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A Descriptive Study About Instructor and Student Attitudes Towards the Use of Educational Technology in Nursing Instruction

David Lawrence Stanghellini

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by

David Lawrence Stanghellini

Bachelor of Arts
Iona College, 1992

Associate of Applied Science
Cochran School of Nursing, 2000

Bachelor of Science
Dominican College, 2002

Master of Science
Benedictine University, 2012

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Accepted by:

Lucas Vasconcelos, Major Professor

Ismahan Arslan-Ari, Committee Member

Fatih Ari, Committee Member

Anna Clifford, Committee Member

Tracey L. Weldon, Interim Vice Provost and Dean of the Graduate School

DEDICATION

I dedicate this dissertation to Almighty God, the source of all that I am, have been, and will be to come. He has been my inspiration and source of strength and I pray that by this work and my work as an educator, I may bring glory and honor to Him.

I also dedicate this work to my wife, Heather, whose faith in me has never faltered and who has managed "our ship" of our three daughters over these years of long days and late nights of research and writing. Thank you, my Love, for your belief in me and all your support. To my daughters, Rina, Nuala, and Anna who have been my cheerleaders and whose encouragement lifted my spirits at times when I felt discouraged. I am so proud and blessed to be your Ba. To my mom and dad. Mom, I wish you could see this achievement while on earth, but I am sure you will have the best seat in the house at my graduation. Pops, you are the best man I know, and you have always inspired me to give my best. I am blessed to call you my dad. Thank you for your love and support.

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ABSTRACT

In recent years, concern has been expressed by the Institute of Medicine (IOM) and the National League for Nursing (NLN) that nursing school graduates lack critical thinking skills needed to provide increasingly complex care to today's hospitalized patient. Although the use of educational technology in the classroom has been associated with improved critical thinking and performance, some instructors at schools of nursing remain reluctant to integrating technology into their pedagogy. Barriers to technology integration include limited knowledge in the use of technology, perceived low self-efficacy, concerns about training, and long-term support.

This study examined factors that affect instructor and student perceptions and attitudes towards educational technology integration in a hospital-based nursing program. These research questions guided this study: (1) what factors influence instructor use of educational technology for teaching theoretical knowledge of nursing, (2) how do instructors use educational technology in teaching theoretical knowledge of nursing, (3) what are student perceptions about the use of educational technologies for learning theoretical knowledge of nursing, and (4) what are student attitudes towards how educational technology is used in teaching theoretical knowledge of nursing?

A convergent parallel mixed methods study consisting of qualitative and quantitative data was developed. The Instructor Technology Survey (ITS) was administered to eight full-time instructors and a composite survey consisting of subscales

from the Computer Technology Integration (CTI) survey and the Technology Attitude Survey (TAS) was administered to 65 students to measure the attitudes of both groups towards educational technology. In addition, one-to-one interviews and focus group interviews were conducted with instructors and students respectively to triangulate both qualitative and quantitative data about attitudes of these groups.

Because the two groups being examined had such different demographics and positions, it was felt that there might be vast differences in the perceptions and attitudes towards using educational technology in the classroom. Upon examination of the findings of surveys, interviews and focus groups, it was noted that these groups of participants were not *vastly divergent*, but both had hopes and concerns about the possibilities educational technology could bring to the classroom. Benefits identified by both groups included potential for increased student interest in the subject matter being presented and a heightened level of involvement in the classroom. Likewise, both groups identified similar challenges. Instructors identified limited time to incorporate technology into their pedagogy and a limited amount of professional development as challenges that needed to be overcome. Students also described challenges such as the need for preparation prior to class with having already oversubscribed schedules. Student concern about instructor capabilities in managing the technology were also expressed. In conclusion, educational technology can play an important role in educating the next generation of nurses. Recommendations for future practice and future research directions are discussed.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

CHAPTER 1: INTRODUCTION

National Context

Integration of educational technology into classroom teaching has been seen as a challenge in nursing education (Skiba, 2017). Though research shows increased student performance and success with educational technology (Fernández Alemán et al., 2011; Patterson et al., 2010), there remains a reluctance on the part of some nursing instructors to employ changes to their pedagogy to include this medium (Celik & Yesilyurt, 2013; Marquis & Huston, 2012; Marzilli et al., 2014). Factors related to this caution in using educational technology include instructor attitudes towards technology integration in the classroom, number of years' experience, perceived level of support for changes to curriculum, provision of technology support, and faculty development (Burke, 2009; Celik & Yesilyurt, 2013; Johnson, 2018; Kotcherlakota et al., 2017).

In addition to these factors, educator's perceptions of their own skill levels and comfort in using technology have significant impact on their use of technology in the classroom. Celik and Yesilyurt (2013) found that instructor attitudes, perception of their skills, and anxiety over new computer technology were significant predictors to whether they would incorporate innovative educational technologies into their classroom. These sentiments and results were echoed by the conclusions of Marzilli et al. (2014), who found educators had negative views towards technology due to a perceived lack of knowledge, distrust of the reliability of computer platforms, and concerns regarding training and support. Likewise, Kotchelakota et al. (2017) found that older faculty, with

more experience in teaching, were hesitant about incorporating educational technology into their pedagogy as they expressed concerns about the support and training needed to successfully integrate these innovations.

As much as there may be an apparent reluctance on the part of some instructors to incorporate educational technology into teaching practice, it is important to understand that, as technology continues to integrate into society, it is changing the ways students interact and learn (Autry & Berge, 2011; Berk, 2009; Brooks & Pomerantz, 2017; Levine & Dean, 2013). It has been acknowledged that technology has had profound effects on how students approach learning (Autry & Berge, 2011; Berk, 2009). Research suggests that using teaching methods which incorporate technology and that actively engage students in learning activities have been helpful in increasing student interest and involvement, making information more memorable and useful (Crookes et al., 2013; McGowan et al., 2014; Rodrigue et al., 2016).

McCrindle and Wolfinger (2009) summed up the challenge to educators facing tech-savvy student consumers when they stated, “while the chalk-and-talk teaching approach was the only style on offer in previous generations, this structured approach to classroom communication is far from effective for today’s technologically savvy, multi-media, post-structured learners” (p. 110). This change in learning must be addressed if nursing instructors are to equip their students with the critical thinking and problem-solving skills needed to care for patients in an increasingly complex healthcare system (Martinez, 2016; National League for Nursing [NLN], 2015).

Students, many who have been exposed to computers and technology from an early age where technology was seamlessly a part of their life experiences, have been

called *digital natives* (Prensky, 2001). These students represent a new paradigm of student-centered learning and will continue to challenge instructors to reflect on their practice and integrate unique methods that are entertaining, interactive, and technology-based (Popkess & Frey, 2015). Recognizing this changing landscape in nursing education, the National League for Nursing (NLN), an organization for nurse educators which offers professional development and specialty certifications, has called for "incentive-based programs to build faculty competence in teaching with and about technology" (NLN, 2015, p. 5).

Local Context

The focus of this study, a small hospital-based nursing program in lower New York, has been educating aspiring nurses since 1894. At the time of this study, the school enrolled 92 students and had 9 full- and part-time faculty. The education of nursing students there included the use of traditional lecture, laboratory practice, and clinical rotations to apply the skills and knowledge in the care of patients. This learning environment, which uses a traditional lecture format where the instructor is the primary source of information and the student the receptacle of knowledge, limits students' active role in learning (McGowan et al., 2014). Over the school's long history, the lecture format has changed little and used only a minimum of technology such as Microsoft PowerPoint to present information. PowerPoint presentations have been used to present course content for the lecture portion of the class. These presentations have been housed on a Learning Management System (LMS) and can be accessed by the instructor in the classroom and are available for student download outside of class. Other technology used are virtual patent simulations, called vSim, in which students playing an avatar nurse interact with a virtual patient and perform a series of tasks meant to simulate patient care

in a hospital nursing unit. However, this technology is generally used for homework or clinical laboratory assignments which are independent of classroom instruction.

In addition to the limited use of technology in the nursing classroom, challenges to using technology may also be seen in potential reluctance by instructors to incorporate technology into their teaching. This apparent complacency may stem from their long experience of teaching using PowerPoint and from reluctance to change. Much of the faculty have been employed at the school for a significant portion of their professional careers, and there appeared to be a reluctance to incorporate new tools and unique ideas into their pedagogy. It is believed the causes for this disinclination may be similar to faculty who cite concerns about their ability to incorporate technology into lessons, perceived support of administration, and resources available to learn and manage new technologies (Celik & Yesilyurt, 2013; Kotchelakota et al., 2017; Marzilli et al., 2014).

One difficulty in changing opinions and practice towards technology integration is to acknowledge that a problem exists. There seems to be a belief within the school that changes should only occur to address a problem. No significant changes have occurred in the curriculum or teaching style at the school to address technology integration because a problem is not apparent. A problem would primarily be perceived through a reduction in the student pass rate of the national nurse licensing exam. The primary measure of the success of students and the nursing school is the student's passage of the National Council Licensure Examination (NCLEX) administered by the National Council of State Boards of Nursing (NCSBN). Passing this exam allows the student to be licensed and work as a registered nurse. With an NCLEX first-time pass rate ranging between 88.9 % for 2019, graduates of the school are well above the national average of 86.0% (New

York State Department of Education Office of the Professions [NYSED], 2020). Since the school has seen little turnover in faculty and the NCLEX pass rates are consistently above the national average, the need to implement modifications such as technology-enhanced teaching methods may be seen as unnecessary.

The nursing school deploys surveys every year to instructors and students to assess their expectations, though little information regarding technology and its impact on learning is collected. Instead, survey questions seek to determine if classroom, laboratory, clinical, and general computer access is considered adequate. In a similar way, a survey of students administered each semester by Educational Testing Service (ETS) assesses student satisfaction with the instructor and use of classroom time, but only one question asks about instructor use of technology in the classroom with a five-point Likert scale selection ranging from *very effective* to *ineffective* (Educational Testing Service [ETS], 2018). Because the question is so broad, it does not adequately address student attitudes and beliefs regarding technology use in the classroom. Through this study, comprehensive data from both students and instructors helped better explain their attitudes towards using educational technology in nursing classrooms.

Statement of the Problem

There is little integration of educational technology in conveying instruction at a small hospital-based nursing program. Most instructors have been teaching at the school for a long time, and their use of technologies for teaching theory in the classroom is often limited to PowerPoint presentations projected on a screen. It appears that high student pass rates on the NCLEX exam do not justify or encourage faculty to adopt practices that integrate educational technologies into nursing lessons.

Purpose Statement

The purpose of this action research was to investigate (1) the factors that affect instructors' use of educational technologies and (2) how instructors use educational technologies in the classroom at a small hospital-based associate degree nursing school in lower New York State. In addition, this study explored (3) students' perceptions about using educational technologies to learn theoretical nursing and (4) students' perceptions about instructors' use of educational technologies in theoretical nursing instruction.

Research Questions

1) What factors influence instructor use of educational technology for teaching theoretical knowledge of nursing?

2) How do instructors use educational technology in teaching theoretical knowledge of nursing?

3) What are student perceptions about using educational technologies to learn theoretical knowledge of nursing?

4) What are student perceptions of how educational technologies are used in teaching theoretical knowledge of nursing?

Research Subjectivities and Positionality

To conduct effective and rigorous action research, it is essential for the researcher to reflect and examine his background, assumptions, and biases (Mertler, 2017; Peshkin, 1988). I am a registered nurse working at this small, hospital-based nursing school in lower New York. I graduated from this same school 21 years ago and have been teaching there as full-time nursing instructor for the last five years. Part of my job responsibilities include teaching in the classroom, providing instruction in the laboratory skills practice

area, and supervising student clinical experiences on a hospital nursing unit. I am aware of its methods of teaching from both a student's and instructor's perspective.

My interest in educational technology stems from my past experiences in school, as a nurse, an educator, and as a parent of school-aged children. In regard to my expertise in digital media, I identify most closely as a *digital immigrant* – someone not raised with technology but who understands its value and benefits and has incorporated it into their personal and professional activities (Prensky, 2001). While a student at the nursing school 23 years ago, I recall only limited use of technology in the classroom. Other than the instructors' use of Microsoft PowerPoint presentations to assist with their lectures, there was little technology used in the classroom. Following graduation, and my experience in practice both as a staff nurse and educator, I realized the practical applications and benefits of technology – seeing how gaming, role playing, and an interactive environment can stimulate participation and lead to a dynamic learning experience.

Returning to my alma mater in 2016 as an instructor, I noticed that little had changed in using educational technology in the classroom. This made me reflect on how digital technology could be incorporated more into the nursing school. In addition to my professional practice, I was influenced by my three young daughters' experiences with technologies in the public-school system. At their respective schools, technology has become integrated into the curriculum. My daughters seem enthusiastic to learn because their classes are interactive and engaging. They play games, answer questions using clickers, and watch videos. I have become concerned that my current and future students have come to expect this active learning environment in the classroom. These

expectations present new challenges to educators, especially those having limited skills in educational technology. Because of this, I wanted to learn more about educational technology and identify how to incorporate it into nursing classrooms. With this knowledge, I hope to see it more fully incorporated in practice by my peers at the nursing school.

When considering the qualities needed to successfully use and teach with educational technology, I believe I possess many of them. Being inquisitive and a good problem solver are essential traits. Wanting to know how something operates and working through challenges are also important characteristics needed to work with technology. Being a good listener, a thorough explainer, and a patient person also typify the qualities of someone able to use and explain technology to others. In addition, I am able to listen to students' needs in order to better understand their issues and challenges. Likewise, I can work with all stakeholders involved to explain the rationales for actions and provide answers needed when questions arise about teaching with this medium.

It is important for researchers to reflect and consider their motivations for research and to affect change. My own research paradigm most closely aligns with the pragmatic worldview. This approach, according to Creswell (2014), "arises out of actions, situations, and consequences rather than antecedent conditions" (p. 39). This worldview seeks to explain life through contextual, emotional, and social interactions (Morgan, 2014). It is through one's paradigm, Creswell (2014) believed, that a researcher focuses on understanding the context of the problem and preparing a workable solution using whichever combination of research methods is most suitable. I personally see that mixing qualitative and quantitative methods provides an opportunity to better understand

and potentially change the integration of educational technology at the school where I work.

Contemplating this project, it was important to address my approach, role, and position within the study. According to the descriptions of positionality by Herr and Anderson (2005), I was an insider collaborating with other insiders. While I hope to gain significant knowledge about educational technology to inform my practice, my overall aim is to work within my position, and in conjunction with other educators, to better understand how educational technology may be most effectively used and potentially integrated into practice at my school. My positionality is not as robust as other instructors because I am the youngest faculty member with the least number of years of experience. It is important for me to partner with other respected faculty members in order to understand issues concerning technology integration as well as to potentially implement any proposed changes.

It was also vital for me to consider the subjectivity I bring to this study. I have had positive experiences with technology and these experiences can bias my perspective as a researcher. Because of these experiences, I could be at risk of introducing bias into aspects of my research design and implementation (Peshkin, 1988). In addition, my positionality as an insider could raise the possible accusations of bias towards faculty or hesitancy to ask questions that challenge instructor norms (Merriam et al., 2001). These potential biases needed to be acknowledged and managed when working with stakeholders to create an effective and meaningful study.

Specific strategies to avoid subjectivity included the detailed description of my role at the school to show my awareness to potential bias. To ensure that I have

accurately collected information free from conscious or subconscious inaccuracies, I used member checking, described by Mertler (2017) as the "process of asking participants who were directly involved in the study to review the accuracy of the research report" (p. 143). This helped establish the accuracy and validity of my reported findings from interviews.

In addition, I conducted peer debriefing and used an outside reviewer not connected to my study to evaluate transcripts to ensure word choice, tone, and inflection did not impose any undue influence or convey unclear messages (Buss & Zambo, 2014; Onwuegbuzie et al., 2010). In addition, to avoid experimenter effect from students or instructors having bias towards me, I maintained a non-judgmental demeanor when discussing the study, maintained a reflective journal of my interviews, and evaluated my recordings for changes in voice and tone that could imply approval or disapproval of responses (Buss & Zambo, 2014).

Definition of Terms

Theoretical Nursing Instruction

Instruction primarily concerned with presenting the student with information in a didactic classroom lecture setting. This setting differentiated from a clinical or lab setting where information learned in the classroom is put into practice through use of simulation or actual patient contact.

Educational Technology

The study and use of technological resources to advance teaching and learning. This is accomplished through the examination of the use, management, design, and evaluation of technologies applied to learning (Januszewski & Molenda, 2008).

Attitudes towards Educational Technology

Judgments, both positive or negative, which are derived from beliefs about and experiences with educational technology which affect one's intent to use educational technology (Ajzen, 2005).

Technology Enhanced Instruction

Technologically enhanced instruction is defined as instruction which incorporates learning technologies to promote interactive learning experiences such as social media experiences, gamification, online and self-directed learning videos, and the use of Student Response Systems (SRS; Chang et al., 2020; del Blanco et al., 2017; Toothaker, 2018; Wirihana et al., 2017). It is noted that technologically enhanced instruction is not something that stands by itself but is a component of a composite that includes content knowledge and instructional knowledge (Mishra & Koehler, 2006).

Traditional Lecture

Classroom instruction (as opposed to laboratory or clinical instruction) that is delivered primarily through the use of lecture, often using Microsoft PowerPoint, as an instructional outline for presenting content (Saini et al., 2015; Thomas & Schuessler, 2016). This format is teacher-centered with the student to whom the content is delivered being considered a passive receptacle of knowledge (McGowan et al., 2014)

Digital Immigrant

People who have grown up not immersed in technology as a part of life. This group of people have been exposed to technology and, to varying degrees, have incorporated it into their lives (Autry & Berge, 2011; Johnson, 2018; Prensky, 2001). It is assumed in this study that this group is represented by the faculty and administration of the small, hospital-based school in which data collection occurred.

Digital Native

People who have grown up accustomed to technology as a part of their everyday life and who interact with technology seamlessly in their business, personal, and educational lives (Autry & Berge, 2011; Johnson, 2018; Prensky, 2001). While not exclusively representative, this group is largely represented by the nursing students at the hospital-based nursing school where the data collection occurred.

CHAPTER 2: LITERATURE REVIEW

Guiding Considerations in Research

This literature review was guided by this study's research questions which focus on: (1) student expectations related to technology, (2) perceptions of educational technology use in the classroom by both students and instructors, and (3) the description of educational technology use in the nursing classroom. These topics were explored through several electronic information databases accessed through the internet and the on-line reference library resources at the University of South Carolina. These databases included *Google Scholar*, *ERIC*, *Education Source*, and *Dissertations and Theses Global* through the University of South Carolina. To capture research related to these subjects, the following keywords were used: *nursing*, *educational technology*, *integration*, *attitude*, *perception,* and *active learning*. Though focused on the perceptions and attitudes of instructors and students towards educational technology, the researcher further explored the perceived benefits and challenges of learning with technology as these affect the attitudes and perceptions under study.

This literature review examines several factors: (a) the evolving perception and use of educational technology and its continued growth and integration into pedagogy, (b) educators' reluctance to incorporate technology into their teaching, (c) the perceived causes of this reluctance, (d) the potential benefits and challenges that technology integration poses to educators, (e) the relatively historic perspectives at the turn of this

century regarding the different learning experiences of instructors and students, and (f) the benefits and challenges of integrating technology into nursing education. The literature review, initially looking at historical perspectives, was not limited to a year range. Further research on the attitudes and perceptions towards work and study were limited to five to seven years to garner the most current resources. Literature searches were limited to peer-reviewed articles and a limited number of dissertations.

A list of key terms used for searching the literature are presented in Table 2.1, which captures information related to concepts of perception and value of educational technology. Educational technology is seen as a tool for supporting active, student-centered approaches to engage the learner which is an important part of developing critical thinking (Benner et al., 2010). Table 2.1 is organized as concepts of general terms, terms related to learning, typical educational technology tools, and the differing theories supporting the use of active, student-centered learning.

Table 2.1. *Search Terms Used Within the Literature Search*

General terms	Learning Approaches	Tools	Theories	Factors Affecting Implementation
Educational Technology	Learning	Educational Tools	Theory of Planned Behavior	Value
Educational Technology	Active-Learning	Gamification	Adult Education	Interest
Perception	Teacher-Centered	Games(s)	Andragogy	Barriers
Value	Student-Centered	Video	TPACK	
Teacher	Barriers	Podcasting	Experiential learning	
Faculty	Interest	Audience Response System		
Instructor	Blended-learning	Polling systems		
Nursing		Kahoot!		
Nursing School				

Note. The searches conducted in the databases at the University of South Carolina Library System used multiple combinations of these keywords.

To ensure the search was of sufficient scope and well-aligned with the purposes of this study, the library staff at the University of South Carolina were consulted for keywords and search strategies. With their assistance using partial matches and the additional methods of using qualifiers to widen and narrow keyword searchers, more comprehensive searches were able to be performed. In addition to reading the articles and dissertations obtained through this search, references contained within each were examined to discover additional sources of literature. Likewise, the reference database *Scopus* was used for reverse reference mining which tracks if the current article was referenced in a subsequent publication. Any additional articles identified were obtained through the University of South Carolina's online reference databases and through Google Scholar.

Based upon these searches, this literature review will first explore the definition of educational technology and its use in nursing education. It will explore potential benefits of educational technology in nursing education. Next, it will review challenges of educational technologies. Following this, it will consider factors that influence instructor attitudes towards educational technologies such as self-perception of technology's uses, self-efficacy, their own perception of digital literacy, and their emotional response to technology in the classroom. In addition, the review will explore the terms *digital native* and *digital immigrant* and how they relate to instructors and students and their use and adoption of educational technology. This review will consider the literature concerning the expectations of these two groups as well as the validity of these terms. Next, it will discuss the research found regarding the perceptions of the use of educational technology in the classroom – how technology used for education is

viewed and valued by both students and instructors. More specifically, this review will examine the research concerning the descriptions of educational technology used in nursing classrooms. Finally, it will examine the theoretical underpinnings of educational technology's use in nursing education through the lens of the theory of planned behavior.

Integrating Educational Technology into Nursing Education

In this section we will define educational technology, discuss its origins, examine the call for its use in nursing education, and consider how it has and can be incorporated into nursing education. We will further review the potential benefits as well as consider the possible challenges educational technology may pose to instructors and students.

Defining Educational Technology

Educational technology, as a field, has been evolving in its definition and scope since its origins in the pre-World War II era when emphasis was placed on audio-visual methods used as an adjunct to lecture instruction (Ely, 1983). Over time, as media has evolved, this definition has expanded to include the use of digital technologies. It has evolved to the current interpretation of the field as described by Januszewski and Molenda (2008) as being "the study and use of technological resources to advance learning and understanding. This is accomplished through the examination of the use, management, design, and evaluation of technologies applied to learning" (p. 16). For this literature review, the term educational technology will include digital tools – both hardware and software – used for learning in the nursing classroom, as opposed to those tools used during nursing clinical or laboratory practice.

Considering this definition of educational technology and its use in the classroom, its function can be further broken down into three primary roles – tutor, teaching aid, and learning tool – as defined by Ross et al. (2010). In the category of *technology as tutor*,

technology's role is an essential tool providing the student with helpful tutorial lessons that reinforce learning in class and offer drilling exercises to practice the application of concepts. As a *teaching aid*, technology is viewed as a tool that allows instructors to present information in more appealing and engaging ways while providing immediate feedback to the learner. As a *learning tool*, educational technology is seen not only as a vehicle through which students can learn more about the topic of study but as a tool that students can interact with to advance their knowledge of both the subject matter and the technology. In these different roles, educational technology helps facilitate learning by creating an engaging environment for nursing students.

