when taking e-learning courses that you don't have to consider when attending traditional instructor-led courses?

40. How does your process for attending courses through e-learning differ from your process in traditional instructor-led courses?

41. If you could change one thing about the asynchronous delivery of courses in your degree program to improve the program what would that be?

42. Is there anything you would like to relate about your experience receiving program courses by asynchronous delivery methods?

43. To what degree have you used Online Discussion Boards or Discussion Forums prior to taking this course?

APPENDIX B. RESOURCES USED FOR SURVEY INSTRUMENT DEVELOPMENT

Beard, L., Harper, C., & Riley, G. (2004)

Cook-Wallace, M. K. (2007)

Dal Bello, A., Knowlton, E., & Chaffin, J. (2007)

Jessup, S. A. (2007)

Kostrzewski, D. L. (2007)

Rothmund, C. A. (2008)

APPENDIX C. MATCH OF PRIMARY AND SUBSIDIARY RESEARCH QUESTIONS TO SURVEY QUESTIONS

Research Question 1: How are synchronous and asynchronous distance delivery modalities perceived by PhD nursing students?		Online Survey Q's: 1-35
	RQ1, Subsidiary Q 1: What contributing factors may lead students to select one delivery modality over the other?	Online Survey Q's: 1-5, 10-19, 22, 24-27, 29-33, 35
	RQ2, Subsidiary Q 2: To what extent do students perceive the different delivery modalities to either help or hinder in their educational pursuits?	Online Survey Q's: 1, 3, 4, 5-9, 13, 15-28, 30-35