Barriers to Integrating Technology in Education

While it has been shown that an increasing number of students have a high level of exposure to technology which allows them to embrace the student-centered learning afforded by technology (Grey et al., 2010), teachers have lagged in adopting technological advances for teaching (Ertmer et al., 2012). In their work on examining barriers towards integration of technology in the classroom, Ertmer (1999) and Ertmer et al. (2012) examined two salient categories called first- and second-order barriers that are believed to impede the integration of technology in the classroom. First-order barriers are those that are external to a teacher's practice, related to administrative and financial barriers such as providing technology and training to integrate technology. Second-order barriers refer to those thought to be internalized by the teacher such as attitudes towards educational technology and their beliefs in their own ability to successfully use and incorporate technology into their pedagogy. A more detailed discussion of these barriers follows.

First-Order Barriers

First-order barriers relate to external barriers, actual or perceived, to be barriers to their integration of technology in the classroom (Ertmer, 1999). First-order barriers are commonly related to financial limitations of acquiring, upgrading, and/or maintaining hardware and software and/or providing the training and support needed to implement teaching with technology (Ertmer, 1999). It is commonly assumed that once these resources are provided, the barriers will be removed, and integration of technology will proceed. However, it is recognized that satisfying first-order barriers does not guarantee meaningful technology integration in teaching (Ertmer & Ottenbreit-Leftwich, 2013).

In their study about perceived barriers to incorporating technology into a teacher's practice, Vongskulluksn et al. (2018) examined how a teacher's value beliefs affected their perceptions of first-order barriers to integration. Examining the beliefs of 624 K-12 teachers, Vongskulliksn et al. (2018) found that teacher value of educational technology affected their perception of barriers to implementation. Teachers who were supportive of integrating technology in the classroom would perceive first-order barriers to be surmountable. Conversely, those teachers who held technology in low regard and questioned its usefulness perceived first-order barriers to be much more difficult to overcome. These findings supported those of Ottenbreit-Leftwich et al.(2010), who found that teachers' beliefs and attitudes played an important role in determining how, if at all, teachers integrated technology into their classroom.

Second-order Barriers

Second-order barriers are those barriers *internal* to the teacher and impact whether or not he or she integrates technology in the classroom. These barriers are

multivariable in nature and take into consideration the views of individual teachers, the school system, and other contextual characteristics (Liu, Ritzhaupt, et al., 2017). Miranda and Russell (2012), examining questionnaire responses from 1042 teachers, concluded that teachers' past experience with computers strongly correlated with their willingness to integrate technology into their classrooms. Likewise, Ritzhaupt et al. (2012) in a study of 732 K-12 teachers concluded that teachers having more experience with technology more readily integrated technology in their classroom. These findings were similar to previous work by Inan and Lowther (2010) in their study of 1,382 teachers in the Tennessee school system where they concluded that computer proficiency was the greatest factor affecting technology integration. Inan and Lowther (2010) also found that years of experience and demographics correlated with a negative view of technology integration with more experienced teachers' readiness to integrate lower than more novice teachers. They concluded that more experienced teachers, who were also older, had less computer proficiency associated with slower technology integration.

Likewise, researchers conclude that teachers' attitudes towards technology as well as their perceived self-efficacy and perceived level of support affect integration practices. These barriers include core beliefs related to teaching such as the role of the teacher; the value placed on the technology in question; the teacher's attitudes and feelings towards technology; the perceived ability to operate and manage technology; and the perceived level of support (Ertmer, 1999; Ertmer & Ottenbreit-Leftwich, 2013; Vongkulluksn et al., 2018). These barriers play a significant role in shaping teachers' intentions of integrating technology into their pedagogy because these factos speak to the values that teachers place on technology and its place in facilitating learning (Hsu, 2016).

A Call for Technology in Nursing Education

In 2010, the Institute of Medicine (IOM) issued a report titled *The Future of Nursing: Leading Change, Advancing Health*. In this document, the IOM outlined the need for radical changes to the education of nurses in order to address the increasing complexities of providing care and navigating the healthcare system. This report recommended that in addition to becoming competent in leadership, health policy, and evidence-based practice, the IOM called upon nurses "to fill expanding roles and to master technological tools and information management systems while collaborating and coordinating care across teams of health professionals" (p. 2). Responding to this call, the National League for Nurses (NLN) and other industry stakeholders called upon the nursing profession to educate students on critical thinking and prepare them to encounter a technologically rich and diverse healthcare field (National League for Nurses [NLN], 2015). This call for the development of critical thinking and technologic competence has stimulated interest in different methods of educational technology. In this section, I will briefly summarize the use of some of these tools, such as video learning, audience response systems (ARS), podcasting, and game-based learning.

Technology as Enhancement to Nursing Education

When studying the use of technology in education, it is important to consider its value in enhancing the learning process and building knowledge. Research has shown that the presence of technology does not necessarily lead to learning gains, but it should be evaluated with the context of the classroom and what is being taught. In a study of 584 undergraduate students, Dunn and Kennedy (2019) concluded that, although students valued Technology Enhanced Learning (TEL), the presence of TEL and students' use of TEL were not predictors of academic success. They determined it was students' level of

engagement with the material and their inner motivations to learn that were the greater predictors of success rather than strict use of technology. Kirkwood and Price (2014) evaluated 47 recent articles on TEL and concluded that "while technology has increasing influence throughout higher education, there is still much to be learned about its effective educational contribution" (p. 26). Moreover, they found that although they were able to determine how technology was integrated into the classroom, there was little research to show how the inclusion of technology allows students to learn.

Evaluations of technologically enhanced learning were also reviewed by Ross et al. (2010), who determined that there was much emphasis placed on the effectiveness of technology but little on how it helps students learn. The authors concluded that learning is particularly contextual in nature and is reliant not only on technology but on the skills of those instructors using it in the classroom. In a similar way, Bennett and Maton (2010) concluded that technology has brought about tremendous change but the call to radically change education due to the characteristics of a new generation of learners is *fundamentally flawed.* These authors concluded that learning is contextual in nature and that "a valuable outcome of the current research agenda is to demonstrate just how diverse learners of all ages are in their technology experiences" (Bennett & Maton, 2010, p. 325).

Potential Benefits of Educational Technologies for Nursing Education

Research has shown that educational technology has the potential to benefit students by increasing engagement, improving writing skills, promoting collaboration, and improving learning (Betihavas et al., 2016; Njie-Carr et al., 2017; Trocky & Buckley, 2016). While the literature lacks empirical studies specific to use of educational technologies in nursing education, research in other instructional contexts has

demonstrated the value of educational technology. The following subsections summarize studies which have shown the benefits of educational technology through increased engagement and knowledge acquisition. The subsections also discuss challenges brought about by educational technology in the context of nursing education.

Knowledge Acquisition

One primary reason for the use of any tool in education is the acquisition of knowledge. Knowledge acquisition is defined by Trocky and Buckley (2016) as "learning how to perform a new task, acquire a skill, or master domain-specific content within the context of a course" (p. 372). Acquiring knowledge can be measured in different ways such as using surveys to determine student perceptions of learning and engagement with material and use of tests and examination to determine and evaluate the level of performance (Trocky & Buckley, 2016).

Tests and examinations. Measuring knowledge acquisition can be accomplished through the comparison of pre- and post- intervention test scores. The efficacy of educational technologies can be evaluated by examining test scores before and after an intervention to see if the intervention assisted in building knowledge. Additionally, it can be assessed with experimental study designs that compare the performance of students exposed to different treatment groups. The literature review found a limited number of studies of nursing students improving scores related to the use of a specific technology (Shin et al., 2015). However, studies have shown evidence that flipped classroom teaching methods, which often incorporate educational technology in addition to active, group-based, and interactive learning methods, have had mixed to positive correlation

with increased testing scores and knowledge acquisition (Betihavas et al., 2016; Njie-Carr et al., 2017).

Chang et al. (2020) used a quasi-experimental study examined the use of gaming software on knowledge acquisition. In this study, the researchers implemented an interactive game that the researchers believed would help with knowledge retention and improve performance in a nursing school in Taiwan. Seventy-two nursing students analyzing Electrocardiograms (ECGs) tracings of the electrical impulses of the heart were enrolled in one of two courses. The experimental group of 36 students used the gaming software while the control group of 36 students did not. Both classes were taught by the same instructor and used the same learning materials on the principles of the heart's electrical and mechanical function during each segment of the ECG. The control group received continued classroom instruction using lecture, discussion, and review of materials. By contrast, the experimental class played the interactive game which simulated scenarios of patients in distress with corresponding ECG tracings. Following the intervention both sets of students were tested on ECG interpretation. In post intervention examinations, students in the experimental group scored higher compared to the control group. These results were determined to be statistically significant and the researchers concluded that gaming could be used to help to improve learning outcomes (Chang et al., 2020).

Another study on educational technologies was conducted by Abate (2013) who looked at the effect of using podcasts in knowledge retention and application. Looking to demonstrate increased knowledge through quiz scores for nursing students taking a pharmacology course, thirty-five students were randomly assigned to three groups: a

face-to-face lecture group (*n*=12), a group given a non-segmented podcast of the lecture (*n*=11), and a group given three shorter segmented podcasts (*n*=12). Several days following the initial face-to-face lecture and the release of podcasts, all groups returned to take a quiz consisting of the same questions on the lecture content. Findings showed that a weak but positive relationship existed between the group using the segmented podcast group and their ability to answer knowledge and application questions correctly. These findings suggested that segmented podcasts could help foster a more comprehensive understanding of the material compared to face-to-face lecture in regard to knowledge retention and application (Abate, 2013).

Student perceptions of learning. Another measure of success used for determining the efficacy of using educational technology found while performing this literature review was student perception of learning – whether the student felt an intervention led to increase in subject matter knowledge (del Blanco et al., 2017; Sheng et al., 2019). During their study on gaming and its use for increasing knowledge, not only did Chang et al. (2020) find that students using gaming performed better on testing, but students also reported that they attained deeper knowledge of the material.

Similar results emerged in a randomized controlled study with 132 nursing and medical students preparing for their first experience in an operating room (OR) (del Blanco et al., 2017). In this study, 70 students were randomized to an experimental group while 62 were in a control group. The experimental group had access to a videogame created specifically to provide information related to the clinical and social aspects of performing in an operating room. The intervention, played the day before the OR experience, simulated a student working in the area and addressed topics such as sterile

gloving and fielding, providing the correct equipment to the surgeon and OR staff, and communicating with staff, patients, and families. In addition, the game addressed topics such as the design of the operating room, the roles of the OR staff, and situations that may be encountered. At the end, the video game provided extensive feedback regarding student performance. The control group did not have access to the game and did not have any additional preparation other than classroom experience (del Blanco et al., 2017). The researchers found strong evidence that students using the videogame prior to the OR reported less fear, greater confidence in the OR setting, and had more positive attitudes towards patients and staff than those students in the control group (del Blanco et al., 2017).

In another study that measured perceptions of student understanding and knowledge, Sheng et al. (2019) conducted a descriptive study that evaluated use of a classroom response system (CRS), also known as *clickers,* in large lecture classes. This technology allows students to anonymously answer questions posed by instructors via an interactive device (DeBourge, 2008). In this study by Sheng et al. (2019), 236 nursing students in a four-year nursing program participated in using the CRS program *TopHat* over the course of 12 weeks. Student learning perceptions were measured using a validated collection tool called the Classroom Response System Perceptions (CRiSP) Questionnaire that measures usability, perceived engagement, and perceived learning using CRS. In addition, researchers collected qualitative data through open-ended survey questions. Sheng et al. (2019) found that mean scores among all subscales correlated to positive perceptions with students finding that they “agreed” or “strongly agreed” that the CRS positively impacted their learning. Likewise, students’ qualitative survey responses

largely supported CRS reinforcing learning through validated key concepts, clarified misinterpretations, improved critical thinking, initiated classroom discussion, increased participation by providing anonymity, and increased attention and confidence.

Toothaker (2018) conducted a mixed-methods investigation of a total of 99 nursing students about the efficacy of a CRS system. The study was to validate the hypothesis that millennial students expect to have student-centered, active learning environments in which knowledge is encouraged to be developed through interaction and near-immediate feedback (Toothaker, 2018). Each week, students were given a pre- and post- lecture quiz to evaluate and quantify their understanding of the material using clicker technologies. Following the 12-week intervention, students completed a post-semester course survey which included nine validated, 5-point Likert scale items and one open-ended feedback question in assessment of use of the clickers. Ninety percent of students said that clickers enhanced classroom interaction, and 94% responded that the clicker exercises enabled them to better gauge how well they understood the material being presented (Toothaker, 2018). Qualitative narrative comments were evaluated with a total of 89.6% of respondents who reported positive feedback. The author concluded that students had overall positive experiences with CRS. In addition to the student survey, the researcher also evaluated pre- and post- intervention weekly quiz performance using inferential statistics and determined that the results showed a potential positive correlation between CRS and critical thinking (Toothaker, 2018).

Student Engagement

Student engagement is another benefit derived from the use of educational technologies. Research has consistently shown that the use of active learning, of which

educational technology is used to promote, engage and stimulate students in their learning. In a study by Dehghanzadeh and Jafaraghaee (2018), the researchers incorporated recorded videos of lectures and group discussion in a flipped-classroom model using educational technology and compared it to results against a traditional instructor-centered model for an 8-week class on musculoskeletal medical-surgical nursing. The researchers randomized student participants with 43 students participating in the intervention and 42 students serving as the control group. Student responses to a 5-point Likert scale validated instrument called the *Ricketts' Critical Thinking Disposition* showed that participants in the experimental group had a significant increase in the domains of perceived engagement with course material and in critical thinking (Dehghanzadeh & Jafaraghaee, 2018).

In a pilot study looking at the usage of gaming to teach evidence-based practice (EBP), Davidson and Candy (2016) evaluated the use of a platform called 3D GameLab and its effect on student engagement and experience. The 3D GameLab program provided a series of *learning quests* to 30 undergraduate nursing students. Students engaged in the learning quests – or assignments – within timeframes allotted by the course syllabus and could choose from among different pathways to interact with information on course topics. Depending upon the time commitment involved, the level of difficulty chosen, the amount of critical thinking needed to accomplish the quest, and the demonstration of mastery of the topic, students would be awarded *experience points* which would translate into a grade at the end of the semester.

Overall, the authors reported high levels of satisfaction based upon end-of-semester evaluations. Narrative feedback reported that students were highly satisfied with

the course and that it was engaging. The authors noted another indicator of student engagement was that 86% of students continued to use the gaming program even after reaching a threshold of the grade of A in the class (Davidson & Candy, 2016).

Clifton and Mann (2011), who were early advocates for the use of the social media site YouTube for the purpose of engaging nursing students in coursework, noted that this technology enhances engagement with material because of three primary factors: 1) an introduction to a novel delivery method such as video will keep attention focused; 2) visual methods of delivery supplement information delivered through other means such as lecture and serve as reinforcement to the material keeping it *memorable*; and 3) the wide variety of material available on YouTube allows for a depth and breadth of information using humor, music, and other devices. These researchers found that this media can hold the interest and be more engaging than traditional teacher-centered education such as lecture (Clifton & Mann, 2011). While the social media video site offers a wide range of information, caution has to be used to ensure assigned videos contain quality information and that instructors fashion this engaging strategy within the context of the educational goals set for class (Clifton & Mann, 2011; May et al., 2013).

Challenges of Educational Technologies for Nursing Education

Though many of the studies presented in this review showed a positive association between educational technology, engagement and learning, challenges for its use have been cited by numerous authors. One challenge is the understanding that educational technology is not a panacea for improving student engagement. It is important that educational technology be used by instructors who understand the context of both the material being taught and the technology being used. In their study regarding the use of the CRS *TopHat*, Sheng et al. (2019) noted that students appreciated the

usability and engagement that the CRS provided. The researchers also stressed the importance that the CRS be used with effective classroom design and contain salient topics to be learned in order for it to be an effective tool in learning (Sheng et al., 2019). Likewise, Mahon et al. (2018), discussing audience response systems, noted that the success of the tool depended not on the technology itself but on how the instructor formulated the question, how they implemented their teaching style in presenting and responding to answers, and their willingness to adapt to their students' needs. In addition, Gousseau et al.(2016), in their evaluation of audience response systems and in providing tips for use in medical education, noted the importance of understanding that technology is a tool and that audience response systems (ARS) "themselves do not improve learning – they open the door to the use of pedagogical strategies that were previously not possible" (p. 648).

Other challenges and limitations to implementing educational technology can include technical difficulties involved with set up and operation, distraction, and costs. Sheng et al. (2019) noted that at times technical difficulties, difficulties with instructors not completely understanding the operation of the technology, and the inability of students to access information from gaming sessions after class led to some reports of student dissatisfaction. Gallegos et al. (2017) noted that students expressed dissatisfaction over the complexity of the gaming studied finding it difficult to navigate and prone to glitches. In addition to technological implementation issues, cost can be a factor. Sheng et al. (2019), noted that costs involved in using the technology, when passed along to students, reflected negatively on satisfaction scores.

Description and Examples of Technology in Nursing

This section examines some selected uses of technologies in nursing education to promote student-centered instruction. It will also discuss some selected uses of that technology. These will include video leaning, audience response systems, and podcasting.

Video Learning

Research on video learning utilizing such websites as YouTube has been determined to have a positive effect on student satisfaction and learning. Fleck et al.(2014), in a qualitative study involving 85 psychology students, found students responded favorably to YouTube videos on course topics. Students described their use of YouTube videos as *engaging*, *fun*, *entertaining,* and *beneficial to learning*. Follow up testing of the same students showed an increase in test scores and apparent knowledge retention. In a literature review of research regarding the use of videos to augment classroom discussion, Wirihana et al. (2017) concluded that students benefitted from the active learning processes, discussion, and demonstration shown in videos and that these provided a safe learning environment. In their review of YouTube and its potential for nursing education, Clifton and Mann (2011) reported this medium's great potential for engagement, for the development and support of critical thinking skills, and for the flexibility of fitting student schedules.

Audience Response Systems (ARS)

A common technologic tool that is being used in the classroom is the audience response system. This system allows an instructor to pose a question to the class and enables students to answer the question anonymously through a handheld device or cellphone. The device enables students to be more active participants in the resulting discussion and allows the instructor to conduct an informal formative evaluation to

determine student understanding of the material (Porter & Tousman, 2010). This technology has been met with a positive response by both instructors and students. Students surveyed reported feeling more secure asking questions without having to worry about being wrong; they appreciated near-instantaneous feedback provided by the survey; and they valued the increased interactivity that the ARS afforded the class (Encarnacion, 2014; Mahon et al., 2018; Porter & Tousman, 2010; Toothaker, 2018).

In a non-experimental, descriptive study that examined the attitudes of 28 post graduate nursing students, Mahon et at. (2018) used a 30-item survey to compare student perceptions towards the use of ARS versus traditional classroom questioning (CQ) described as an instructor calling on individual students during a lecture. Students who had been previously taught using CQ were introduced to an ARS using Kahoot! and asked to compare the perceptions of the two methods. Mahon (2018) found that students preferred ARS over CQ because they felt it helped them to learn better and made the classroom more interactive. In addition, students indicated that the anonymity helped to provide psychological safety allowing them freedom to answer questions without the embarrassment of providing an incorrect answer.

Toothaker (2018) also evaluated the perceptions of nursing students and the use of ARS. Using a convenience sample of 99 sophomore and senior level nursing students, a mixed methods design was undertaken to determine student perceptions about the use of ARS. Over the course of a semester, instructors embedded 10 ARS questions within weekly lectures in a formative method of assessing post lecture knowledge. At the end of the semester, students completed a 10-item Likert-type survey with added fields for comments. Toothaker reported that a vast majority of students had a favorable view of

ARS. Students agreed that ARS helped them have a better understanding of material presented in class over the traditional lecture. Eighty-nine percent of respondents reported that they felt ARS allowed instructors to better understand areas of material where students needed clarification. In addition, 94% responded that ARS helped them better gauge their understanding of the material being taught. Of 29 responses in a commentary section, 26 were positive and included responses about how ARS made the classroom more interactive, engaging, and more beneficial to their learning (Toothaker, 2018). While ARS is seen as a useful tool to promote understanding, some caution that it should be used as an adjunct to teaching and not its replacement (Gousseau et al., 2016; Mahon et al., 2018).

Podcasting

Another emerging technology that is being more commonly used in nursing education are podcasts (Hargett, 2018). Podcasts are described as an audio recording of either a recorded class lecture or other prepared recordings that allow students to review concepts taught or to supplement the information to be learned (Stiffler et al., 2011). In an early pilot study of 35 students, Abate (2013) found that the students thought podcasts helped them to remember and apply the concepts they learned in a nursing classroom lecture. In addition, Abate noted that some students demonstrated higher scores on multiple-choice exams and scored better on case-study questions completed several days following an initial classroom lecture.

In a similar way, Hargett (2018) and Mostyn et al. (2013) conducted surveys of students who used podcasts and found that students had positive interactions with this technology. Hargett (2018) conducted a pilot study of nine first-year nursing students

regarding the use and benefits of commercially prepared podcasts for nursing instruction. Students were assigned to listen to a pre-selected, commercially prepared podcast on ethical issues in nursing. Following the podcast, students were asked to summarize the podcast and complete questions related to the topics presented. Students were then asked to complete a survey and free-text response about their perceptions of the assignment. Students reported that the podcasts piqued their interest and promoted learning and critical thinking. The author concluded that her findings "help affirm that utilizing commercially prepared podcasts in nursing education is a viable new tool with the potential to generate learning in a way that is engaging" (Hargett, 2018, p. 56).

In a study of first-year nursing students, Mostyn et al. (2013) provided nine podcasts on a variety of topics related to human biology over the course of a semester to 189 students. At the conclusion of the semester, 153 students participated in a survey and six participated in a focus group regarding the usefulness of podcasts. Overall, students found the podcasts useful in their learning and in correcting misconceptions, and it was helpful in advancing their understanding of the material (Mostyn et al., 2013).

Another study, conducted by Vogt et al.(2010), sought to determine if podcasts helped advance student knowledge and increase satisfaction. Nursing students from two cohorts over two consecutive years were evaluated for changes in demonstrated learning on exams. The first student cohort (n = 63) served as the control and received face-to-face classroom lecture only. The experimental group (n = 57) consisted of the subsequent cohort and received instructor-created podcasts and voice-over PowerPoint presentations with students using classroom time for questions and case studies regarding material covered in the podcasts and PowerPoints. In the subsequent survey, 47 students from the

experimental group completed a survey and reported being satisfied by the portability and flexibility that the podcasts provide. However, in review of examination results of the two cohorts, students did not yield any statistically significant difference in grades compared to those who did not use podcasts (Vogt et al., 2010). The authors noted that this difference could have been due to the treatment group receiving instruction solely by podcast without lecture.

Attitudes Towards Technology Integration

The traits of students, what they prefer, and expect from learning impact how they interact with their environment (Jukes et al., 2010). This next section reviews research on the attitudes of instructors and students concerning technology integration in the classroom. It is important to consider these expectations to gain an understanding of why and how, and to what extent, instructors are willing to use educational technology.

Factors Influencing Instructor Attitudes Towards Educational Technologies

Instructor Perceptions

Perceptions of instructors towards the use of educational technology in the classroom have been shown to be met with a mixture of optimism and apprehension. Many instructors perceive educational technology to be beneficial to their student's learning (Fiedler et al., 2014) and instructors who value technology and believe it to be an effective tool to facilitate learning would readily use it in their classrooms (Vongkulluksn et al., 2018).

While there appears to be support for the use of educational technology in the classroom, some instructors have expressed concerns regarding the integration of educational technology. Concern for using technology in the classroom can be seen as being sourced from internal and external factors having to do with internal beliefs of

themselves and their practice and external factors related to administrative support (Roney et al., 2017). Factors leading to instructor's concerns towards technology integration are examined in the following subsections.

Perceived Self-Efficacy

Self-efficacy is a concept originally described by Bandura (1977) and is a central part of his theory of self-efficacy. Bandura describes perceived self-efficacy as a person's reaction to a situation in which they feel is within their ability to influence. Bandura (1977) highlighted this notion by stating: "People fear and tend to avoid threatening situations they believe exceed their coping skills, whereas they get involved in activities and behave assuredly when they judge themselves capable of handling situations that would otherwise be intimidating" (p. 194). Adapting this definition to technology, McDonald and Siegel (1992) defined technologic self-efficacy as "the belief in one's ability to successfully perform a technologically significant new task" (p.467). Lilly et al.(2015) acknowledged that as technology plays a greater role in educating nursing professionals, it is important to study the beliefs, understanding, and experiences of instructors related to technology integration.

Indeed, self-efficacy has been cited in a number of studies by those looking to determine factors related to the willingness of educators to incorporate educational technology into their classrooms and curricula (Buchanan et al., 2013; Celik & Yesilyurt, 2013; Gonen & Lev-Ari, 2016; Roney et al., 2017). In their study involving a large university in the United Kingdom, Buchanan et al. (2013) sought to understand factors that affected faculty adoption of learning technologies. These researchers collected online surveys from 114 faculty members who answered survey questions about their comfort at using the internet, factors related to their use of educational technology, and the

perceived usefulness of technology in the classroom. In addition to perceived usefulness affecting use, they noted that self-efficacy was positively associated with level of usage of learning technologies.

Celik and Yesilyurt (2013) studied 471 pre-service teachers enrolled at three Turkish universities to determine their attitudes and perceptions towards technology, their perceived self-efficacy and computer anxiety, and their relation to each other and their anticipated use of computer supported educational technologies. Through their analysis of several previously validated surveys, they determined that positive correlations existed between computer anxiety, self-efficacy, attitudes, and perceptions towards educational technology. They determined that these factors affected the intent to use these technologies in their future classrooms (Celik & Yesilyurt, 2013).

In their quantitative study of 109 nursing instructors in ten nursing schools in Israel, Gonen and Lev-Ari (2016) studied the effects of work climate on instructors' use of educational technology. They used a survey consisting of several subscales that measured perceptions of work climate, instructor sense of self-efficacy, innovativeness, attitudes towards use of educational technology, and actual technology use. Following analysis, these researchers concluded that a supportive work climate had a positive relationship with instructor feelings of self-efficacy and attitudes towards the use of educational technology (Gonen & Lev-Ari, 2016).

In a similar way, Roney et al. (2017) examined technology use and technologic self-efficacy among faculty in accredited baccalaureate nursing programs. Using a survey consisting of several validated subscales, these researchers evaluated sociodemographic factors, current technology use, and feelings of self-efficacy. These researchers found that

their respondents reported a high degree of self-efficacy, but they were unable to correlate this with specific factors. They did note, however, a positive relationship between age and reported feelings of self-efficacy in using technology.

Perception of Digital Literacy

Another important factor in the integration of technology in the classroom is the instructor's perceived digital literacy. The term digital literacy was originally coined by Gilster (1997) who initially defined it in terms of the impact the internet was having on education with the digitally literate student having the ability to use skills of searching and evaluating to enable them to access a nearly limitless amount of information. This perception of digital literacy is related to an instructor's perception of self-efficacy and their perceived ability to accomplish technology integration (McDonald & Siegall, 1992). Indeed, instructors' perceived digital literacy and comfort level with technology have influences on their willingness to integrate technology within their classroom have been reported in the literature (Harrell & Bynum, 2018; Kumar et al., 2008; MacCallum et al., 2014).

In their study of 175 college instructors regarding their perceptions of the use of mobile learning and Information Communication Technology (ICT), MacCallum et al. (2014) administered surveys to examine determinants affecting instructor intention to use mobile learning and ICT in their instruction. In their analysis, they determined that ICT literacy was an important factor in instructors' choice to adopt mobile learning in their instruction. They found that higher literacy affected instructor perception regarding the technology's ease of use as well as its perceived usefulness – defined as the idea that it can provide significant advantage to student learning or assist their own teaching. The

authors also found that higher levels of literacy corresponded with future intentions to adopt mobile technologies in their educational practice (MacCallum et al., 2014).

In their study of secondary teachers and their computer use in the classroom, Kumar et al. (2008) found digital literacy to be an important factor the use of technology in the classroom. In their study, they used the term *computer compatibility* for digital literacy and defined it as having "the depth of knowledge and understanding of computer hardware and software, how they function, and their advantages and disadvantages" (Kumar et al., 2008, p. 610). The authors used previously validated surveys to examine the perceptions of 318 secondary education instructors in areas such as perceived usefulness, attitude, ease of use, relevance to teaching, self-efficacy, and computer compatibility. These authors concluded that computer compatibility had a positive relationship with the use of computers in the classroom played an important role in instructors' decisions to use computers in their classrooms (Kumar et al., 2008). Likewise, Harrell and Bynum (2018), in their paper regarding factors affecting instructor adoption of technology in the classroom, citied teacher perceptions of their digital literacy as one of the factors influencing adoption of technology in their practice.

With the growth of information technology, the expansion of the internet, and the emergence of Web 2.0, the definition of digital literacy had to evolve as well. Martin and Grudziecki (2006) and their organization *DigEuLit* were tasked by the European Community to revise the definition of digital literacy and define it as:

> The awareness, attitude, and ability of individuals to appropriately use digital tools and facilities to identify, access, manage, integrate, evaluate, analyze, and synthesize digital resources, construct new knowledge, create media expressions,

and communicate with others, in the context of specific life situations, in order to enable constructive social action; and to reflect upon this process (p. 255).

Reflecting on this definition, this researcher recognizes the importance of understanding the definition of digital literacy as well as recognizing the need to accommodate for the expanding role technology is taking in the lives and education of future nurses.

Perceived Support to Integrate and Sustain Technology

Another influence on instructor perceptions of the use of educational technology is the perceived support and commitment to these media in the classroom (Johnson, 2013). Johnson (2013) found that administrators had a great amount of influence on the integration of technology due to their infrastructural decisions on hardware and software. However, several studies cited instructor reluctance to integrate educational technology due to concerns over the perceived lack of sustained support from administration to commit to and sustain technology integration (Buchanan et al., 2013; Fiedler et al., 2014; Gonen & Lev-Ari, 2016; Roney et al., 2017; Wetzel et al., 2014).

While it has been shown that administration support is an important factor in influencing instructor decisions to use technology, it should also be noted that this support could be fleeting or misplaced. Administration support may also have less to do with the learning needs of students and more with the perception of the school having modern pedagogy with state-of-the-art technology to impress potential students (Johnson, 2013). Johnson (2013) makes a note of this priority through the comments of one of the instructors he interviewed where little input was solicited from professors about educational technology: "nobody from the university has ever come to the department to

talk about [instructional technologies]. Things just appear in the classroom, and I don't recall us discussing it as a department" (p.139). Schools who rush into incorporating technology may find their good intentions to "modernize" met with instructor resistance because of poor planning, unreasonable expectations, and lack of contextual consideration of subject matter (Shelton, 2014).

Perceived Support for Professional Training and Development

Closely related to administrative support in acquiring and maintaining educational technology are concerns over continued administration support for professional training and development. Professional development is seen as key to maintaining instructor interest and sustainability in using and integrating technology into their classrooms (Tondeur et al., 2017; Wilkerson et al., 2016). In a study of pre-service instructors, Wetzel et al. (2014) recommended offering continued professional development that supported the integration of technology into the classroom. They even suggested that professional development for such integration be mandated. Fiedler et al. (2014) reported on the qualitative portion of a mixed methods study involving 27 instructors across 14 nursing programs where participants used a digital simulation program called *The Neighborhood*. The study examined their perceptions regarding its value to their pedagogy through focus group interviews. The researchers found that the simulation program was positively received by the instructors who believed it helped to enhance their teaching by providing situational context of a patient care situation as well as an interactive format.

Instructors believed administrative support by means of training and continued faculty development were vital for adoption and continued use of this type of educational

technology. In a meta-analysis of the effectiveness and integration of educational technology in the classroom, Archer et al. (2014) examined 38 studies that measured success at implementing information communication technology (ICT) in the classroom. These researchers found positive relationships between instructors who received training and continued support and their perceived success in implementing ICT in the classroom. Likewise, Harrell and Bynum (2018) cited the importance of having professional development in order to maintain and increase technology integration into instruction. This sentiment is echoed by Johnson et al. (2016) in their review of challenges to implementing technology in the classroom.

Past Experience Learning with Technology

It has been a consensus in the teacher education literature that instructors teach the way they were taught (Billings & Halstead, 2012). Considering that many of today's nurse educators grew up in a time when computer technology was still in its infancy, it is important to examine how these past experiences have shaped their teaching practices (Oleson & Hora, 2014). People having grown up and experienced life and education before or just as technology was becoming popular, have been termed digital immigrants, while those that have been exposed to education seamlessly from an early age are termed digital natives (Prensky, 2001). The terms digital immigrant and digital native were first popularized by Prensky (2001). The digital immigrant was a person who grew up and experienced life and education before or just as technology was becoming accessible in the mass market. These experiences could have implications to their perceived value and willingness to incorporate. Conversely, educators growing up with technology more

ubiquitous to their experience might integrate these technologies more readily into their pedagogy (Inan & Lowther, 2010; Christensen & Knezek, 2017).

In a study of 1,430 instructors involved in K-12 education, Christensen and Knezek (2017) used surveys to determine instructor comfort and use of mobile technology in their classrooms and their perceived intention to use those technologies. The researchers determined that teachers who had been teaching the longest and had no experience in technology integration reported they would have the most difficulty integrating mobile technologies into their teaching. Conversely, teachers who more readily integrated technology into their classroom tended to have previous positive experiences with technology as well as a positive view of the benefits of mobile technology. These teachers also had the fewest number of years experience in teaching (Christensen & Knezek, 2017).

Factors Influencing Student Perceptions towards the Use of Educational Technology

Perceived Use and Benefit of Technology

Before the emergence of technology, traditional pedagogy focused on the passive transfer of knowledge from instructor to student in a teacher-centered classroom model (Darcy, 2019; Janzen et al., 2012). In this model of instruction, students were perceived as vessels to be filled with information and expected to acquire knowledge each in a similar way with similar learning outcomes (Freire, 2019; Janzen et al., 2012). With the advent of digital media and the ubiquitous exposure to technology, students began to experience technology through all aspects of their lives and became engaged with this media for both social and educational purposes.

Looking at how students incorporate technology into the different aspects of their lives, we must consider their preferences and expectations of how they and their instructors can use technology for learning (Jukes et al., 2010). As previously mentioned, students born between 1982 and 2003 and growing up where digital technology was ubiquitous, have been termed digital natives (Prensky, 2001). These students, it has been theorized, have been profoundly influenced by technology which has affected the way they learn and process information (Oblinger & Oblinger, 2005; Prensky, 2001).

Students growing up with technology are seen as multitaskers who are technologically literate, near connected continuously to the internet, tend to favor learning through visual media, and are used to having almost instantaneous access to information and answers to their questions (Autry & Berge, 2011; Oblinger & Oblinger, 2005; Prensky, 2001). This group tends to look positively on blended technology-mediated learning which combines aspects of both traditional lecture and active learning with educational technology which allows them to actively participate in their learning (Darcy, 2019; Mata et al., 2016; Patrick et al., 2016; Swart, 2017). In a survey of 1446 nursing students across multiple sites in France, Serbi et al. (2016) found that students routinely use cell phones for texting and entertainment, and many use laptops for note taking and looking up information related to class lectures.

Some have claimed the introduction of technology as the most significant factor impacting learning for these students and that technology has caused a paradigm shift in pedagogy and an expectation to incorporate many more digital tools in educating these students (Jukes et al., 2010; Levine & Dean, 2013; Min et al., 2014; Prensky, 2001). These studies found that in order to meet the educational needs of digital natives,

instructors' teaching strategies need to evolve in ways that incorporate technology with student-centered, active learning approaches to engage the 21st century student.

Research regularly finds the importance of keeping digital native students engaged with the materials and course content (Darcy, 2019; Montenerny et al., 2013; Rodrigue et al., 2016). In her survey of 21 students studying a variety of subjects at university in South Africa, Maürtin-Cairncross (2014) examined attitudes towards the use of educational technology. The researcher found that students believed teaching styles should adjust and adapt to the learning needs of this "new" type of student. Maürtin-Cairncross (2014) further found that students preferred a digital classroom environment that provided visual stimulation of color, photos, and animations to pique student interest.

Likewise, Toothaker and Taliaferro (2017), in a qualitative study that surveyed millennial students about their experiences in traditional lecture-based nursing school, found that these students craved engagement with the material being taught. The researchers made recommendations that instructors incorporate active, blended learning strategies in the classroom which included integrating technology with lecture. In addition, a mixed-methods study conducted by Peart et al. (2017) of 95 undergraduate students in a first-year science course described the use of educational technology as helpful in engaging students and reinforcing concepts. Students surveyed found that using technologies such as animated mini-review of course material (ShowMe) and multiple-choice quizzes made the content more easily understandable and allowed them feedback through formative assessments.

In another qualitative study, nursing students were asked about their attitudes concerning educational technology in the classroom (Montenery et al., 2013). Those

surveyed (n = 108) had exposure to ARS, computerized simulations of patient care exercises, virtual case scenarios, and the use of topical podcasts. Study participants reported that they had positive attitudes towards these technologies believing they helped to increase attention and participation in class which supported the creation of knowledge and critical thinking (Montenery et al., 2013).

Theoretical Background

This section examines the importance of understanding the motivations behind incorporating or not incorporating technology into nursing education using the theory of planned behavior as a theoretical lens. Proposed by Icek Ajzen in 1985, this theory was used to frame instructors' motivation and influences for incorporating educational technology into their pedagogy by considering the three primary constructs of the theory: 1) attitude towards the act or behavioral intention, 2) the presence of favorable social norms, and 3) the level of perceived behavioral control, or the ability to use educational technologies.

In Ajzen's theory the concepts of behavioral, normative, and control beliefs are interrelated and affect each other. Behavioral beliefs, or those beliefs about the benefits or consequences of an action affect a person's attitude towards the intention to perform that action. Normative beliefs consider others' perceptions and beliefs regarding the action in question. Both concepts affect intention to perform an action. Ajzen's concept of control belief considers a person's belief in their ability to perform the action, or self-efficacy. These concepts are outlined in figure 1.1 with arrows corresponding to how each concept affects and is related to each other (Ajzen, 2019).

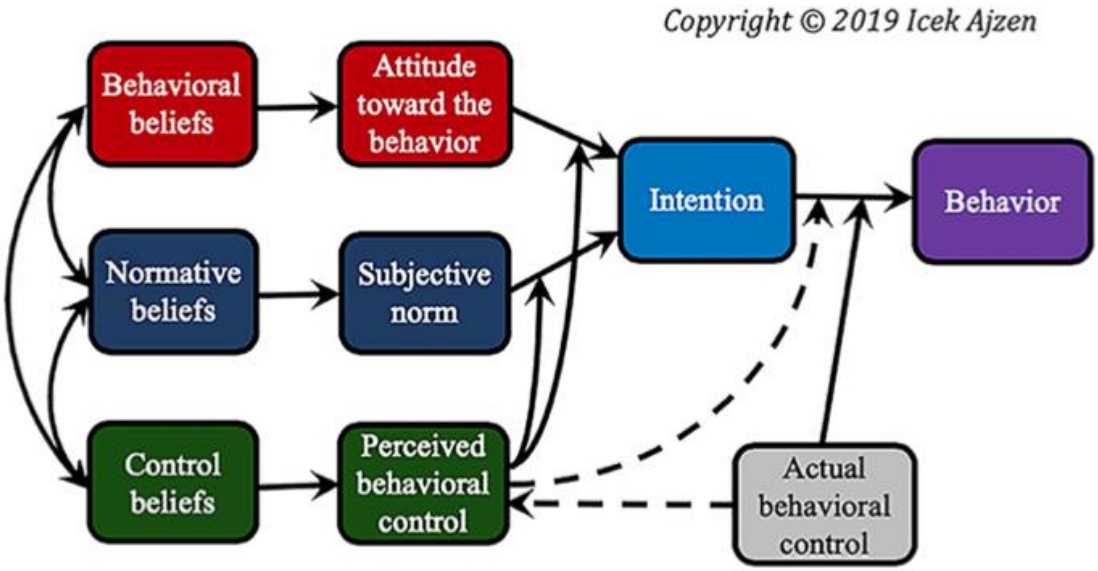

Figure 2.1. Ajzen's theory of planned behavior (Ajzen, 2019). *Note*. Used with written permission of author.

Behavioral Intention

Intention can be defined as how a person plans to act in a given situation. As stated by Ajzen (1991), "intentions are assumed to capture the motivational factors that influence a behavior; they are indications of how hard people are willing to try, of how much of an effort they are planning to exert, in order to perform the behavior" (p. 181). Intentions are only valid when the person has voluntary control over a situation. Ajzen further theorizes that a person's behavior is affected by their experiences and their beliefs about the consequences of performing that particular behavior which he terms *behavioral beliefs* (Ajzen, 2019). Therefore, when an instructor has control of their own practice, intention is assumed to precede their conduct (Ajzen, 1991). For this study, behavioral intention reflects the factors that affect instructor's intentions to use educational technology in their classrooms. Ajzen (1991) believes that behavioral intention is the primary factor for someone to be motivated to act. Because there can be many reasons for

instructors to intend to incorporate technology into their pedagogy, studies have explored variables such as attitudes, perceived usefulness, benefits to student learning, peer influence, and self-efficacy (Ottenbreit-Leftwich et al., 2010; Sadaf & Gezer, 2020; Teo et al., 2018). The constructs of attitude, subjective norms, and perceived behavioral control are the basis of the theory of planned behavior and therefore the center of instructors' behavior intentions. These constructs are reviewed in greater detail below.

Attitude

According to Ajzen (1991), attitude refers to a person's beliefs about performing an action or acting in a certain way. A person with a positive attitude will have an affirming mindset about performing an action while someone with a negative attitude will be pessimistic that an action can be accomplished. For the purposes of this research, attitudes of instructors towards the use of educational technology were considered in predicting whether or not there will be a favorable outcome in integrating these technologies. This is not a new concept and has been studied by numerous researchers. Sadaf et al. (2016) in a study of 14 preservice teachers' attitudes, beliefs, and intentions found that attitude towards Web 2.0 educational tools was the strongest basis of desire to use those tools. In their survey of 1,484 Dutch teachers regarding the causes of technology acceptance or rejection in the classroom, Kreijns et al. (2013) found that intention to use technology was also most strongly influenced by attitude. A strong correlation was seen between positive attitudes towards technology and instructor intent towards its use. Likewise, these same researchers found that instructors with negative attitudes towards technology corresponded with little intention towards use (Kreijns et al., 2013).

In a study examining the attitudes and perceptions of 72 full-time instructors at five regional public colleges, Marzilli et al. (2014) found a strong association between participant attitudes and technology usage. Instructors who expressed positive attitudes towards educational technology reported a higher level of ease of use as well as integration of technology in their classroom. Kim et al. (2017) examined how training affected nursing instructor attitudes towards and intent to use technology. Their study of 52 nursing instructors at a large midwestern nursing school found that positive attitudes of instructors correlated with their intention to use simulation technology. In the same study, following training on simulations, 27 instructors completed subsequent questionnaires which showed that these instructors had even more positive attitudes and greater intent to implement simulation in their courses than the ones who did not complete the training (Kim et al., 2017).

Subjective Norms

Subjective norms refer to perceptions of others towards a planned behavior. Azjen (1991) describes this as "the perceived social pressure to perform or not perform the behavior" (p. 188). For the purposes of this study, it considered social pressures towards the acceptance of educational technology that can stem from the opinions and beliefs of colleagues, administrators, staff, and students. If school administrators consider educational technology an important factor in the education of nurses and incorporate this in an educational plan through funding, training, and support, this could have a positive impact on its adoption. However, ambivalence and little support for new technologies could produce the opposite effect. Likewise, instructor interest, support, encouragement, and own use of educational technology can help raise fellow faculty interest and use of

these technologies. In a similar way, student interest in technology, its value in study, and its ability to raise involvement in class could raise student expectations for its use in the classroom. This could have the effect of raising instructor intentions towards its use as well.

Subjective norms have been considered in the literature as an influence on the use of educational technology in the classroom. Liu et al. (2017) found that subjective norms were a significant factor in the use of technology in teaching Chinese in American classrooms. In their study of 47 Chinese language instructors in the Midwestern United States, they found that internal factors such as subjective norms and perceived usefulness were primary factors that could predict intended use of technology in the classroom. Though these were considered internal influences, Liu et al. (2017) also found that external factors such as access to technical support, adequate resources, and faculty development influenced the internal factors as reported by the subjects.

Subjective norms were considered an influence in encouraging the use of information technology in nursing schools in Israel. Surveying 109 academic nurse educators, Gonen and Lev-Ari (2016) found that work climate is considered an important factor in encouraging the use of information technology. Work climate included such characteristics as positive feedback, support, warmth, friendliness, and sense of belonging. Their study found positive correlations between work climate, attitude, and the intention to use information technology. These researchers concluded that a positive, supportive work environment should be considered an important element in encouraging Information Technology (IT) usage in pedagogy (Gonen & Lev-Ari, 2016).

In addition to the incorporation of informational technology in the classroom, subjective norms have been seen as influencing the adoption of simulation in nursing programs. During a conference providing faculty development on simulation technology, Roh et al. (2016) surveyed nurse educators regarding factors influencing their use of simulation technology. Of the 13 educators who completed both pre- and post-conference surveys, it was found that significant increases took place in scores regarding attitude, subjective norm, and perceived behavioral control towards the intention to use simulation technology in the educators' practice.

In another study of nursing educators' intention to adopt simulation, Kim et al. (2017) evaluated the beliefs and opinions of nurse educators taking a webinar regarding the use of simulations. Fifty-two educators participated in a survey prior to taking the webinar and 27 of the same educators participated in a survey following completion of the training. One premise of the study was that faculty norms (subjective norms) such as the perception that simulation is supported by peers and administration could influence the intention to adopt simulation. The researchers found that attitudes, subjective norms, and perceived behavioral controls significantly influenced educators' intent to adopt simulation technology. While the researchers found that the use of a webinar did not increase subjective norms – their measure remained consistent and favorable before and after the training – they did find that the webinar improved the attitude of participants towards simulation (Kim et al., 2017).

Perceived Behavioral Control

Perceived behavioral control refers to the extent to which a person believes they are capable of and have the confidence in their ability to carry out a behavior (Azjen,

1991). In this construct, the person either has or lacks the perception that they could accomplish a specific task or goal and, having this perception, would be more likely to implement an action. While this construct is internal, in that it originates within the person, it is influenced by outside forces such as access to technology, access to training, and administration support (Gonen & Lev-Ari, 2016; Liu et al., 2017). This construct is also closely related to Bandura's (1997) concept of self-efficacy in his social learning theory where it is believed a person's belief in their ability to perform a task is closely related to their desire to complete the task.

Researchers have found a relationship between perceived behavioral control in using technology and their intent to use technology in the classroom. In their study, Sadaf and Gezer (2020) examined factors influencing teachers to integrate technology into a digital literacy class. They administered an online survey to 144 instructors to evaluate what factors most influence use of technology in a class on digital literacy. Their analysis determined three factors: availability of resources, availability of training, and instructor self-efficacy as being most predictive of intention, with instructors' self-efficacy determined to be the most significant factor in intention (Sadaf & Gezer, 2020).

Considering nursing education, there have been some studies that have linked perceived behavioral control and self-efficacy with intent to use technology. In a study to determine instructor and student use and intent to use mobile technology in learning, Kenny et al. (2012) surveyed 104 students and 17 instructors from two nursing programs in Canada to examine their mobile technology use and their likelihood to use this technology in their learning. Their research found that both students and instructors reported confidence in their ability to use mobile technology. They concluded that this

high self-efficacy would correlate with intent to use mobile devices for learning. Likewise, Gonen and Lev-Ari (2016) found a positive relationship between a nurse educators' work climate, their self-efficacy, and the intent to use educational technology. In their research carried out with 109 nurse educators, they determined that an educator's belief that they could navigate and use educational technology would strongly affect their intention and desire to use this technology.

Conclusion

Students entering college today are viewed differently from the past by the ways they access, use, and learn information. Administrators and instructors have seen them – sometimes as homogenized, sometimes not – as a group that learns in different ways, through digital media, and questions how to respond in what seems like a change in the teaching paradigm. This literature review examined the ways that instructors perceive educational technology and the potential barriers they may encounter when trying to implement such tools in the classroom. Also reviewed was the concept view of the digital native student and how they learn in today's digital immersive environment.

Through this review the researcher has worked to establish the background for what he has examined in the problem of practice, namely how students and instructors based at the small hospital-based nursing school perceive the use and value of educational technology in the classroom. The belief factors influencing instructors' use of educational technology coupled with the views of the digitally native student are transforming the landscape of education have been demonstrated in the numerous studies cited in this literature review. There is also concern that this simplified paradigm of looking at students as just consumers of technology is simplistic and misleading. A truer, balanced view of technology and its impact on education may be seen in its contextual

nature and how it is viewed by students and instructors, alike, in their unique environment of learning.

This study examined whether digital media are as valued by the student population as some researchers would suggest. The study also explored instructors' perceptions about educational technology and the role it plays in their classroom. Is educational technology something that is readily embraced? Is it something that is feared? Given that there does not seem to be a universal conclusion that educational technology is the standard of practice for nursing schools, this research examined and provided valuable insights in determining its perceptions of value and efficacy by both students and instructors in a hospital-based nursing program.

CHAPTER 3: METHOD

The purpose of this study was to investigate (1) the factors that affect instructors' use of educational technologies and (2) how instructors use educational technologies in the classroom at a small hospital-based associate degree nursing school in lower New York State. In addition, this study explored (3) students' perceptions about using educational technologies to learn theoretical nursing and (4) students' perceptions about instructors' use of educational technologies in theoretical nursing instruction. The following research questions guided the study:

1) What factors influence instructor use of educational technology for teaching theoretical knowledge of nursing?

2) How do instructors use of educational technology in teaching theoretical knowledge of nursing?

3) What are student perceptions about using educational technologies to learn theoretical knowledge of nursing?

4) What are student perceptions of how educational technologies are used in teaching theoretical knowledge of nursing?

Research Design

Action Research

This study examined the factors influencing attitudes and perceptions of instructors and students towards the use of educational technology in the researcher's work setting. Therefore, the most appropriate method for this inquiry was action research.

Action research, as described by Mertler (2017), entails practitioners evaluating their practice setting to determine how they could improve their teaching and the learning experiences for their students. Action research differs from scientific theoretical research in that the researcher is actively involved in the environment that he or she seeks to understand (McNiff et al., 1996). Schmuck (1997) distinguishes action research from more traditional theoretical scientific research by describing traditional research as something that can inform and provide ideas but is more concerned with the research community. Action research, therefore, is highly contextual and intimately involves the researcher as they seek to best understand factors impacting their practice and their students (Bassey, 1995; McNiff et al., 1996; Mertler, 2017; Schmuck, 1997).

In action research, the educator – as researcher and practitioner – is not a passive subject, but has direct ownership of effecting change (Bassey, 1998). It is the educator who is taking *action* in their commitment to making change in their practice and environment. According to Mills (2018), it is the educator who is committed to effecting change by studying a problem of practice, reflecting upon its specific meaning, gaining an understanding of the factors involved, and working to improve students' learning experiences. Discussing the approach of action research, Mills (2018) and Mertler (2017) highlight that instructors engage in a four-step process of identifying an area of focus, collecting data, analyzing data, and developing an action plan to effect change.

Mixed Methods

Action research can be qualitative, quantitative, or a combination of both methods. The action research undertaken with this study used a mixed methods approach. This approach, which combines qualitative and quantitative data, is beneficial in helping

to understanding the complexities of an issue (Creswell, 2014; Johnson et al., 2007) Information collected from different methods can (a) be used to validate the credibility of the findings, (b) provide a better understanding of the phenomenon in context, (c) help illustrate research gaps in a single method study, and (d) be useful in creating recommendations that can guide future research and practice (Bryman, 2006).

Action research using mixed method design can be viewed through different characteristics which describe the typology, or design, of data collection methods, the timing of analysis, and the intent or goal that the study wishes to achieve. Typology refers to the classification of the mixed methods study taking into consideration the timing, the objectives, and purpose of qualitative and quantitative data collection methods (Creswell & Plano Clark, 2018). The present study is a convergent parallel mixed methods study that used different but complementary quantitative and qualitative data to best understand the conditions at the nursing school. This design incorporated equal emphasis on qualitative and quantitative components to determine if the results of both are similar in answering research questions (Creswell & Plano Clark, 2018; Morgan, 2014). In this design, qualitative and quantitative data were collected and analyzed independently of each other with the results being merged in a final analysis and explanation of meaning (Morgan, 2014; Schoonenboom & Johnson, 2017).

An important characteristic of mixed methods research is the timing of data collection and analysis. The convergent design that this study followed saw both the quantitative and qualitative components proceed concurrently nearly parallel to each other (Schoonenboom & Johnson, 2017). The timing of the method is important because the collection of data may or may not be used to inform and influence the collection of

data in a subsequent method. In addition, being able to define the goal of the collected data is an important part of having the reader understand the overall purpose of the study. Primary types of purpose in action research are to explain, explore, or converge (Creswell & Plano Clark, 2018). Research in which the primary intent is to converge or combine results to more fully understand the issue is the goal of convergent design of mixed methods research. In this study, the primary goal was to determine the current perceptions of the study participants in order to better understand the current conditions at the nursing school. Therefore, quantitative and qualitative data were collected independently of each other and analyzed following the collection of all data.

Setting and Participants

Setting

This study took place at a small, Associate-degree granting, hospital-based private nursing school located in lower New York. The school is owned, operated, and physically attached to the hospital which fosters a type of symbiotic relationship allowing students a place to practice while the school provides the hospital with a source of nurses following graduation. At the time of the study, the school enrolled 92 students and employed nine full- and part-time faculty members. It provides nursing-centered courses such as medical-surgical, pediatric, maternal, and psychiatric nursing. Prior to enrollment in the school, students must take pre-requisite and general education courses in anatomy and physiology, microbiology, nutrition, psychology, English, and sociology. The nursing program usually takes two years to complete the eight courses in the nursing major. However, it may take longer depending upon the student's success in completing courses on their first attempt and their ability to take two major courses in each semester of their second year of study. The school has two programs – a day and an evening program –

with an approximately equal distribution of students between each. Coursework is considered full-time, though many students work part- or full-time through the two years of study. The day program usually fits the needs of traditional students who do not work or work part-time, while the evening program tends to satisfy the schedules of students who usually work or have other obligations.

The school primarily adopts teacher-centered instruction with some supplementation with educational technology. Classroom instruction accounts for approximately 30% of instruction with the remaining time split between skills practice laboratory and patient clinical experiences. Classroom instruction is primarily mediated through PowerPoint hosted on the learning management system, Moodle. Moodle serves as a repository for course materials such as the syllabus, clinical paperwork, and assignments.

Recently, the school has begun additional integration of technology for both learning and test-taking. The school contracted with their textbook vendor to provide web-based, interactive patient care simulation software. This is used primarily during skills practice lab and for student self-study and is not generally incorporated into the classroom. Occasionally, instructors have used videos for demonstration of clinical situations or procedures. However, these are primarily used for skills lab or in preparation for clinical. In addition, the school recently contracted with an online test-taking company to provide computer-based examinations – as opposed to traditional paper-based examinations – beginning in the Fall of 2020. These examinations are to be held synchronously in the classrooms at the school. Faculty had begun training to use the examination software over the course of several months. Students attending in the Fall of

2020 were the first to use the new test-taking method and training for students to use the new software took take place shortly before their first exam and just prior to this study.

Participants

This study involved two different populations at the school – students and instructors. Because of the relatively small number of students and instructors, the study used purposeful sampling and involved all those who volunteered to participate. Choosing a sample of participants was essential because those involved help to adequately and articulately answer the research question (Luciani et al., 2019). In this study, although the total number of students and instructors were invited to participate, for the purpose of conducting focus groups with students, the researcher selected a sample of students believed to represent both day and evening students. This purposeful sampling, termed maximum variation sampling, is used to achieve the widest variation of opinions related to the phenomenon being studied (Creswell & Poth, 2018), Both populations were informed that participation is not mandatory, and that it had no effect on their grades, academic standing, or employment status.

The student body is diverse and comes from varied socioeconomic backgrounds. It is estimated that approximately 85% of students receive some form of financial assistance in the form of grants or loans. Students are culturally diverse, with large populations of both Hispanic and African American students making up over 50% of the study body. A vast majority of students are female. The average age of the students upon entering the school is 32 years for day students and 35 years for evening students. Some students have switched to nursing as a second career following retirement from another

field. Other students have gone into nursing as a natural progression from being a nursing or medical technician or working in some capacity in the healthcare field.

Full-time instructors are more homogenous in their makeup. The school employs nine full-time instructors, including myself. Two instructors – including myself – teach nursing basics, two teach intermediate medical-surgical nursing, two teach advanced medical-surgical nursing, one teaches psychiatric nursing, one teaches pediatric nursing, and one teaches maternity nursing. Seven instructors are Caucasian, one is African American, and one is Indian. Eight instructors are female. Instructor's age ranges from 50 to 65 years and most of the instructors are long-time employees of the school employed between 13 and 38 years. While the school employs adjunct instructors – those who work on an as-needed basis – they are not included in this study because they do not lecture in classrooms. Adjunct instructors provide hands-on instruction during clinical and laboratory sessions which are outside the scope of this study.

Data Collection

Several methods of data collection were used in this study. Research using multiple forms of data collection provides a richer understanding of the problem of practice as well as provides triangulation of opinions expressed between the methods of data collection (Creswell, 2014; Patton, 1999). Data sources (Table 3.1) used in this study included surveys of both instructors and students, one-to-one instructor interviews, and student focus groups. The following sections describe how the data sources that address each research question.

Table 3.1. *Research Questions and Data Sources*

Research Questions (RQ)	Data Sources
RQ1: What factors influence instructor use of educational technology for teaching theoretical knowledge of nursing?	Instructor Technology Survey (ITS) Instructor interviews
RQ2: How do instructors use educational technology in teaching theoretical knowledge of nursing?	Instructor Technology Survey (ITS) Instructor interviews Student focus groups
RQ3: What are student perceptions about using educational technologies to learn theoretical knowledge of nursing?	Computer Technology Integration (CTI) survey, Technology Attitude Survey (TAS) Student focus groups
RQ4: What are student perceptions of how educational technologies are used in teaching theoretical knowledge of nursing?	Computer Technology Integration (CTI) survey, Technology Attitude Survey (TAS) Student focus groups

Instructor Data Collection

In order to gather information about what factors affect their use of educational technology in the classroom, instructors were asked to complete the Instructor Technology Survey. In addition, they were invited to participate in one-to-one interviews. Both of these forms of data gathering were reliable methods to collect information and triangulate results (Mertler, 2017).

Instructor Technology Survey

The Instructor Technology Survey (ITS) is an instrument used to measure instructors' feelings, beliefs, and emotions towards use of educational technology. The ITS took approximately 15 minutes to complete and is loosely based upon a survey called the Teacher Technology Questionnaire (TTQ) first created by Lowther and Ross (2000). Specifically, survey items from their original survey were rewritten. The ITS is

comprised of five subscales that measure instructor perception of educational technology's impact on classroom instruction; its impact on their students; instructors' perceived readiness to integrate technology into their classroom; instructor perceived support for technology in the school; and instructor perceived level of support for integrating educational technology in the classroom. Content validity of ITS was evaluated by a review of this researcher's dissertation advisor, colleagues in his dissertation cohort, as well as through review by other instructor colleagues. The full survey is provided in Appendix C.

In order to collect information about use of technology in their classrooms, instructors were asked a series of questions during one-to-one interviews. These interview questions explored their use of current educational technology tools as well as tools they have used in the past.

Individual Instructor Interviews

After completion of the ITS, instructors were invited to participate in one-to-one interviews to further explore their attitudes and opinions about education and technology use in the nursing classroom. Interviews are used primarily to gather information about an individual's perspective on a topic of interest (Seidman, 2003). These interviews followed an unstructured format which allowed the interviewer to use questions as a framework but afforded a measure of flexibility allowing for follow-up and probing questions. This flexibility enabled the researcher to uncover underlying motivations for behaviors and responses (Tracy, 2013). Interviews took place in each instructor's office and were approximately 30 to 45 minutes in duration. Because of social distancing restrictions during the COVID-19 pandemic, these office interviews were mediated

through Google Meet. During the interview, written notes were taken, and the interview was automatically recorded and transcribed with the Otter transcription software and video recorded through Google Meet. The instructor interview protocol addresses RQ1 and RQ2, as shown in Table 3.2.

Table 3.2. *Instructor Interview Protocol*

Research Question	Instructor Interview Questions
RQ1: What factors influence instructor use of educational technology for teaching theoretical knowledge of nursing?	1. Tell me about your experiences using technology in your classroom. 2. How do you feel about using technology to teach nursing in the classroom? 3. Which technologies do you use most often, and how? 4. What leads you to use (or not use) technology in nursing instruction? 5. What is the impact, in your opinion, of using technology to prepare nursing students for their future jobs? 6. Do you see a role for technology to be used in the classroom to develop critical thinking, problem solving, and professional bearing? Why or why not? 7. Do you feel inclined to use new technology such as games, polling software, and simulations in your classroom? Why or why not? 8. Do you feel pressured by your colleagues to use technology in the classroom? By administration? By students? 9. Do you see a role for the increased presence of technology in the classroom? How so? 10. Do you see the use of technology as having the potential to change the role of the instructor in the classroom? Why or why not? 10a. If seen as a threat/challenge to their role - how do you perceive this as a threat? 10b. If seen as a benefit – how do you perceive this benefit? 11. What would motivate you to use more technology in the classroom? a. Do you think administrators have a role in this? b. Do you believe students play a role in this? 12. Do you feel that technology helps you to better connect in the classroom with your students, or do you feel that technology presents as a barrier?

	13. Do you feel that your attitudes toward educational technology have changed following the circumstances made necessary by the COVID-19 pandemic to move classes to an online format? 14. Do you feel that your attitude toward educational technology has changed with the expanded use of clinical simulation software and computer-based test taking?
RQ2: How do instructors use educational technology in teaching theoretical knowledge of nursing?	1. Which technologies do you use often in your classroom? Do you use the whiteboard that is available? 1a. Other than PowerPoint and the Learning Management System, Moodle, do you use any other technology in teaching nursing theory in the classroom? 2. Describe how you use technology on a regular basis? 3. Do you see a role for the use of "apps" in the classroom either on the computer or on a smart phone? 4. Have you ever used or seen used technologies such as iPads, Clickers, Survey Tools, or games such as Kahoot? 5. The school just recently started to use a Computer-Based test taking application. Do you see this as a benefit to your teaching or to your students? 6. If you were to use technologies to better support your students' learning, what would you do? Any lesson ideas?

Student Data Collection

To gain perspective of their perceptions using educational technology, students were asked to complete a survey as well as participate in focus groups. The survey consisted of portions of the Computer Technology Integration (CTI) survey (Keengwe, 2007) and the Technology Attitude Survey (TAS) (Maag, 2006; McFarlane, 1997). These surveys are contained in Appendix D. In addition, students were asked to participate in focus groups where questions related to their perceptions of educational technology were asked. Student focus group questions are listed in Table 3.3.

Table 3.3. *Student Focus Group Protocol*

Research Question	Focus Group Questions
RQ3: What are student perceptions about using educational	1. When you hear the words educational technology in a classroom, what comes to mind? 2. Tell me about how your instructors use educational technology in the classroom?

technologies to learn theoretical knowledge of nursing? RQ4: What are student perceptions of how educational technologies are used in teaching theoretical knowledge of nursing?	3. Do you feel that your instructors use technology adequately in the classroom? 4. How do you feel about using education technologies to learn nursing? 5. In your opinion, how can technologies make an impact on your preparation to be a future nurse? 6. Have you ever played games, taken a poll, or used interactive technology in a classroom? 6a. Do you feel that these types of educational technology increase your interest in learning or are more distracting to learning? 7. Other than the use of PowerPoint presentations and Learning Management Systems, do you see a role for additional technology use in the classroom? 8. Do you feel that the current learning environment prepares you to function in a very technology-heavy profession? Why or why not? 9. Do you feel that educational technology can help clarify information or reinforce understanding of concepts during lecture? 10. How do you feel about taking exams on a computer? 11. How do you feel about playing games, taking a poll, or using interactive technology in the classroom? 12. Following the change to online learning due to the disruptions caused by the COVID pandemic, do you feel your attitudes have changed regarding its usefulness in your learning? 13. Have the recent additions of online simulation modules in the classroom and computer-based examinations changed your attitudes towards educational technology?

Similar to the actions for RQ3, to gather nursing students' perspectives towards their instructors' use of educational technology in the classroom, students were asked to complete a survey consisting of the Computer Technology Integration (CTI) survey (Keengwe, 2007) and the Technology Attitude Survey (TAS) (Maag, 2006; McFarlane, 1997; Appendix D). Likewise, student perceptions of instructor use of technology was sought using questions asked during focus groups.

Computer Technology Integration (CTI) Survey

A valued part of the research for this study was the collection of survey data from students. Surveys determine "the characteristics of the target population from the answers provided by a sample of respondents" (Fowler, 2014, p. 8). Mertler (2017) cites that surveys can be advantageous because their efficient format allows researchers to gather information more quickly than qualitative methods such as interviews.

The CTI (Keengwe, 2007), designed to assess student and faculty perceptions of computer proficiency in instructional activities, has 55 questions divided into five subscales. However, only two sections were used in this study: demographic information, in which participants rate their perceived competency and comfort level with computer applications on a three-point Likert type scale, and 20 statements regarding students' perceptions of their instructors' use of educational technology in the classroom and their perceptions about educational technology's effect on their learning which uses a four-point Likert type scale (Keengwe, 2007). The instrument was initially validated through a pilot survey of 20 students. Later, it was subsequently revalidated with a sample of 837 students. On both occasions, Keengwe (2007) reported an acceptable Cronbach's alpha of .73 for each of the survey samples.

Technology Attitude Survey (TAS)

The TAS was originally designed by McFarlane (1997) to survey teacher attitudes towards the use of technology. It was subsequently revised by Maag (2006) in order to capture nursing student perceptions towards technology use for nursing education. The survey consists of two subscales with a total of 15 Likert-type questions assessing: confidence in and benefits of using technology and lack of self-efficacy in the use of

technology (Maag, 2006, p. 114). The Likert type questions ask the participant to evaluate each question using a six-point scale ranging from 1) strongly disagree to 6) strongly agree. Maag (2006) reported McFarlane's original survey had a Cronbach's alpha between .85 and .92 in a study of 192 students. This same researcher reported the Cronbach's alpha for her revised survey of 743 nursing students to be .88 for questions measuring lack of self-efficacy and .91 for items measuring confidence in the benefits of technology (Maag, 2006).

The combined CTI and TAS surveys were estimated to take approximately 20 minutes to complete. Students were to originally complete the survey during in-class time, however due to the COVID pandemic, the students were invited to complete the survey, mediated through Google forms. Link to the Google form survey was provided through an email invitation. The invitation letter emailed to students is located in Appendix A.

Student Focus Group Interviews

Focus group interviews entail asking the same question to a group of people and providing a non-threatening forum of empowerment to individuals who may not have otherwise felt confident sharing their opinion (Krueger, 1997; Litosseliti, 2003). Focus groups can be an opportunity for participants to provide clarification and insight when using different methods of inquiry (Morgan, 2019). Focus group interviews took place after the administration of the CTI.

Criteria for selecting students for focus group participation emphasized recruiting as varied a population as possible in order to examine different perspectives and perceptions on educational technology. Variety in participants helped to ensure that

multiple and contrasting viewpoints were explored (Seidman, 2013). Students from all four semesters and both the day and evening programs were invited to participate in focus groups. Students who volunteered were purposely chosen based upon their cohort (day or evening), their current semester in the nursing program. Four focus groups were conducted containing a total of 19 students with each group having a maximum of five students each. The focus group interview lasted approximately one hour. Again, because of COVID restrictions, students participated using the Google Meets video conferencing system. Following Roller's (2015) recommendations for conducting focus groups starting with general questions and asking additional and specific questions to encourage clarification of responses, this researcher started with questions related to students' view of technology and then include additional follow up questions as warranted.

Data Analysis

Several different methods of data analysis were applied to examine the qualitative and quantitative data gathered for this study. Quantitative data took the form of surveys given to instructors and students, and qualitative data was collected through individual interviews and focus groups. The combined interpretation of findings from qualitative and quantitative data provided a much broader and richer understanding of the research topic than use of each type of data alone (Creswell & Plano Clark, 2007). Table 3.4 presents alignment of research questions, data sources, and analysis methods.

Table 3.4. *Research Questions, Data Sources, and Methods of Analysis*

Research Questions (RQ)	Data Sources	Methods of Analysis
RQ1: What factors influence instructor use of educational technology for teaching theoretical knowledge of nursing?	Instructor Technology Survey (ITS) survey Instructor interviews Student focus groups	Descriptive statistical analysis Thematic analysis

RQ2: How do instructors use educational technology in teaching theoretical knowledge of nursing?	Instructor Technology Survey (ITS) survey Instructor interviews Student focus groups	Thematic analysis
RQ3: What are student perceptions about using educational technologies to learn theoretical knowledge of nursing?	Computer Technology Integration (CTI) Survey Technology Attitude Survey (TAS) Student focus groups	Descriptive statistical analysis Thematic analysis
RQ4: What are student perceptions of how educational technologies are used in teaching theoretical knowledge of nursing?	Computer Technology Integration (CTI) Survey Technology Attitude Survey (TAS) Instructor interviews Student focus groups	Descriptive statistical analysis Thematic analysis

Quantitative Data Analysis

Quantitative data collected with the ITS survey for instructors and the Computer Technology Integration (CTI) survey and Technology Attitude Survey (TAS) were analyzed using descriptive statistics through the JASP statistical software. This software determined the mean, median, and standard deviation of the responses. These measures were valuable in understanding the researched population. These statistics helped to determine the average age of instructors, in comparison to the students they teach. It enabled the researcher to compare the number of years' experience with computers between the groups. The surveys also allowed this researcher to determine the average perception of comfort on the part of instructors and students in using computers for work; the amount of stress encountered when using computers; as well as how strongly instructors and students perceive the benefits of educational technology in teaching and learning. These descriptors provide us a baseline understanding of each population and how their perceptions towards educational technology may differ and, if so, to what degree. Standard deviation helped to substantiate if the group is relatively homogenous in

their attitudes and assist in illustrating variations among the groups if significant outliers exist (Etchegaray & Fischer, 2009; Greasley, 2008).

Description of ITS Subscales

The ITS subscales address the first two research questions: (1) what factors influence instructor use of educational technology for teaching theoretical knowledge of nursing and (2) how do instructors use educational technology in teaching theoretical knowledge of nursing. To this end, five subscales of the ITS, consisting of a total of 20 questions, addressed the first research question. The sixth subscale, consisting of five questions examining instructor actual use of technology in the classroom and appearing at the beginning of the survey, addresses the second research question. The subscales and their corresponding number of questions are outlined in Table 3.5, below.

Table 3.5. *Instructor Survey Subscales (ITS)*

Research Questions	ITS Subscales	Number of Questions
RQ1: What factors influence instructor use of educational technology for teaching theoretical knowledge of nursing?	Effect on Classroom Teaching	4
	Effect on Students	5
	Comfort and ability to Integrate Technology	3
	Perception of Peer / Administration Support	5
	Perception of Technology Support	3
RQ2: How do instructors use educational technology in teaching theoretical knowledge of nursing?	Technology Use in Classroom	5

Description of CTI and TAS Questionnaires

These two questionnaires address research questions 3 and 4 as they relate to being taught nursing in the classroom: (3) What are student perceptions about using

educational technologies to learn theoretical knowledge of nursing, and (4) What are student perceptions of how educational technologies are used in teaching theoretical knowledge of nursing. To answer these research questions, two surveys, the Computer Technology Integration (CTI) survey (Keengwe, 2007) and the Technology Attitude Survey (TAS; Maag, 2006; McFarlane et al., 1997) were administered to 65 students and analyzed. TAS has two subscales addressing the use of technology in learning and student confidence in using educational technology. However, due to length and the survey's wide breadth, only one subscale of the CTI, related to the student perception of instructor integration, was included in this study. Three additional questions were included in the survey in the final section of the TAS survey to assess students' perceptions of pressures on instructors to incorporate technology into their classrooms. These survey items were reviewed for content validity by the researcher's dissertation advisor, colleagues in his dissertation cohort writing group, and other instructor colleagues.

The subscale reliability of the CTI and TAS were measured using Cronbach's alpha. The subscale for the CTI was previously measured for reliability in Keengwe's 2007 study based upon two reported surveys, a pilot survey of a convenience sample of 20 students, and a separate survey of 873 student respondents. For the subscale utilized for this study, consisting of 20 survey items, Keengwe's reported a Cronbach's alpha of .73 in both the pilot survey and the sample survey.

The reliability of the TAS was determined by evaluating the research conducted by McFarlane et al. (1997) who used their survey of 15 items to evaluate student attitudes towards educational technology at West Coast university (n=193) and yielded a reliability

coefficient of .88. Maag (2006), surveying a convenience sample of 743 nursing students, revised McFarlane et al.'s original survey by changing wording to reflect use by nursing students. In addition, Maag reversed the Likert scale (1 = strongly disagree and 6 = strongly agree) and split the survey into two subscales. On analysis of this revised survey, Maag reported the Cronbach's alpha to be .88 for 10 items surveying students' lack of self-efficacy and .91 for five items measuring student confidence in the benefits of using technology.

In addition to these reliability studies listed above, this researcher, with the assistance of his dissertation chair, ran reliability coefficients on each of the subscales contained in the CTI and the TAS. Using the responses of the 65 student participants to these survey items, reliability was measured through JASP statistical software and Cronbach's alphas obtained. On the subscale comprised of 20 questions concerning student perceptions of technology using the CTI questionnaire, Cronbach's alpha was determined to be .78. The subscale measuring student perceptions of the use of technology affecting learning, composed of 10 questions from the TAS, the Cronbach's alpha was determined to be .88. Finally, the subscale from the TAS concerning the reported lack of self-efficacy using technology, which was composed of five questions, yielded a Cronbach's alpha of .95. These coefficient results are reported in Table 4.2.

According to McMillian and Schumacher (1997), coefficients ranging from .70 and .94 are considered reliable for most research instruments. Because of this, and the fact that Cronbach's alpha coefficient results have remained stable over its use in the studies cited, these subscales would be considered to have acceptable internal consistency. Table 3.6 lists each survey subscale along with their Cronbach's coefficient.

Table 3.6. *CTI and TAS Subscales, Items in each Subscale, and Cronbach's Alpha*

Subscales	Number of items	Cronbach's alpha (Keengwe, 2007 – CTI) (Maag, 2006 - TAS)	Cronbach's alpha (current)
Student Perceptions of Technology (CTI) *(Items 1-20)*	20	.73	.78
Use of Technology Affecting Learning (TAS) *(Items 1-4, 6, 8, 10, 11, 13, 15)*	10	.88	.88
Reported lack of self-efficacy using Technology (TAS) *(Items 5, 7, 9, 12, 14)*	5	.91	.95

Qualitative Data Analysis

Qualitative data analysis is a multifaceted process in which data is used and evaluated to describe, explain, interpret, and possibly predict a phenomenon (Braun & Clark, 2012; Dey, 1993) For the purposes of this study, an inductive approach to analysis was used. This inductive approach used thematic analysis in determining meaning from data gathered. Thematic analysis involves the gathering of raw data and its organization using coding and the assignment of meaning through the interpretation of data (Braun & Clarke, 2012). From these activities and the skill of the research analyst, emerging themes allow for the generation of meaning and the drawing of conclusions (Seidman, 2013). In order to answer the research questions, analysis of data from instructors and students occurred separately.

To start qualitative analysis, all interviews and focus groups were recorded and transcribed using Otter Voice Notes (AISense, 2018) and reviewed for accuracy. Once transcribed, the information was reviewed several times to allow familiarization with the data (Braun & Clark, 2012). Reflecting upon the data, it was examined for common threads of ideas which were assigned codes (Braun & Clark, 2012; Strauss & Corbin,

2008). A code is a word or a phrase meant to represent these ideas and used to identify patterns of meaning (Saldaña, 2016). These codes were reviewed through several iterations of the data. From this review, some codes were refined, combined, deleted, and new codes were created. Codes were grouped into categories based upon the researcher's knowledge and understanding of the material. From these categories, themes were identified (Braun & Clark, 2012; Kolb, 2012). Themes and their associated, supportive categories were organized into a data table to organize and display their relationships to each other (Buss & Zambo, 2014). Once accomplished, the themes were considered and determined how they correspond with and address the research questions (Creswell, 2014; O'Connor & Gibson, 2003).

Study Timeline and Procedures

This study spanned over seven weeks and consisted of three phases. Phase 1 consisted of preparation for the study such as Institutional Review Board (IRB) approval, participant recruitment, and collection of informed consent. IRB approval was obtained from the university through which this doctoral degree is being sought. Separate approval was sought from the Vice President of Nursing at the hospital where the school is located. This person was the highest-ranking administrator overseeing the operations of the school. Prior to data collection, informed consent from each individual participating in this research was obtained.

Due to the small size of the student body and faculty, all members of both groups were invited to participate. Instructors were asked to participate through personal appeal by this researcher. To recruit students, they were initially sent an email informing them of the study and requesting assistance in completing a survey. Due to restrictions during the COVID-19 pandemic, requests were made by email. Following the survey, the researcher

requested a purposeful sampling of students representing day and evening students to volunteer to be additional participants in focus groups. All study participants were informed by the invitation letter and for interviews their confidentiality was maintained through the assignment of pseudonyms. Surveys completed during the study were confidentially held.

During the first few weeks of September 2020, when instructors returned from summer break, I recruited instructors by having face-to-face conversations requesting their participation. I provided them with additional information about the study through an email communication invitation letter which was also used to obtain informed consent by instructing the participant to click on a link that would take them to the survey. A few weeks later, once classes started, student participants from the entire student body of the school – at the time, 92 students - were recruited through personal appeal during skill lab meetings and email solicitation using the invitation letter located in Appendix A. In light of the COVID-19 pandemic, and because the school opted to hold lecture online, these in-person appeals were made during socially distant in-person skills laboratory sessions held in the school.

Phase 2 involved data collection through deployment of surveys and administration of interviews to the instructors at the school. Surveys, using the ITS questionnaire, were deployed to instructors using Google Forms which not only allowed for ease of collection and basic aggregation of data but maintained socially distant practices during the COVID-19 pandemic. Following the collection of surveys from instructors, individual interviews with instructors were conducted in their offices over Google Meet. At that time, I took notes and collect audio recordings of our conversation.

Phase 3 consisted of data gathering from students. Following the data collection from the instructors, students were initially surveyed and then interviewed in focus groups. Like the instructors, students took their survey, the combination of CTI and TAS subscales, using Google Forms. Following these surveys, I recruited students into four focus groups consisting of four or five participants each, with a total of 19 participants – to further explore student perceptions. These groups met at a mutually agreed upon time to allow as many as possible to participate. Again, owing to the social distancing required during the COVID pandemic, focus groups were conducted using Google Meet. Data collected were used to triangulate findings and subsequently draw conclusions about each population's views. The outline of these phases of activities are listed in Table 3.7, below.

Table 3.7. *Timeline of Preparation, Data Collection, and Data Analysis*

Phase	Activity	Timeframe (duration)
Phase 1: Preparation	1. Obtain university and hospital IRB approval.	
	2. Recruit and obtain informed consent from instructors.	1 week
	3. Recruit and obtain informed consent from students in-person and via email.	1 week
Phase 2: Data Collection with instructors	4. Instructor surveys (ITS)	1 week
	5. Instructor one-on-one interviews	1 week
Phase 3: Data Collection with Students	6. Student surveys (CTI, TAS)	1 week
	7. Student focus group interviews	2 weeks

Rigor and Trustworthiness

It is important to maintain credibility for one's study. Though he was discussing the characteristics of qualitative research, Patton's (1999) assertions that research needs

to be trustworthy, validated, reliable, and credible rings true for both qualitative and quantitative inquiries. Throughout this study, different strategies were used to ensure rigor and trustworthiness (Jick, 1979; Mertler, 2017). These strategies included triangulation, member checking, audit trails, and peer debriefing.

Triangulation

Triangulation is the evaluation of multiple data sources and/or methods that allows the researcher to generate theory and support and to verify the credibility of conclusions inferred by the researcher (Bryman, 2006; Denzin, 1978; Schwandt, 2007). This strategy enables the researcher to corroborate information gathered between differing datasets to establish consistency and confirm a more holistic and complete understanding of the phenomena being studied (Jick, 1979). At the end of this study, both qualitative and quantitative data from interviews, focus groups, and surveys were evaluated to determine if the data allowed the researcher to corroborate information between data sources and draw conclusions from the information gathered (Ivankova, 2014). The triangulation of the data between surveys and focus groups enabled me to support conclusions in this study and no additional attempts to reconcile differences in consistency of data were warranted.

Member Checking

The qualitative data collection phase used instructor interview and student focus group data. To ensure that this data is accurately interpreted, member checking occurred. Member checking, as described by Mertler (2017) is the “process of asking participants who were directly involved in the study to review the accuracy of the research" (p. 143). Study participants evaluated preliminary findings in terms of the assertions and themes

developed, to ensure that their sentiments and experiences are accurately portrayed (Creswell, 2014; Guest et al., 2012; Shenton, 2004). Over the course of my analysis, I requested that instructors validate copies of their transcripts for accuracy. Out of the eight transcripts sent out, five were confirmed by the instructors advising that their interviews had been accurately documented.

Audit Trails

Audit trails were used throughout the data gathering and analysis portion of this study. Audit trails entail the use and keeping of field observations, journals, interview notes, recordings, calendars, and interpretations made by a researcher during the process of the study (Carlson, 2010). These artifacts are used not only to support the accuracy of the data, but they are used to ensure accountability for how the researcher arrives at their conclusions. According to Dey (1993), "If we cannot expect others to replicate our account, the best we can do is explain how we arrived at our results" (p. 259). In addition to keeping a researcher journal, all email correspondence to participants have been printed and kept for easy reference.

Peer Debriefing

Within action research, the reliability of studies can be a challenge because the phenomenon being studied is contextual. Reliability is described as the degree that a study can be repeated with similar results (Johnson, 2002). Another way to ensure reliability was through the use of peer-debriefing. Additionally, the dissertation advisor also served in a debriefing capacity. Through this method, my dissertation chair helped review my analyses and conclusions (Mertler, 2017). Peer debriefer can serve as a *devil's advocate* asking difficult questions and challenging interpretations of findings

(Onwuegbuzie et al., 2010). In addition to my dissertation chair, another student from my cohort also reviewed by information and served as a debriefer.

Plan for Sharing and Communicating Findings

At the completion of this study, findings will be shared with the researcher's dissertation committee and key stakeholders involved including instructors, administrators, and students. The first report of my findings was made to the Dissertation Committee of the University of South Carolina. This report was reviewed initially in written form and the researcher was called upon to review and defend his findings to the committee. Following final approval of the dissertation committee, the researcher will share his findings with all key stakeholders at the nursing school. The first report will be made to the researcher's direct supervisor and proponent of this research, the dean of the nursing school. Following this, resulting information will be shared with students, faculty, and hospital administration. Because there were 92 students currently enrolled, and they are not all in school on the same day, an email which will include a narrated Microsoft PowerPoint presentation using Screencast-O-Matic will be sent to students. Students will be encouraged to review the study findings, provide feedback, and ask questions. In order to present the study findings to the full faculty, a meeting of the Staff Development committee will be requested. This committee, which meets regularly to discuss topics concerning staff education, is composed of the entire faculty of the school. Research findings will be shared, and questions, comments, and recommendations will be requested.

After meetings with immediate participant stakeholders, results of the study will be presented to the hospital's Board of Trustees, the governing board of the hospital and school. To protect the identities of participants, at no point will names of students or

faculty be identified either in the written dissertation or the presentation of findings. Additionally, aggregate data will be used in presentations of study findings.

CHAPTER 4: ANALYSIS AND FINDINGS

The purpose of this action research was to describe and compare perceptions and attitudes of instructors and students towards the use of educational technology in the classroom at a nursing school in lower New York. Historically, nursing education has been teacher-centered with knowledge being passed down from the instructor to the student where nursing instructors would teach in the same manner they were taught (Billings & Halstead, 2012). Because many nursing students were born in an age where computers were ubiquitous, this study sought to examine both the perceptions of instructors and students towards educational technology in education. One of this study's goals is to determine if these perceptions diverge or are similar and, if different, in what ways.

For this study, both quantitative and qualitative data were collected to answer the following four research questions: (1) what factors influence instructor use of educational technology for teaching theoretical knowledge of nursing, (2) how do instructors use educational technology in teaching theoretical knowledge of nursing, (3) what are student perceptions about the use of educational technologies for learning theoretical knowledge of nursing, and (4) what are student perceptions towards how educational technology is used in teaching theoretical knowledge of nursing? This chapter describes the examination of quantitative data collected through instructor and student surveys, as well as qualitative data collected through student focus groups and one-on-one instructor

interviews. Quantitative followed by qualitative findings are presented in the following sections. Each section is divided per the research questions outlined above.

Quantitative Analysis and Findings

Quantitative data were collected through surveys of both instructors and students. Instructor survey was carried out using the Instructor Technology Survey (ITS), which was adapted from Lowther and Ross's (2000) Teacher Technology Questionnaire (TTQ). In addition to demographics and general information regarding computer ownership and use, the ITS contained six subscales designed to collect information regarding factors that influence instructor use of technology as well as their actual use of these technologies in the classroom. The subscales in this survey included: (a) instructor perception of educational technology's impact on classroom instruction, (b) its impact on students, (c) instructor's perceived readiness and capability to integrate technology into their classroom, (d) perceived support from peers and administrators for integrating technology into the school, (e) perceived availability of technological support and resources, and (f) perceived level of support from students regarding its use. Because this survey was created by the researcher, its validity and reliability were evaluated by the researcher's dissertation advisor, colleagues in his dissertation cohort, and other instructor colleagues.

ITS Subscales

As previously mentioned, the ITS subscales were used to collect perspectives from instructors at the nursing school. This survey consisted of six subscales and was used primarily to answer research questions one and two. The survey helped to provide information regarding demographics as well as data regarding factors that could influence

instructor use of technology for teaching nursing in the classroom. The analysis of those responses is listed below.

CTI and TAS Questionnaires

The CTI and TAS questionnaires were used to collect student demographic information as well as information regarding their use of technology. In addition, these surveys were used to understand student perspectives about the use of technology in the classroom. The CTI consisted of 1 subscale containing 20 positive and negative statements concerning the use of technology in education. The TAS consisted of two subscales with statements that measured student perceptions about the use of technology for learning and their potential lack of perceived self-efficacy in using technology. An additional subscale of three items was added to the TAS to evaluate student perceptions regarding pressures on instructors to use technology in their teaching.

Because some items in the CTI and TAS subscales included negatively worded statements, then it was decided that these individual elements would be reverse coded. Reverse coding entails reversing the meaning of the scale for those particular elements. This was done in order to avoid inconsistencies when moving from positive to negatively worded elements. In their examination of students and drug use, Wright and Masters (1982) discussed inconsistencies in data analysis that can result from "for" and "against" survey statements. Because the negatively worded statements may be a source of inconsistency in participants responses, Wright and Masters (1982) suggest that researchers reverse the scoring of the negative worded elements. In this analysis, a total of 10 elements of the CTI and four elements of the TAS were reverse coded. The

instances of revere coded are specified later in this chapter and are also noted in Tables 4.1 and 4.2.

Survey Findings by Topic - Research Question 1 and 2 Instructor Responses

Surveys were sent out to eight full-time instructors at the school of nursing. The ITS completed by instructors (RQ1 and RQ2) had a return rate of 100%. Survey results of instructors are described below under the following topics: (a) demographics, (b) years of experience as an educator, (c) use of educational technology tools in the classroom, (d) effect of educational technology on classroom teaching, (e) effect on students, (f) comfort and ability to integrate technology, (g) perception of peer / administration support, and (h) perception of technology support.

Demographic Information

All instructors, other than the researcher, are females. Age range was reported in five-year intervals. One instructor was 65 years of age or greater, two instructors were between 60 and 64 years of age, four instructors were 55-59 years of age, and only one instructor was between 50 and 54. According the data collected by the American Association of Colleges of Nursing (AACN) and reported by Fang and Kesten (2017), these age ranges are higher compared to national averages. In comparison, 87.5% of instructors at the school fall in the age range of 55 or greater compared to 49.6% nationally. Demographics by age group and pseudonyms is listed in Table 4.1, below.

Table 4.1. *Distribution of Full-time Faculty by Age Group / Pseudonym*

Age Group / Pseudonym	National % (N=19,323)	Nursing School % (N=8)
Less than 50	35.9	0
50 – 54 (Mandy)	14.9	12.5
55 – 59 (Debbie, Remi, Cathy, Emily)	18.7	50.0
60 – 64 (Louise, Karen)	19.4	25.0
65 and Greater (Sarah)	11.5	12.5

Years of Experience

In the ITS, instructors were asked to report their numbers of years of experience lecturing in a college/university/nursing school classroom. Out of the eight respondents, one (12.5%) reported having over 25 years of experience, three (37.5%) reported having 16 – 20 years, and two (25%) reported having between 11 and 15 years of experience. Of the two remaining, each (12.5%) had experience of 0 – 5 years and 21 – 25 years. These experience levels are distributed by years of experience and pseudonym in Table 4.2, below.

Table 4.2. *Years of Lecture / Teaching Experience (n = 8)*

Years of Experience / Pseudonym	Frequency	Percentage
0 – 5 (Emily)	1	12.5
6 – 10	0	0.0
11 – 15 (Sarah, Cathy)	2	25.0
16 – 20 (Debbie, Remi, Mandy)	3	37.5
21 – 25 (Louise)	1	12.5
25 + (Karen)	1	12.5

Educational Technology Tools used in Classroom

One of the initial subscales of the ITS consisted of five questions which polled instructors about different types of technology they may be using in their classrooms (RQ2). Because all instructors use PowerPoint in their classes, that medium was not included in the survey. Instructors were asked if they used technologies such as

instructional videos, blogs/vlogs, computer-mediated games, audience response systems (ARS), and simulations. If they used these technologies, they were also asked to indicate how often these were used in the classroom setting. It should be noted that, because lecture is held once a week for each course, the response of *weekly* would indicate that the instructor uses the technology at each class meeting. In order to best capture the use of technology in the classroom setting, instructors were specifically asked only to consider classroom activity and not activities in the skills laboratory or clinical components of their courses. The breakdown of technology usage is shown in Figure 4.1.

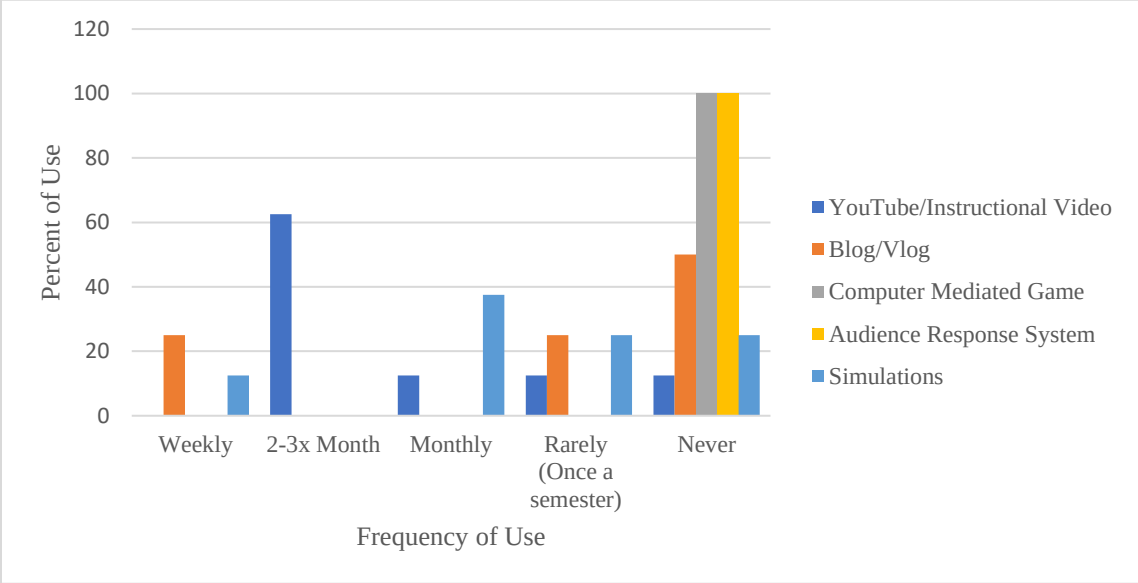

Figure 4.1. Percent frequency of technology use in the classroom. Bar chart of percent of frequency use of from the ITS. Questions reflected the use of technology in the classroom. Didactic lectures occur once weekly at the school.

As Figure 4.1 shows, 62.5% of instructors responded that they use videos two to three times a month. A smaller percentage of instructors, 25% reported using Blogs / Vlogs in their classroom. None of the instructors reported using computer mediated games such as *Kahoot!* or *TopHat* or ARS. Thirty-seven percent of instructors reported

using simulations in their classroom at least once a month, 50 % of them never or rarely using simulations, and 12.5% reporting using them weekly.

Effect of Educational Technology in the Classroom

The ITS was divided into five subscales addressing perceptions and concerns of instructors. The first subscale addressed the effect educational technology has on the instructor's classroom teaching. The four questions comprising this subscale asked if the respondent to fill out a five-point Likert scale ranging from 1-Strongly Disagree to 5-Strongly Agree regarding their perceptions of educational technologies effects on their students. The responses were examined for the mean and standard deviation and are reported in Table 4.3, below.

Table 4.3. *Educational Technology Effect on Classroom Teaching (n=8)*

Effect on Teaching	*Mean*	*SD*
Allows more participation and student-centeredness	3.25	1.48
Regularly uses educational technology in lecture	3.13	1.46
Provides a positive effect on student learning	2.88	1.36
Allows more interaction in teaching topics	3.13	1.46

Responses by instructors showed a primarily neutral stance (neutral response reported as a 3 on the Likert scale) towards the effect educational technology had on their classroom teaching. The strongest area of agreement regarding the effects of technology was that it allowed for more participation and student-centeredness in the classroom (M = 3.25, SD = 1.48). Responses to other questions in this subscale remained closer to neutral. One question, about belief that technology provides a positive effect on student learning, leaned towards disagreement – reported as a 2 on the Likert scale (M = 2.88, SD = 1.36).

Effect on Student Learning

The second subscale of the ITS addressed instructor perceptions on educational technology's effects on student learning. Again, this survey utilized a five-point Likert scale to measure perceptions rating responses from 1=Strongly Disagree to 5= Strongly Agree. Descriptive statistics are presented in Table 4.4.

Table 4.4. *Perception of Educational Technology on Student Learning (n=8)*

Effect on Student Learning	*Mean*	*SD*
Increased student involvement in class	3.25	1.28
Increased collaboration between student and instructor	2.88	1.36
Students can effectively use technology	3.75	0.89
Technology has a positive effect on learning	3.00	0.76
Increase in quality of student work	2.75	1.28

Reviewing the scores from this subscale, it appears that there are some areas of variance among instructor responses. Instructors were asked the degree to which they agreed with statements with the following scale: (1) Strongly Disagree, (2) Disagree, (3) Neutral, (4) Agree, and (5) Strongly Agree. Among instructors, perception of the strongest effect educational technology has on learning came to responses regarding students' ability to use technology effectively (M = 3.75), item 7, and its capability to increase student involvement in class (M = 3.25), item 5. When examined more closely, a majority of instructors, 75%, chose either the term "Agreed" or "Strongly Agreed" when answering item 7. This answer indicated the instructors' opinion that their students have the capability to use educational technology such as games, clickers, and podcasts.

Instructors expressed limited agreement that technology increased student involvement (M = 3.25, SD = 1.28). In their responses, only 37.5% chose the term "Agree" and 25% responding "Neutral." Instructors expressed answers leaning towards disagreement regarding the idea that technology had a positive effect on learning (M =

2.88). For this item, 50% of the instructors were neutral on whether educational technology had a positive effect, and 25% expressing disagreement with the statement.

Comfort and Ability to Use Technology

Next, addressing RQ1, the survey subscale evaluated instructor's perceived comfort and ability to use technology. Using the five-point Likert scale, questions evaluated instructor comfort level with their knowledge of and skills with technology to incorporate into their classroom instruction. In addition, this subscale measured perception of the availability of adequate training to incorporate technology. This subscale with respective questions is outlined in Table 4.5.

Table 4.5. *Perception of Comfort and Ability to Use Technology (n=8)*

Comfort and Ability to Use Technology	*Mean*	*SD*
Comfort in knowledge to integrate technology into classroom	3.25	1.28
School provides adequate training to use technology	3.25	1.17
Belief in having skills to integrate technology	3.79	1.49

Evaluating instructor responses regarding their comfort and ability, all answers to the subscale questions reflected a somewhat positive belief in comfort and ability to use technology. Answers leaned towards stronger positive perception and a higher degree of confidence in their ability to integrate technology use technology (M = 3.79). For this question, 75% of instructors chose to respond either "Agree" or "Strongly Agree" to statements about their comfort and use of technology. There was some variation in responses, however, with 25% of instructors choosing to answer either "Strongly Disagree" or "Disagree" (SD = 1.49) to statements about their perception of comfort with using technology.

The other questions, expressing comfort in their knowledge base and the existence of adequate training, showed weaker positive perceptions of the adequacy of their knowledge base and with adequate training (M = 3.25). To the statement expressing comfort with knowledge to integrate technology, the greatest percentage, 37.5%, of instructors responded "Agree" with the second most common response being "Neutral" chosen by 25%. The remaining 37.5% of instructors equally divided between answering "Strongly Disagree," "Disagree," and "Strongly Agree" to statements about having comfort integrating technology.

The statement expressing instructor satisfaction with the amount of training provided to use educational technology was positive (M = 3.25) with 67.5% of instructors responding "Agree." Variation in other instructors' responses was demonstrated in a standard deviation of 1.17 with 12.5% of instructors each answering, "Strongly Disagree," "Disagree," or "Neutral."

Perceived Support for Incorporating Technology

This subscale addressed RQ1 by evaluating instructors' perceived levels of support for incorporating educational technology by students, their colleague peers, and administration. Using a five-point Likert scale, instructors chose between the responses Strongly Disagree (1) and Strongly Agree (5) to statements about perceived levels of support. This subscale and associated questions are listed in Table 4.6.

Table 4.6. *Perceived Support for Incorporating Technology (n=8)*

Perceived Support	*Mean*	*SD*
Students supportive of technology in class	3.25	0.71
Administrators supportive of technology in class	3.25	0.71
Technology plan in place at school	3.25	1.28
Technology plan addresses how to obtain, update, and support technology in class	3.13	1.46

Colleagues supportive of personal efforts to incorporate technology in class	3.88	0.84

Evaluating the responses to this subscale on perceived support, the overall response to this subscale was moderately positive (M = 3.35). Examining the individual questions for the subset, the strongest positive perception is demonstrated in item 16, the perceived level of support for colleagues in their efforts to incorporate technology in class. This item scored the highest degree of positivity with a mean score of 3.88, with 37.5% of instructors answering "agree" and 25% of instructors answering "strongly agree" with the statement of perceived support for colleagues' efforts to integrate technology. The only other response to this item, from the remaining 37.5% of instructors, was "Neutral" with no instructors answering "disagree" to the statement.

Regarding the other questions of the subscale addressing support from students and administration, mean scores showed weaker positive responses (M = 3.25) for each item. Evaluation of these two questions showed responses to both questions were equal. Both statements of support from administrators and students garnered 50% neutral responses, 37.5% agreement responses, and 12.5% disagreement with the statement.

Responses related to a technology plan at the school showed modest agreement to the statement that the school had a technology plan in place. For this item, responses were mildly positive (M = 3.25) with 50% of respondents either agreeing or strongly agreeing with this statement. The remaining respondents were either neutral, 25%, or disagreed or strongly disagreed, with 12.5% each. The statement addressing how the technology plan supports the acquisition, maintenance, and support of educational technology showed the least positive response (M = 3.13). To this statement, 37.5%

responded that they agree or strongly agree while the same percentage responded that they disagreed or strongly disagreed, with the remaining 25% responding neutral.

Perceived Technical Support

The final subscale of the ITS addresses perceptions of actual technological support available to instructors. Like previous subscales, the five-point Likert scale ranging from strong disagreement to strong agreement was used. The three questions making up the subscale addressed instructor beliefs concerning the presence of technical support for instructors, students, and routine maintenance and upgrading of technology at the school. The subscale and its corresponding questions are listed in Table 4.7, below.

Table 4.7. *Perception of Technical Support and Availability of Resources (n=8)*

Technical Support and Upkeep	*Mean*	*SD*
School / Hospital provide adequate technical support	3.50	1.20
School technology is well maintained and upgraded	3.13	1.36
School / Hospital provide students with range of hardware and software during school year	3.25	1.29

Responses to this subscale were positive (M = 3.29). The most strongly positive item of the subscale addressed the adequacy of technical support. The mean for this item was 3.50 with 50% of respondents agreeing that there was adequate technical support. The remainder of responses for this item expressed a variety of responses with those expressing a neutral response (25%), and those expressing a response strongly in agreement (12.5%), and strongly in disagreement (12.5%). Again, Instructors expressed only modest agreement regarding the maintenance and availability of technology at the school with means of 3.13 and 3.25, respectively.

Survey Findings by Topic - Research Question 3 and 4 Student Responses

Surveys were emailed to all 92 day and evening cohort students at the school. The survey included portions of the CTI and TAS survey as discussed previously which addressed RQ3 and RQ4. Completion rate of the survey was 69%, with a total of 65 responses out of a student body of 92. Survey results of students are described below under the following topics: (a) demographics including age, gender, and highest level of school completed; (b) what educational technology tools they see used in the classroom, (c) how educational technology enhances their learning in the classroom, (d) their confidence in and benefits of using technology, (e) lack of confidence in their use of technology, and (f) additional questions related to the incorporation of technology into the classroom.

Demographic Information

Most of the students responding to the survey were female (90.7%) with the others being male (9.23 %). Age range was reported in five-year intervals with over half (55.4%) of students being age 30 or greater. There were no students under the age of 20. Twelve students were between 20 and 24 years of age. The largest group, consisting of 17 students (26.2%) were between 25 and 29 years of age. Fourteen students were between 30 and 34, and 12 were between 35 and 39. Very few students were over 40 years old. Six were between 40 and 44, three between 45 and 49, and one was 55 years or older. Compared to national averages for nursing students, the average age of the respondents was significantly greater than the average ages of students in Associate degree programs. According to the National League for Nursing (2018) students tend to be younger in age compared to respondents with 37.8% of students in Associate Degree

of Nursing (ADN) programs being 25 years old or less. The second largest percentage nationally of students in ADN programs with 26.4% aged 26 to 30 years of age and 24.6% aged between 31 and 40 years of age. A breakdown of age demographics for the students surveyed in this study is listed in Table 4.8, below.

Table 4.8. *Distribution of Student Respondents by Age Group (n=65)*

Age Group	Frequency	Percentage
Under 20	0	0
20 – 24	12	18.5
25 – 29	17	26.2
30 – 34	14	21.5
35 – 39	12	18.5
40 – 44	6	9.2
45 – 49	3	4.6
50 – 54	0	0
55 and over	1	1.5

In addition to age and gender, the students were surveyed on the highest level of education they completed. It should be noted that all students entering the nursing school need to have completed most of the general education core requirements of 30 credits prior to attending and would, therefore, have some experience in a college classroom. While the largest number of students attended following high school (33.9%), a significant portion of students had degrees prior to starting the program. Almost 28 percent had an associate degree, and an even higher number (35.4%) had a prior bachelor's degree. Only a small percentage had graduate degrees (3.1%). The breakdown by highest level of schooling is listed in Table 4.9.

Table 4.9. *Distribution of Students by Highest Level of Schooling (n=65)*

Highest Level of School Completed	Frequency	Percentage
High School Diploma	22	33.9
Associates Degree	18	27.7
Bachelor's Degree	23	35.4

Master's Degree	1	1.5
Doctorate or Other Professional Degree	1	1.5

Educational Tools Used in Class

Students were asked to report how often they used different technologies in the classroom. They were given a list of different types of educational technologies which included the use of computer mediated games, audience response systems, videos, blogs, and simulations. They were then asked to describe use as either never, rarely, monthly, 2-3 times a month, or weekly. Because PowerPoint is commonly used in the school, this was excluded from the survey. Of the different types of technologies listed, the greatest number of students reported using videos and simulations at least monthly in class (83.1% and 50.8%, respectively). Thirty-eight (58.5%) of students reported that YouTube and other instructional video were used at least weekly in the classroom. The second most common technology used weekly was simulation programs. These were reported by 17 (26.2%) students. Remaining tools were reported to be used rarely or never at all. Table 4.10 shows the frequency of use breakdown of educational technology.

Table 4.10. *Percent Frequency of Technology Experienced in the Classroom (n = 65)*

Technology experienced in the classroom	Weekly	2-3 x Monthly	Once a Month	Rarely (once per semester)	Never
YouTube or other Instructional Video	58.5	16.9	7.7	9.2	7.7
Blogs / Vlogs	9.2	9.2	7.7	29.2	44.6
Computer Mediated Games	9.2	16.9	12.3	27.7	33.9
Audience Response Systems	3.1	6.2	3.1	15.4	72.3
Simulations	26.2	15.4	9.2	20.0	29.2

Student Perceptions of Technology Use

The subscale of the Computer Technology Integration (CTI) survey asked students to rate their perceptions of educational technology. The subscale outlined several types of educational technology which included videos, blogs, computer-mediated games, audience response systems, and simulations. The subscale contained 20 items which examined perceptions by presenting 10 potentially positive attributes to educational technology (e.g., "Helps me to better organize my classwork for improved learning.") followed by 10 potentially negative attributes of technology (e.g., "Creates more anxiety that affects my overall class learning activities"). Students were asked to choose responses on a four-point Likert scale that ranged from 1=Strongly Agree to 4=Strongly Disagree. The mean scores of each of these subscale elements as well as their standard deviations are listed in Table 4.11, below.

Table 4.11. *CTI Items on Perception of Technology Use (items 1-20) (n=65)*

Survey Item	*Mean*	*SD*
Provides stimulating classroom environment	1.72	0.70
Helps practice concepts taught in class	1.63	0.65
Helps better understand abstract concepts	1.51	0.69
Helps better organize classwork	1.89	0.79
Makes class more interactive, exciting	1.71	0.79
Provides greater access to learning materials	1.57	0.68
Provides opportunities to critically think and problem solve	1.77	0.68
Provides opportunities to communicate with peers and instructor	1.82	0.73
Enables disabled students to overcome barriers	2.02	0.74
Helps students learn at their own rate	1.91	0.90
Creates more anxiety*	2.09	0.98
Disrupts effective learning, especially when the computer crashes*	2.62	1.11
Creates learning problems finding information on the World Wide Web*	2.02	0.88
Increases the chances of making mistakes that I cannot correct*	2.08	0.82

Slows my learning process, especially computer classwork outside of class*	2.14	0.93
Takes time from actual instruction*	2.28	0.96
Decreases my self-confidence to learn*	1.92	0.91
Creates competition with class lectures*	2.02	0.86
Creates "computer dependency" *	2.00	0.81
Slows my learning process, especially when faculty are not available*	2.19	1.00

Note. Survey items marked with an asterisk were reverse coded due to their negative statements.

It was noted that students generally concur when asked about positive aspects of educational technology and tended to react negatively to statements that technology causes more challenges or problems with learning. When asked about their perceptions about positive attributes of educational technology, the mean scores ranged between 1.51 and 2.02, falling between the perceptions of strongly agree and agree. Conversely, when presented with potential negative attributes of educational technology that implied that students might face difficulties, make mistakes, or be concerned about learning effectively, students' mean scores were less definitive ranging from 1.92 to 2.62 which ranged between the perceptions of disagree and slightly agree. Reactions to statements outlining benefits of educational technology showed less variation in responses than responses to statements outlining challenges. Statements describing challenges with technology had wider standard deviations ranging between 0.81 and 1.11. Meanwhile, statements describing benefits of educational technology had less variation and more agreement in responses with standard deviations ranging between 0.65 and 0.98.

In this subscale, it was noted that students expressed stronger positive reactions to how educational technology allows students to better visualize and understand concepts and provide additional access to learning resources. The statement that educational technology allows the student to better visualize or understand abstract concepts scored

the highest rating closest to strongly agree, with a score of 1.51 and a standard deviation of 0.69 showing little variation in responses among students. Similarly, the statement that educational technology provides students with greater access to learning resources had the second-highest positive response of 1.57, again with little variation of response, with a standard deviation of 0.68.

There were significant findings related to statements that viewed educational technology in a negative light. These statements included those about confidence, learning issues, competition with lecture material, and fear of "computer dependency." It should be noted that because these 10 survey elements were worded to contradict the positive statements of the previous elements, these elements were negatively coded using the four-point Likert type scale where 1=Strongly Disagree and 4=Strongly Agree and 2.5 would be considered to be neutral. In this section that was reverse coded, all these statements garnered scores of between 1.92 and 2.62 placing them primarily in the category labeled as *disagree* on the Likert scale. To the statement that technology creates learning problems finding information on the World Wide Web, students' mean response was in the *disagree* category, scoring 2.02 (*SD* = 0.88). When asked if technology competed with class lectures, the mean response was 2.02 (*SD* = 0.86). Asked whether technology created "computer dependency" and the inability to learn well in learning environments not supported by computers, the mean score was 2.00 (*SD* = 0.81). Finally, the strongest degree of *disagreement* was with the statement that technology decreases the students' self-confidence to learn effectively in class. To this, the mean score was 1.92 (*SD* = 0.91).

Student Confidence in Benefits of Using Technology

In the second portion of the survey, students were evaluated using the Technology Attitude Survey (TAS) which contained two subscales. The first subscale addressed confidence in the benefits of using technology. In both subscales, students were asked to choose a rating on a six-item Likert scale with 1= Strongly Disagree, 2= Disagree, 3= Slightly Disagree, 4= Slightly Agree, 5= Agree, and 6= Strongly Agree. In these subscales a score of 3.5 could be considered neutral with scores greater than 3.5 leaning towards agreement and scores below 3.5 leaning towards disagree. Because the TAS reversed the responses and changed from four to six response choices as compared to the CTI, a header was posted at the beginning of the subscale notifying respondents that answer choices were expanded to six as well as reversed. The mean responses and standard deviation of elements of this subscale are listed in Table 4.14.

Table 4.12. *TAS Elements of Confidence in and Benefits of Using Technology (n=65)*

Individual Element	*Mean*	*SD*
Knowledge of technology is a necessary skill	5.26	1.34
Enjoyment using technology	4.94	1.27
Confidence in learning to use technology	5.06	1.25
Learning technology is worthwhile	5.12	1.30
Technologic knowledge will be useful as a student	5.25	1.16
Technology will be needed in my future career	5.39	1.13
Technology will facilitate my learning	5.02	1.26
If I work hard to learn about technology, I will do better*	2.40	1.40
Knowing technology will make me a better student	4.60	1.42
Technology won't make my performance as a student better*	3.95	1.49

Note. Survey items marked with an asterisk were reverse coded due to their negative statements.

It should be noted that because four survey elements of the TAS were worded to contradict the positive statements, for analysis these elements were reverse coded using

the same six-point Likert type scale, but reversed, where 1=Strongly Agree and 4=Strongly Disagree and 3.5 would be considered to be neutral. Overall students have a favorable perception of technology with almost all mean scores ranging between 4.60 and 5.39, leaning towards the answer selections agree and strongly agree. Only one element, a statement which described that technology would not improve performance as a student and which was reverse coded, met with the lowest score, 3.95, closest to the corresponding answer on the survey of slightly disagree. Of the elements reverse coded in this subscale, the one showing the strongest agreement (after reverse coding) was to the statement "If I work hard to learn about technology, I will do better" which had the most agreement of the reverse coded elements (M=2.40, SD=1.40).

Examining the elements of subscales more closely, the highest values of positive responses were on perceptions regarding the use of technology for school and future career. The statement "I will use my knowledge of technology in many ways as a student" garnered a mean score of 5.25. The statement "Knowing how to use technology is a necessary skill for me" had a mean of 5.26. The statement "It is important to know about technology in my future career" had the highest mean score of 5.39, closest to the corresponding survey choice of strongly agree. It should be noted, however, that while these statements showed positive student perceptions, there was significant variation in answers with the standard deviation of these three elements reported as 1.16, 1.34, and 1.13, respectively.

Lack of Self-Efficacy in Using Technology

This second portion of the student survey consisted of the subscale containing five elements from the TAS that measured student perception of having a *lack of self-efficacy*

using technology. This subscale used the same responses, from 1= Strongly Disagree to 6= Strongly Agree, that was used in the previous subscale. Because of the positive responses to the previous section concerning perceptions towards technology in the classroom, it is not surprising that answers to elements related to the lack of confidence in using technology would be met with a degree of negativity on the part of respondents. Responses to the five elements of the subscale are listed in Table 4.13. Recall that a score of 3.5 would correspond with a neutral response. Scores less than 3.5 lean towards disagreement and scores greater than 3.5 lean towards agreement.

Table 4.13. *TAS Elements Measuring Lack of Self-Efficacy using Technology (n=65)*

Individual Element	*Mean*	*SD*
Technology makes me feel nervous	2.63	1.54
Technology makes me feel stupid	2.09	1.34
I'm not the type to do well with technology	1.91	1.28
Using technology will be difficult for me	1.92	1.30
I feel uncomfortable using most technology	1.92	1.27

In this subset, all respondents replied negatively to statements describing a lack of self-efficacy. The only differences noted were the *degree of disagreement* with the statements of the subscale. To the elements of the subscales regarding the use of technology – feeling uncomfortable using, having a difficult time operating, and not "doing well" with technology, student means were between 1.91 and 1.92 showing the greatest negatively. Only one element, that measuring nervousness working with technology, approached the survey response answer *slightly disagree*, with a mean score of 2.63. Incidentally, this element also had the highest standard deviation (1.54) indicating that respondents had the greatest variation in their responses. Like the other

subscale of the TAS, standard deviations ranged between 1.27 and 1.54 indicating responses were more varied.

Technology Incorporation at the Nursing School

As an added subscale, the researcher included three questions to students about their perceptions regarding the use of educational technology in classroom instruction. These questions were evaluated by peer review and the researcher's dissertation advisor for content validity. Respondents were asked whether they agreed or disagreed with statements related to technology at the nursing school. Similar to the other two subscales of the TAS, students were asked their agreement on a six-point scale with 1= Strongly Disagree and 6= Strongly Agree. Responses greater than 3.5 were deemed leaning towards agreement while those less than 3.5 were deemed leaning towards disagreement. Because two of the elements in this subscale were negatively worded, like previous elements, these were reverse coded. Responses ranged in means from 2.91 to 3.92 with resulting means and standard deviation listed in Table 4.14.

Table 4.14. *Additional Elements Related to Technology Incorporation (n=65)*

Individual Element	*Mean*	*SD*
My instructor is knowledgeable in using technology for classroom instruction	3.92	1.54
My instructors feel pressured to use more technology due to expectations of administration*	2.91	1.43
My instructors feel pressured by the expectations of their students to use more technology*	3.29	1.52

Note. Survey items marked with an asterisk were reverse coded due to their negative statements.

Responses indicated that students showed some level of agreement to the elements of the subscale. The element where students agreed the least with a mean of 3.29, was towards the statement that instructors felt pressured to use more technology in

the classroom. A more positive shift towards agreement came with the statement that instructors are knowledgeable in using technology (*M* = 3.92). Another area of agreement was with the statement of their belief that instructors feel pressured by administration expectations to use technology in the classroom. This element was reverse coded and remained in perceptions between *agree* and *slightly agree* (*M*=2.91, *SD*=1.43). Like the other elements of the previous two subscales of the TAS, student responses had a wider degree of variation with standard deviations ranging from 1.43 to 1.54.

Qualitative Findings

Qualitative data for this study were collected using two different methods. Data were gathered from instructors using individual interviews. A total of eight interviews were conducted with instructors. Student information was gathered using focus groups. Four focus groups were convened and were comprised of students from all courses in the program. These groups met in gatherings of four or five students, two groups from the day cohort, two from the evening cohort. Due to restrictions related to the COVID pandemic, both interviews and focus groups were conducted over Google Meet and were recorded and transcribed.

Instructor Interviews

Participants completed one semi-structured interview each. Interview length spanned from approximately 35 minutes to slightly over one hour and took place in instructor offices and were conducted through Google Meet. Instructors, while of similar age ranges, had varying years of experience. These demographic data are contained in Table 4.15. Prior to the meeting, instructors completed a survey regarding their attitudes and perceptions of educational technology and were aware that the interview would be

related to these views. Over the course of the interview, I would ask the instructor a question, listen to their response, and ask follow-up questions as warranted.

Table 4.15. *Interviewees' Demographic Information, Specialty, Experience*

Pseudonym	Age	Gender	Specialty	Years Teaching
Cathy	55-59	Female	Pediatrics	11-15
Debbie	55-59	Female	Fundamentals	16-20
Emily	55-59	Female	Maternity	0-5
Karen	60-64	Female	Medical-Surgical	25+
Louise	60-64	Female	Medical-Surgical	21-25
Mandy	50-54	Female	Advanced Med-Surg	16-20
Remi	55-59	Female	Advanced Med-Surg	16-20
Sarah	65+	Female	Psychiatric Nursing	11-15

Recordings of the interviews were made in real-time using Otter note transcription software on my mobile phone as well as video recording capabilities of Google Meet. Recordings from Otter note were saved in an mp3 audio file and refined in transcription using *GoTranscript.com* which produced a Microsoft Word file. Each transcript was then manually reviewed by me against the video recording of the interview for accuracy. Any inaccuracies were updated with formatting changes as needed. In any instances where the participants' responses were impossible to hear, this was listed in the transcript as *unintelligible*. Transcripts were formatted into individual Microsoft Word documents with participant names changed to pseudonyms. In addition to my individual review, finalized transcripts were emailed to the individual instructors with the request that they be reviewed for accuracy. These participants were asked to reply to confirm the accuracy of their transcripts. Of the eight interviewed instructors, six responded that their transcripts accurately portrayed their interview. Two instructors did not respond. Following confirmation, coding of the transcripts was performed.

Focus Groups

In addition to instructor interviews providing a perspective to answer my RQ1 and RQ2, I chose to interview students in focus groups to determine their attitudes and perceptions of educational technology in order to help answer RQ3 and RQ4. Students were chosen for focus groups based on the following criteria: 1) students who participated in the original quantitative survey (*n*=65); 2) students from all levels of nursing courses (from freshman Fundamentals to senior Advanced Medical Surgical nursing); 3) students from both day and evening cohorts. Focus groups met over Google Meet with the interviews being video recorded through that medium as well as audio recorded through the Otter note audio application.

There was a total of 19 focus group participants in four focus groups with two groups representing the day cohort and two the evening cohort. The first day cohort consisted of five students and the second day cohort consisted of four students. Both groups with the evening cohorts had five participants each. As mentioned previously, students from all courses at the school were asked to participate. The majority of the participants were female with 17 females participating. The two males participating in the focus groups both belonged to the day cohort. Regarding breakdown by age, the most common age range of participants in both the day and evening cohorts was the 25-29 years old. A breakdown of each participant per group is presented in tables 4.16 and 4.17, below.

Table 4.16. *Focus Group Composition – Day Cohort*

Pseudonym	Age	Gender	Group	Year in Program	Current Course
Anne	25-29	Female	1st	First	Medical-Surgical
Jessica	35-39	Female	1st	First	Medical-Surgical
Mary	20-24	Female	1st	First	Fundamentals
Tracy	35-39	Female	1st	Second	Psych / AMS*
Yolanda	25-29	Female	1st	First	Fundamentals
Aaron	45-49	Male	2nd	Second	Psych / AMS*
Kristin	25-29	Female	2nd	Second	Peds / Maternity*
Nikki	40-44	Female	2nd	Second	Psych / AMS*
Will	30-34	Male	2nd	Second	Psych*

Note. Two courses may be listed because most second-year students take two courses each semester. *AMS – Advanced Medical-Surgical Nursing, Peds – Pediatric Nursing, Psych – Psychiatric Nursing

Table 4.17. *Focus Group Composition – Evening Cohort*

Pseudonym	Age	Gender	Group	Year in Program	Current Course
Ariel	35-39	Female	1st	Second	Peds / Maternity *
Christine	25-29	Female	1st	Second	Psych / AMS*
Karin	25-29	Female	1st	Second	Peds / Maternity*
Martha	30-34	Female	1st	Second	Psych / AMS*
Sheila	25-29	Female	1st	Second	Psych / AMS*
Anya	25-29	Female	2nd	First	Fundamentals
Ellie	35-39	Female	2nd	Second	Peds / Maternity*
Lisa	25-29	Female	2nd	Second	Psych / AMS*
Sheena	25-29	Female	2nd	Second	Medical-Surgical
Yvette	25-29	Female	2nd	Second	Psych / AMS*

Note. Two courses may be listed because most second-year students take two courses each semester. *AMS – Advanced Medical-Surgical Nursing, Peds – Pediatric Nursing, Psych – Psychiatric Nursing.

Like the handling of the instructor interviews, focus groups were conducted via Google Meet which provided both video and audio recordings of the groups. The Otter note application was also used to obtain an audio recording of the groups' meetings, which was submitted to *GoTranscript.com* for transcription. Following the return of the transcript, I manually reviewed the transcripts against the video recording of the groups

and corrected any inaccuracies. Additional edits included notations on the transcripts when it appeared that participants were nodding in the affirmative following the posing of questions or observations. Because students were ending their semester soon after the focus group interviews and several were graduating, their examination of the transcripts was not practical and therefore were not conducted.

Analysis of Qualitative Data

The initial step of analyzing the qualitative data was evaluating the audio and video files from my instructor interviews. For this first step, I watched each of the video recordings and listened to the one audio file that was completed without video. In this initial review, I wanted to get a general sense of how instructors and students felt about educational technology. While watching the videos and listening to the recording, I jotted general notations of my perceptions in my field notes. Creswell (2018) recommends this reflection as an important process of reviewing and refining data in preparation of analysis. For example, during an interview with Debbie, one of the instructors, I made the notation *lip service.* I thought this was appropriate because while she commented on the value of educational technology, she also appeared to belittle the same technology by commenting: “I don't see the need for a lot of these little games and things like that, they're adults.”

After watching and listening to each interview and sending the audio recordings to an online transcription service, I reviewed each returned transcript against the video recordings to ensure they were accurately transcribed into a Microsoft Word file. Once satisfied, I downloaded each of the eight instructor and four focus group transcriptions

into Delve, an online qualitative coding platform, and began the process of coding the data. Coding of the data took place in two separate cycles of coding.

First Cycle Coding

My principal method of analyzing my data was through inductive analysis, where I would evaluate information from the different interviews in order to formulate themes (Creswell, 2014; Mertler, 2017). The process of accomplishing this analysis was through the coding of my data. Coding of data is the assignment of a code – one to a few words, and possibly a paragraph – to represent a central idea of a comment or statement made by an interviewee (Saldaña, 2016). The process of inductive analysis involved several rounds of coding.

For my first cycle of coding, I utilized two rounds of initial coding. Initial coding, also referred to as open coding, is described by Williams and Moser (2019) as the initial step in qualitative analysis where the researcher reviews and interacts with data and constantly compares and consolidates the data into more central ideas. According to Douglas (2003), the use of coding "represent[s] the interplay of subjects' and researcher's perceptions of the nature and dimensions of the phenomena under study" (p.48).

Coding methods such as in vivo coding, concept coding, and emotion coding were used to evaluate my data as individual remarks, sentences as well as overall paragraphs (Saldaña, 2016). In vivo coding entails using the interviewee's own words as a code to describe the general concepts of their experiences. Examples of in vivo coding included quotes such as one student's comment "I still believe in teaching" (Nikki) and another's "professors have to just jump on that band wagon" (Yolanda). Concept coding is the use of codes that convey intangible concepts such as efficacy, value, and feelings of support.

Examples of concept coding included words such as *engagement* and *motivation.* Emotion coding works to convey the presence of fear, satisfaction, and other affective factors. Examples of emotion coding used for this study included codes such as *fear* and *anxiety.*

During the course of first cycle coding, I generated many instances of splitting of codes among data. Saldaña (2016) describes splitting as the process of assigning several codes to a paragraph or collection of data to allow a more detailed and nuanced analysis of the information. This initial coding method, yielding a greater number of codes initially, can allow codes to be evaluated in subsequent cycles of coding. For example, during my first round of coding, I assigned the codes *challenge incorporating technology, context, mixed student population, perception of student needs,* and *time constraints* to comments by Debbie, one of the instructors interviewed as shown in Figure 4.2 below. In this example, Debbie was outlining the frustrations she felt about the limited time she already has to teach numerous concepts in class, and how that can be compounded with the introduction of technological devices such as "clickers." In addition, she alludes to her thought that many students in class are "at risk" where they have competing responsibilities which could also compound her ability to convey the required amount of information during the time allotted for lecture.

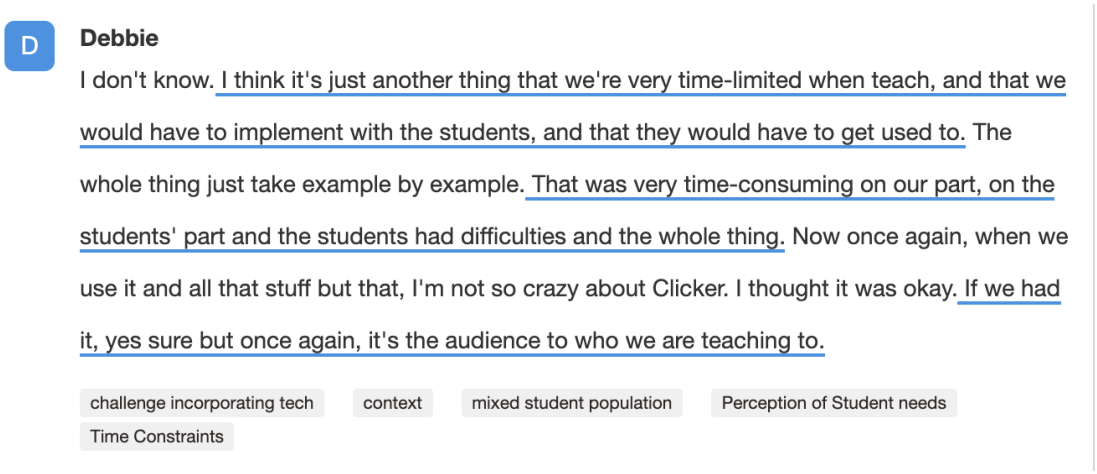

Figure 4.2. An example of split coding with Debbie's paragraph split into several codes.

When completed, the first round of coding yielded a total of 247 preliminary codes. Subsequent revisions of codes, following consultation with a cohort colleague in peer debriefing, consisted of consolidating codes that represented similar ideas and discarding codes that were thought irrelevant. For example, the code *material matters* was deemed too vague and lacked good representation of the idea originally expressed by the interviewee and was discarded. In another instance, the in vivo code "opportunity to mess up" (Martha), expressed by a student who liked the idea of formative assessment through game playing in the classroom, was revised as a general code *positive student perception.*

Second cycle coding

Following the first cycle of coding with its multiple rounds, I reviewed the codes in Delve, reflected upon the resulting codes, and compared the concepts represented against my research questions. This second cycle of coding consisted of three rounds of pattern coding. During one of these rounds, codes were written on post-It notes and attached to a large wall, see Figure 4.3. Reflecting on these codes and considering their meaning, codes were able to be consolidated or discarded.

Figure.4.3. Photo of author's use of post-It notes to evaluate and consolidate codes.

Saldaña (2016) describes pattern coding as the method of grouping similar codes together with the purpose of arriving at categories, and eventually themes, that best represent the grouping of ideas. For example, the codes *fear of change, confidence in current practice, excellent nursing board scores,* and *fear of embarrassment* were grouped into the category termed *complacency.* In another instance, the codes *glitchy, student frustration, student struggles with technology*, and *student characteristics* were grouped under the category named *challenges.* Subsequent coding and development of themes were recorded in my field note journal. Subsequent second cycle coding and review of coding with an external auditor, resulted in 42 final codes.

Peer Debriefing and External Auditing

Peer debriefing is the process of asking one's colleagues or dissertation chair to review their findings to scrutinize the researcher's beliefs, ideas, and conclusions (Creswell, 2014; Mertler, 2017). Over the course of the coding process, meetings were held with my dissertation chair to discuss the coding process and the arrival of categories

and themes. In addition, I asked one of my cohort colleagues to review my codes for accuracy and alignment with categories and themes. As a further method to ensure the validity of my conclusions, I obtained the assistance of an external auditor to evaluate my qualitative findings. An external auditor is someone not familiar with the research project and who is able to provide an impartial evaluation of my data analysis and conclusions (Creswell, 2014). The use of an external auditor, reviewing the accuracy of transcription; examining the associations between conclusions, themes, and research questions; and determining the rigor of data analysis, helps to provide the researcher independent and unbiased evaluation of their data which enhances the study's overall legitimacy (Creswell, 2014).

Identifying Themes

Upon evaluation of the input from peer debriefers and the external auditor, I considered the identification and development of themes. The purpose of the qualitative analysis of instructor interviews and student focus groups was to order the collection of information into discernable ideas (Mertler, 2017). I looked upon the data that I had gathered and considered how this helped me to determine factors that influence instructor use of educational technology. In addition, I considered how students perceived the use of educational technology currently being used and how this affected their perceptions of educational technology as a whole.

Presentation of Findings

For this study, the inductive approach was adopted to better understand the thoughts and perceptions of both instructors and students at the nursing school. This approach consists of the evaluation, organization, and consideration of data to determine

the presence of commonalities that emerge (Braun & Clark, 2012). The primary purpose of using codes is to examine the data for common thoughts and ideas and to develop these into categories. Guest et al. (2012) describe how thematic analysis is accomplished by moving "beyond counting explicit words or phrases and focuses on identifying and describing both implicit and explicit ideas within the data, that is, themes" (p.9). From the examination of codes and categories, reflecting upon recurrent ideas, and examination of them considering my research questions, themes emerged (Seidman, 2013).

Over the course of analysis of instructor interviews and student focus groups, six primary themes emerged which addressed the four research questions of the study. These themes included: a) Instructors demonstrate ambivalence towards educational technology, b) Workload and volume of content prevent faculty from adopting educational technologies, c) Emerging technology usage by instructors due to COVID-19 causing reevaluation of technology in the classroom, d) Students demonstrate mixed feelings regarding use of technology in the classroom, e) Students see educational technologies as a supplement to lecture and not a replacement to the teacher, and f) Students feel frustrated about the lack of effective technology usage in the classroom. These themes and their associated categories, as well as examples of codes which helped formulate the themes, are listed in Table 4.18. Each theme is discussed in connection with its respective research question in the following sections.

Table 4.18. *Themes, Categories, and Sample Quotes*

Themes	Categories	Sample Quotes
Instructors demonstrate ambivalence towards	• Resistance/ Unnecessary • Lack of self-efficacy • Lack of support	• Debbie: "I don't see the need for a lot of these little games and things like that, they're adults." • Cathy: "it's a lack of knowledge of how to use it properly without

Themes	Categories	Sample Quotes
educational technology (RQ1)	• Perceived need for change	sitting there, fumbling, losing everything else I have and looking like an idiot in the classroom." • Remi: "we need faculty development to introduce new things to all the faculty and then everybody has to be on the same page to move forward." • Debbie: "Part of my mindset is, if it ain't broke, don't fix it."
Workload and volume of content prevent faculty from adopting educational technologies (RQ1)	• Volume of information / Time to teach • Need for support / Faculty development • Conformity / Need for group consensus	• Remi: "On top of that, you want to learn something new…you are looking at how much time you're going to spend to learn this new thing." • Emily: "because no good giving me something to use and I don't know how to use it. Just throw it on you and expect you to know how to do it." • Remi: "if you want to bring something new, other than the PowerPoint, …somebody should step up as the leader, like a faculty development committee."
Emerging technology usage by instructors due to COVID-19 causing reevaluation of technology in the classroom (RQ2)	• Acclimation • Adaptation to online environment.	• Cathy: "For that, I just feel like we've all come a long way in a very short amount of time due to COVID." • Sarah: "I felt that I learned some aspects of it [technology] but certainly not to the max because it becomes overwhelming."
Students demonstrate mixed feelings regarding use of technology in the classroom (RQ3)	• Interactive and fun • Technology can detract from learning	• Ariel: "I think it's a cool idea because sometimes when you play a game, as we know, that's how a lot of kids learn. When they start to play little games, we were able to get the message across." • Yolanda: "I know it may be hard to include always a video during lectures because then that would

Themes	Categories	Sample Quotes
		make our lectures even longer than they are."
Students see educational technologies as a supplement to lecture and not a replacement to the teacher (RQ3)	• Adjunct to lecture • Mental break • Instructor role in the classroom	• Yolanda: "I think that during lecture time, I'm okay with just having a lecture and listening to what you guys are saying, but here and there a video would be nice. Even if it's a short video, just to keep the person engaged, I think helps. • Tracy: "I think [videos] breaks up the monotony. I think even if it's just a short little, 10, 15 [minute video]. Just something to just kind of stimulate your mind in a different way."
Students feel frustrated about the lack of effective technology usage in the classroom (RQ4)	• Frustration at teacher challenges in using technology • Dated material, limited resources, and inappropriate use of technology.	• Christine: "Then they're about to say something that is going to be a test question and it completely gets overlooked [by their distraction with the technology]." • Aaron: "the technology can be improved upon…[watching] more of a simulation video that would pause and prompt us [to ask] what we will do next as opposed to watching these videos form 1985."

RQ1: What factors influence instructor use of educational technology for teaching theoretical knowledge of nursing?

Theme 1: Instructors demonstrate ambivalence towards educational technology. Over the course of their interviews, instructors expressed ambivalence about the use of educational technology in the classroom. For the purpose of this study, I have defined ambivalence as having an unclear or the lack of a well-defined attitude towards the use of educational technology. While it was clear that instructors felt that there could be benefits of technology for the students, there was also an underlying reluctance to use

educational technology due to factors such as fear, lack of self-efficacy, complacency, and lack of perceived administrative support.

Over the course of interviews, instructors acknowledged the benefits of technology. Technology could help provide a richer learning experience. It could also help provide a medium to increase student involvement and interaction. One instructor, Mandy, commented about how virtual simulations provide a benefit to her students: “Yes I find vSim very good for that because it helps [students] come to conclusions.” Likewise, Remi, another instructor, when asked about whether she believed that technology such as clicker technology could make an impact in her class, recalled her past use of clickers:

> The reaction is we get a sudden response from the student. We can always have that [formative] assessment where they are at like you're teaching for an hour and now using a small five questions, Clickers' response, so they will be able to-- I can evaluate where the students are and that I can re-emphasize on the content. The student's response were good. Actually, they liked it.

Sarah, another instructor, remarked on how technology such as clickers could involve more students leading to a more interactive environment: “Would it [clicker technology] help with [quiet students]? Absolutely.”

However, while instructors acknowledged the value of technology and its increasing use, there remained an underlying hesitancy, even resistance regarding its incorporation in the classroom. This theme of *ambivalence towards the use of technology* was derived from four categories. These categories concerned underlying feelings of resistance and necessity towards the need to integrate educational technology. Another

category, *lack of self-efficacy*, considered instructors' perception of their ability to use and integrate technology into their practice. The category *lack of support* entailed the amount of available support for instructors perceived to be needed to successfully integrate technology into the classroom. The last category, *perceived need for change*, discusses the underlying desire to change practices if no problem is perceived.

Resistance / Unnecessary. Analysis of the qualitative information revealed a general resistance to using educational technology. Some expressed it was not necessary to use in their practice, that it was superfluous because they felt their teaching strategies were effective. Others acknowledged resistance to using technology because of changes, unwelcome changes, that technology could bring about. One educator, Debbie, while initially describing positive aspects of technology, later in the interview changed her tone to one of resistance regarding how to use technology in the classroom: "I don't see the need for a lot of these little games and things like that, they're adults." This same instructor remarked several times during the interview about the need of students to take responsibility for their learning, and she seemed annoyed to have to consider changing her practice to accommodate for other methods of learning. She stated: "if the student is engaged, and wants to be there, they're going to be engaged no matter what we do for them." Another instructor, Remi, reflected on resistance on changes in nursing education: "I have seen resistance to a lot of changes in the nursing profession, especially in education…you can say that not all the faculty is going to welcome the changes." She specifically cited resistance to technology and implications of time constraints:

> the technology is one impediment…what I see with my colleagues most of the time, that you will get a sudden 'no' or 'we don't want to change it.' We know

that is understandable because we all have enough workload to do. As faculty, we have so much to do.

It can be seen through these interviews that some of the instructors resisted using technology into their classroom because they felt it was unnecessary. Next, we will examine how the feeling of self-efficacy affected instructor intentions to use technology in their classroom.

Lack of self-efficacy. Some instructors expressed concern about their perceived ability to use and integrate educational technology into their teaching. While instructors did not outright state they were fearful of technology, many acknowledged their common concerns regarding a lack of self-efficacy regarding the use of technology in the classroom. One instructor, Sarah, who uses only PowerPoint in her class, summed up her feelings very bluntly when asked what leads her to not use technology: "lack of comfort." Sarah further explained: "Do I feel that it would help my classroom? Absolutely…but I would really have to practice in order to feel unbelievably comfortable with it." Another instructor, Cathy, expressed her concerns about technology making her look unprepared, leading to a lack of credibility among her students: "It's a lack of knowledge of how to use it properly without sitting there, fumbling, losing everything else I have and looking like an idiot in the classroom." This lack of self-efficacy in ability to incorporate educational technology into a classroom setting can be a factor in instructors' intention of using technology. Related to this is the perception of support by administration and colleagues towards further professional development. This perception of support will be examined in the following section.

Lack of support. The perception of limited support from both colleagues and administration to incorporate technology was a concern expressed during instructor interviews. While there was authentic acknowledgement in the usefulness of technology in the classroom, instructors alluded that the environment at the school was not as readily conducive to adopting technology. One instructor, Remi, intimated that while she previously had experience using educational technologies such as clickers, *Jeopardy*, *Who Wants to Be a Millionaire,* and other game-based programs in a class, she did not carry this practice over to her current school. She reported that she believed that when she used these instructional technologies the students were more interactive and engaged. Although she could not recall if this produced an increase in grades or retention of knowledge – she was not studying its effect – she did not feel she could transfer that practice to her current work setting because: "we don't use it. That's not practiced here. The faculty practice is [different] at this location."

Remi here also acknowledged the importance to have buy-in from all faculty and administration in order to move forward with technology integration: "For that reason, that is why we need faculty development to introduce new things to all the faculty and then everybody has to be on the same page to move forward." She maintained that all the faculty needs to be supportive of technology or it would not move forward. This sentiment was echoed by Cathy, who replied "absolutely" when asked if a supportive administrator who was very positive and pro-technology and willing to provide staff development resources would drive her to use more technology. Perceptions of administration and colleagues towards the use of technology was examined and showed that there were areas for better understanding regarding the need for support and

professional development. In addition, another challenge to integrating technology into pedagogy was the perceived need for change which will be examined next.

Perceived need for change. In order for a solution to be sought after, there needs to be a perception of a problem. In the case of the instructors, the presence of a problem or issue of incorporating technology was not always considered apparent or an issue. During the interviews with the instructors, not all acknowledged that there needed to be a change in the current method of classroom teaching of traditional lecture supported by PowerPoint and an occasional video. Some believed that it was not technology that was needed but better motivation. Others believed that the school's current NCLEX licensing examination pass rates indicated that the curriculum was already successful and that no change was warranted. One instructor, Louise, a longtime part of the faculty, did not see the limited use of technology as a problem as much as the need to get students motivated to learn. For her, motivating students came in the form of actively and physically engaging her students while they were either in the classroom or, during the pandemic, meeting online and using current resources such as the Moodle LMS. Concerning assignments, she remarked:

> They have to come to class with stuff that we have to do. I bring the work to class for them to do and it's very dynamic. I don't put a PowerPoint up and go slide by slide…they had projects that they had to come with stuff and then we had to interact." I remarked that it sounded very much like a flipped classroom. To this, Louise replied: "Yes, I've been trying to do that. We have been trying to do flipped classrooms. I've been using discussion boards and blogs, the Moodle, all the extra stuff they had there.

Complacency with the status quo can be summarized by remarks from two teachers who discussed how the current environment at the school did not support significant changes. One instructor, Debbie, talked about her tendency to want to keep things the same: "Part of my mindset is, if it ain't broke, don't fix it." This sentiment was echoed by Cathy, who did not feel that administration would press for significant changes if the National Council Licensure Examination (NCLEX) – the rates of graduates who have passed the NCLEX remained high:

> We have free freedom of teaching…we base…what we do in our program on board results, things like that. I think administration would really come down on us if we weren't getting positive results out of that…I think that they're content with what we're doing because we're giving positive results with the board rates.

With current pass rates remaining above the national average, it could be more challenging to persuade instructors of the value of changing their practice.

Theme 2: Workload and volume of content prevent faculty from adopting educational technologies. Issues such as the amount of work needed to train, implement, and maintain practice concerns for the instructors. Participants were asked what might be hindrances to them implementing educational technology in the classroom setting. Through their coded responses, categories became evident that incorporating of technology would be time consuming, require the need for continued support, and the use of educational technology would have the effect of limiting time – already short – for teaching the ever-growing body of knowledge of nursing. In addition, instructors seemed hesitant to attempt to incorporate new methods of teaching unless other instructors were willing to do the same. Three primary categories developed from my coding include

volume of information / time to teach, need for support / faculty development, and *conformity / need for group consensus.*

Volume of information/ time to teach. The amount of theoretical knowledge of nursing – an ever-growing body of knowledge as more treatments are discovered and research changes practice – and the time needed to convey instruction was seen as a limiting factor to adding additional technology to instruction. Instructors expressed their concerns regarding the use of educational technology in trying to teach the ever-increasing body of nursing knowledge and how technology could curtail the already limited amount of instruction time they have with students. One of the newer instructors, Emily, shared these sentiments: "I do try to incorporate some games into my classroom but what I find is there is so much information that I can't lose that much time playing games." Sarah shared similar frustrations at trying to accommodate for new technology in the classroom:

> A lot of these ideas, they sound like great ideas, but just the transition, there goes an hour of the classroom. It's really hard to stay within the time parameters of your material if you're throwing in all these other games and whatnot. It's hard to know what to leave in, what to take out, what to include in the games. It's hard.

In fact, review of instructor transcripts showed that every instructor commented about how the lack of time could be a compounding factor for them integrating technology in the workplace. Karen, a long-time instructor, discussed the logistical challenges of incorporating technology into a classroom: "the problem with the five-hour lectures… is you have to pick out what you're going to focus on…you can't do a game for every topic… you got to do things that are extremely well-timed."

The factor of time, however, did not seem to dissuade everyone. Mandy, one of the instructors who commented positively on the use of technology, acknowledged that time could be a limiting factor for some of her colleagues to integrate technology. However, she believed that her years of experience and knowledge of subject matter helped dispel concerns: “For me, I’ve been in the classroom, gosh, now 14 years, over 14 years. I just find I am pretty comfortable with what I'm teaching that I can incorporate [educational technology].” This concept of the time needed to change practice is valid consideration in willingness of instructors to change. A related concept, that of support for faculty development, is something that will help instructors to manage the use of technology and instructor workload and is considered below.

Need for support/faculty development. Support for increasing the use of educational technology in the nursing classroom was felt by instructors to be an important part of increasing the use of technology in the classroom. Support by administration in providing funding for faculty development and for resources to support the instructors were seen as important factors for implementing and maintaining the use of educational technology. This category, the need for professional development and information technology support, was one that was woven throughout all the instructor transcripts. A level of frustration was noted by one instructor, Emily, who answered the interview question about whether she would be more willing to adopt technology if she felt supported: “Yes, and teaching, too, because no good giving me something to use and I don't know how to use it. Just throw it on you and expect you to know how to do it.” Cathy repeated this sentiment: “it's just practice and it's learning…if someone teaches me how to turn something on, flip a switch, change this, do that, I can learn it, but I need to

spend the time with somebody…to work with me." Debbie also echoed these sentiments: "I find it frustrating most of the time on the implementation of it and that we have enough of help and resources to get it up and running the way we should get it up and running." Remi, another long-time instructor at the school, summed up the need for support and development:

> I think the resolution for [integrating technology in the classroom] is good faculty development. If you really teach enough resources to learn…that will help the faculty. I think they'll be more open to accommodate, more open to learn the new technology. That is what I see in my profession.

The need for faculty development was seen as an important factor for integration of technology in the classroom. This factor is related to the perceived support from administration and colleagues and factor of conformity and group consensus was seen as significant for some instructors interviewed. The important of group consensus is discussed in the next section.

Conformity/need for group consensus. Over the course of the interviews, I got the sense that instructors were supportive of each other, but also wanted to have a consensus of faculty to support significant change to practice. While discussing with participants their ability to change practice, there seemed to be an underlying sense that it would not be welcomed to change practice unless the faculty in its entirety felt the change was warranted. This sentiment resonated in the words of Remi: "Keeping in mind if you want to bring something new, other than the PowerPoint, …somebody should step up as the leader, like a faculty development committee." Debbie expressed a similar opinion regarding the importance of faculty buy-in "you have to have the time to

implement something like that [educational technology] across the board and the resources behind it." From these instructors I understood that consensus was important to have in order for a change to be implemented.

RQ2: How do instructors use educational technology in teaching theoretical knowledge of nursing?

Theme 1: Emerging technology usage by instructors due to COVID causing a reevaluation of technology in the classroom. An underlying theme that was developed upon in the analysis of faculty interviews was the effect of the COVID-19 pandemic and its influence on changing instructor comfort levels and practice. As the school had to adapt to restrictions due to the COVID-19 pandemic which coincided with this study, instruction had to change from in person to remote. Instructors had to accommodate their teaching methods to fit this remote format. During that time instructors were able to work with technology and consider its uses for instruction. In the process it forced them to reevaluate their use of technology in their classrooms. Two primary categories emerging from data analysis included *acclimation* and *adaptation to the online environment in the age of COVID-19.*

Acclimation / adaptation to the online environment. During the COVID-19 pandemic, instructors were forced to make adaptations to their instruction in order to continue teaching. Over the course of the pandemic, the nursing school had to undergo a radical change in order to continue its operations. In-person classes, skills laboratory, and clinical experiences were suspended, requiring instruction to move to an online platform and clinicals to be completed using a virtual simulation program (vSim) through Lippincott, the school's textbook supplier. Classes met initially through the online

meeting platform, then through Google Meet. The schools' Learning Management System (LMS), Moodle, housed more than just PowerPoints and videos. The LMS served as a vehicle for online forum discussion posts, a weekly assignment repository, and a medium for regular summative assessments such as unit, mid-term, and final exams. The expanded use of this platform influenced instructor sentiment regarding the use of technology. The attitude of acceptance and adaptation can be seen in Cathy's comments about the changes brought about by the COVID-19 pandemic: "we've all come a long way in a very short amount of time due to COVID… I do feel that technology for everybody is just accelerating…for ExamSoft and the meetings and all that stuff." Her sentiments are further expressed in my dialogue with her, below:

> Cathy: "Yes, I just feel like has my attitude changed on the whole thing? I 100% think it has. We had no choice. It was like there was no choice in the matter, we had to do it.
>
> Researcher: Right, you had to do it. It wasn't like you saying, "No, well, I guess we'll learn this next year." It's like "No, you need to learn it now because we can't get anything done if you don't."
>
> Cathy: "This was literally like, my God, it was just literally slapped us in the face. We had no choice then but to learn it and sometimes that's not such a bad thing. To be honest, the biggest thing is, people don't like to accept change quickly."

Sarah, who self-described during our interview as not being tech-savvy, shared these thoughts about the pandemic's effect on her practice: "I felt that I learned some aspects of it [technology] but certainly not to the max because it becomes overwhelming." Likewise, Karen, who identified herself as "not a computer person," had this to say: "I'm

just getting used to the online format, and the computer on the online format, and everything. I'm very impressed on what we've done, what we've learned, what I learned, and what I've done. I'm blown away."

RQ3: What are student perceptions about using educational technologies to learn theoretical knowledge of nursing?

Theme 1: Students demonstrate mixed feelings regarding use of technology in the classroom. Over the course of four focus groups, it was noticeable that students were conflicted regarding the use of technology in the classroom. In some instances, students felt that adding technology could make the classroom more interactive and fun. However, becoming aware that a more interactive environment might necessitate a higher degree of preparation for classroom activities, some students expressed concern regarding extensive classroom preparation with an already oversubscribed schedule. In addition, some students felt that due to the complexity of the material and the serious nature of nursing, it could be difficult to plan serious coursework around something that could be fun. I will examine the expression of these feelings in two categories – *interactive and fun*; and *technology can detract from learning*, in this next section.

Interactive and fun. From some student insights, many were of the opinion that technology in the class, in the form of games, videos, and audience response systems such as *clickers* could have the effect of making the classroom more interactive and fun, which was seen as a benefit of technology. Some of the interviewed students perceived the use of educational technology in the classroom as a more enjoyable and interactive way to learn concepts and enhance their learning. Ariel, a fourth semester student soon to be graduating, saw the use of games as a way to get information across to students in the

nursing classroom: “I think it's a cool idea because sometimes when you play a game, as we know, that's how a lot of kids learn. When they start to play little games, we were able to get the message across.” Mary, a first-semester student, recalled how a previous psychology instructor used Kahoot!, a competitive web-based question and answer game: “That was definitely a fun way of learning things for me.” She added that games helped her to focus on salient points of the classroom lecture: “I feel like [games] actually helped me a lot more in the end when it came down to the test…it would push me to be like, ‘I didn’t know that I need to know that now.” Yolanda, a first-semester student, recalled how her high school instructors would use games to make leaning fun for her:

> I know when I was in high school…a lot of the times, we would all be taking game quizzes, we would do Pictionary, or there was Who Wants to Be a Millionaire but in the style of history, or whatever we were learning during that time. We would all do it together. That was very encouraging because we were all like, "I've got it first." It was like [my competitor was] boosting me to do better. I did appreciate using that a lot in high school, the technology within the classroom and the games. That helped me at least.

Students in this study found value in the ability of technology to make the nursing classroom more interactive and fun. However, students also expressed some concern that technology could have the negative effect of detracting from learning. These concerns are discussed in the next section.

Technology can detract from learning. Some students interviewed felt that technology, while providing vehicle for making the classroom more interactive, could be time consuming and divert attention, both of which could detract from learning. During

our discussions, while students expressed primarily positivity towards the use of games and other electronic tools and applications in the classroom, it was felt that technology did have some shortcomings. Some acknowledged that adding videos and games could have the effect of lengthening the time students stayed in class for lecture. Yolanda, a first-semester student, was concerned about how a much longer class could be extended by watching videos or playing games: “I know it may be hard to include always a video during lectures because then that would make our lectures even longer than they are.” When describing a classroom environment that would be more interactive and technology focused with the instructor playing a facilitator role and requiring a significant amount of student preparation time, Tracy, a fourth-semester Senior, did not find the preparation as appealing: “Part of it feels interesting but I don't know that I would necessarily… enjoy that aspect of having to do so much up front and then just coming in and having the teacher be more of a facilitator.”

In addition to taking up extra time, students were concerned about how effectively instructors might use technology and, if not handled well, can lead to distraction and disruptive learning experiences. Christine, a second-year student seconded another student’s comment about how glitches and teacher inexperience with technology disrupt the flow of class: “I’ve had the same experiences and when that happens, it throws the teacher off track.” This sentiment was shared by Ariel, a first-year student:

> The only thing that's distracting is when your professor's not tech savvy. We end up spending more time trying to figure out what's the issue than actually learning, because I think the first day, we spent a good hour just figuring out what was wrong. That took us so much time when we should have been learning.

In addition to the instructor's skills at using technology, students believed the technology itself needs to be timely and appropriate. Tracy, a second-year student, responding as to whether technology in the classroom is more a benefit than a distraction, talked about how the quality of the technology is an important factor to her learning:

> I think it piques my interest more than it's a distraction as long as the content is quality… I get distracted when I feel like the material is really dated and not applicable to now. I feel like the quality of the content will distract me. As long as the content is applicable and current, yes, I'm not distracted, I'm more engaged.

As students are hoping that technology does not add workload or detract from their learning, this research found that they also want instructors to remain central in the classroom. The next theme developed, that of technology as supplement to the lecture and not a replacement of the instructor, is listed below.

Theme 2: Students see technology as a supplement to lecture and not a replacement to the teacher. Students acknowledged the value of technology in the classroom. They believed that technology had value as a supplement and not a replacement of instructor-centered lectures. Over the course of the focus group discussions, students considered what role educational technology could play in the classroom and how it could expand or detract from the role of the instructor. Based upon their responses, three categories - *adjunct to lecture*, *mental break,* and *instructor role in the classroom* emerged from the analyzed data. To this question, students largely saw technology serving as an adjunct to the traditional lecture, a way to stop and recollect, and give a valuable mental break to the student while the teacher remains in an active role of providing the information for the students to learn.

Adjunct to lecture. Educational technology was looked upon by the students as a supplement to the lecture with students reporting that they valued lecture because the teacher helped explain and clarify information they received. Both students from the day and evening cohorts agreed that technology, in addition to lecture, helped to make learning more interactive and interesting, while reinforcing what students are learning through lecture. Aaron, recalling how I used Kahoot! in class, commented on how this helped in the classroom: "it was cool. It was nice. It was fun. It was interactive." Tracy agreed that technology added to the level of involvement in the classroom: "I still think…traditional learning is still valid…but just incorporating here and there new ways of learning, just makes it all a more appealing lecture and just more encouraging for the student as well." Karin, a second-year student also agreed that technology helps pique student interest: "The whole technology thing with lecture, it does make things more interesting." Martha, also a second-year student discussed how the use of technology games helped with reinforcing concepts:

> The idea of touching base on a topic and diving in… [followed by] a game like Jeopardy…allows me an opportunity to mess up, but then to be given an explanation, to help me understand where I was wrong in my thought process would more than likely help me be even more successful in nursing school or in any class. Because I'm given an opportunity to mess up during a game where it's not going to mess up my grade or my GPA or anything.

In addition to seeing technology as a useful and entertaining way to supplement lecture, students believed the use of games, videos, and other technologies could provide a

needed mental break during long days of lecture. This idea of mental breaks is discussed below.

Mental break. While appreciating the effect of technology to enhance their learning experiences, students also described the practical benefit of technology in providing a needed break during lectures. This helped them to remain engaged with the information and the students believed it also helped to improve the instructors' performance by breaking up large segments of lecture. Ariel felt that technology provides a break to increase energy in the class during a long lecture: "If you have that bit of break where you say…we're going to have an interaction with whatever, may be Jeopardy… you bring back up that energy level in the class." Yolanda agreed that a break from lecture can be beneficial: "I'm okay with just having a lecture and listening to what you guys are saying, but here and there a video would be nice. Even if it's a short video, just to keep the person engaged." Tracy asserted that technological tools such as videos can serve to help stimulate learning: "I definitely agree with that. I think it breaks up the monotony." Martha concurred and reflected upon how games could be made different:

> It's like Ariel was saying, "How long can I really listen to a lecture for before I'm not listening anymore?" To have those spurts where you can play a game or do this, will allow your attention span to be utilized a little bit better as well.

The students also agreed that mental breaks can also be good for the instructor. Aaron considered how long lectures and having breaks affect the instructor as well: "these teachers are there four, five hours teaching. Having these little things to break it up, I think, enhances the teacher's performance as well." This emphasis of the teacher's performance is important to consider because it underscores the importance and value

they place on the instructor's role in presenting knowledge. The students' perceived role of the instructor is discussed below.

Instructor role in the classroom. Another topic discussed was the instructor's role in the classroom. Was the classroom supposed to be student-centered, where an instructor assumes more of a facilitator role, or was it supposed to remain instructor centered as commonly seen in traditional classrooms? Our focus groups discussed the role of the educator in the classroom, especially in light of increasing technology in the classroom. Far from the notion that technology might relegate the instructor to a facilitator of learning, students felt that instructors should continue to be the primary source of information. Some felt that they still liked "old school" lecture, enhanced with technology. Some, like Kristin, did not like the notion of a *flipped classroom* model where students prepare prior to class and come ready to discuss ideas and share learning. She felt that instructors are needed to guide students through learning: "As far as being prepared for lecture…even if I would try to read it, I honestly had no idea of what I was reading until I got that lecture." Nikki, another student, concurred. She felt that taking lecture out of the classroom was not productive:

> I still believe in teaching. I understand this generation… they know more about technology, but then where's the teaching? That's [the Flipped Classroom] a more of Laisse Fare approach, where you only have the instructor inputting and the students inputting, but I just want to know where the teaching is in that type of model.

Evening students shared similar views with their day colleagues. Sheena, a first-year evening student, believed it was important to have the instructor to offer clarification and

guidance: “Just don't say, ‘Here, watch this video and get whatever you get out of it.’ I would prefer like, ‘Let's have a conversation about what we just watched, go over maybe something that wasn't clear’.” Likewise, Christine believed that information in class was just too serious not to have a lecture by an instructor:

> I feel like me as a student, I don't know how, but how would they avoid lecturing for three hours or lecturing for that long to get all that information across? Because…it's not like we're in high school and it's just the history class. That stuff, I feel like you can make more into games and things. You can have more interactive. This stuff can you interact at law school? Like that material, can you make teaching online fun or interactive for law students?

It was clear that the students did not desire to see a diminishment in the role of the instructor potentially caused by the use of educational technology. They seemed concerned that changes in pedagogy could minimize the amount of teaching causing them to take on more responsibility for their own instruction and learning.

RQ4: What are student perceptions of how educational technologies are used in teaching theoretical knowledge of nursing?

Examining student views on how educational technology is currently used at the nursing school, it was determined that most instructors use little technology in the classroom to convey instruction. Based upon responses by the student focus groups, one theme emerged.

Theme 1: Students feel frustrated about the lack of effective technology usage in the classroom. Reflecting on the current use of technology in the classroom, students expressed some frustration over how instructors currently incorporate

technology in the classroom. In addition, the inappropriate and dated use of technology was of concern. In this next section, the categories *frustrations at teacher challenges using technology* and *dated and inappropriate use of technologies* will be explored.

Frustrations at teacher challenges using technology. Over the course of the group interviews, students expressed their frustrations at the challenges faced as instructors attempted to incorporate technology. Karin, a second-year evening student expressed her belief that teacher technology use is frustrating to learners: "It's also frustrating too when the person who's presenting the technology doesn't know how…they're trying to figure out how to put the video up, or they don't know how to make the video play, it breaks my concentration."

Christine, a second-year student, had similar experiences:

> I've had the same experiences and when that happens, it throws the teacher off track. Then they're about to say something that is going to be a test question and it completely gets overlooked. Now, that's an exam question, or that's something vital that we're supposed to know.

In addition to frustrations regarding instructor use of technology, which students felt caused distraction in the classroom, another category that emerged was the distraction caused by dated and limited resources and instructor inappropriate use of technology.

Dated material, limited resources, and inappropriate use of technology. Students expressed some concern regarding what they interpreted as a lack of resources with instructors using older, dated, materials, as well as the overreliance on PowerPoint. Over the course of the focus groups, I asked the students what kind of technology did their instructors use in the classroom? With either nods or verbal acknowledgement, every

participant agreed that the primary method of conveying information in the classroom is PowerPoint. Concern was expressed that PowerPoints, while valuable, can be ineffective if not used appropriately. Aaron, the second-year day student who thought that PowerPoints could be used more effectively expressed these thoughts: “I think, for me, that [interactive] experience changed because I found it was just so easy for a professor to throw up a PowerPoint and start reading it as opposed to really interacting with us.” Another second-year day student, Kristin, had similar frustrations: “It's going to help you have more confidence in your class if you keep mixing it up rather than just lecturing the whole time of PowerPoints, adding in some other things, maybe a video here or there…”

Participants expressed frustration over limited resources and the use of older, dated material as well. Karin, the second-year student quoted previously, reflected that the replacement of dated videos in class with current videos, combined with questions, could facilitate her learning: “With the videos I find myself if they're very outdated, I find myself thinking too hard about how outdated they are, rather than the inspiration that's being provided.” Nikki, the second-year student previously quoted talked about the limitations of resources: “the school needs to be more open to buy [resources]...they're on the backend of technology, so that’s a hinderance.” Aaron discussed the quality of PowerPoint presentations: “the quality of PowerPoints sometimes is what determines whether it’s a good presentation or not…if you just copy and paste something…as opposed to taking time and putting a picture with some wording and things like that [could be helpful in learning].”

Summary

In this chapter I have examined and analyzed quantitative and qualitative data from both instructors and students regarding technology in the classroom. Survey results showed that instructors at the researcher's school have a number of years of experience and tend to be older than the national average of nursing school instructors. Participant instructors reported using limited amounts of technology in the classroom – except for videos used occasionally – and used technologies such as games, audience response systems, or simulations much less often or not at all. Regarding the role of educational technology in the classroom, instructor median responses during survey showed a neutral perception of its value on a 5-point Likert scale. Likewise, instructors' responses were relatively neutral regarding perceptions about educational technology's effect on student learning in the classroom. In a subscale asking instructors to rate their comfort with and ability to use technology, instructors expressed having comfort in using technology, but the results had a higher standard deviation showing variance among comfort levels. The last subscales, measuring perception of support from students, colleagues, administration, and the actual presence of support services, found only weak agreement with a higher standard deviation.

The demographic makeup and experiences of students at the school were evaluated alongside their perceptions regarding technology and its use for education. Students surveyed tended to be older than the average nursing school student and all had some college classes prior to enrollment in the nursing school with a majority of them possessing a prior degree. Students where then surveyed using subscales from two instruments, the CTI and TAS, along with several questions in a subscale that I created.

The CTI measured student perceptions about technology by presenting statements about attributes of technology. Students generally approved of statements that presented positive attributes of technology and disapproved of statements that presented negative attributes of the technology. Responses to each of these showed little variation with a lower standard deviation score for this subscale.

The second subscale, using the TAS, measured student confidence in the benefits of using technology. Similar to the results of the CTI, students responded favorably to statements demonstrating the benefits of technology use with the highest positive responses related to its use in their education and future careers. With this scale, however, there was noted to be more variation in responses, with a higher standard deviation, than with the CTI. The second subset using the TAS measured the perceived lack of self-efficacy. To these questions students generally answered in the negative – generally disagreeing with statements that technology made them uncomfortable or caused difficulty. However, a higher standard deviation showed that responses were varied.

Finally, the students answered three additional questions composed in a third subscale related to perceived ability of instructors to use technology in the classroom and perceived pressure on instructors to use technology in the classroom. To questions about instructor ability to use technology in their teaching, students answered weakly positive. Regarding pressure from administration or students to use technology in their classroom, students believed that more pressure came from administration rather than students to integrate technology in their classroom.

From the qualitative data, collected through instructor interviews and student focus groups, six primary themes emerged from the analysis of responses in answering

the four research questions of this study. Instructors stated that they believed educational technology could be a benefit in the classroom but expressed concern about training, support, and the lack of time to implement its use. Students, likewise, believed that educational technology in the classroom could be beneficial to their learning by providing innovative ways to learn and helping to keep them engaged. Students also expressed the importance of having the instructor continue to be their primary source of information, rather than having students use significant time before class to read and review material. In the next section, I will discuss my findings and their implications for this practice setting and will make recommendations for further research and possible changes to practice at the school.

CHAPTER 5: DISCUSSION, IMPLICATIONS, AND LIMITATIONS

This chapter discusses the study findings and how they relate to the literature about incorporating educational technology in the nursing classroom. The purpose of this action research was to evaluate the attitudes, perceptions, and expectations of both instructors and students towards educational technology in a small hospital-based nursing program in lower New York. Quantitative findings showed both instructors and students expressing a level of belief in the benefits of technology for both teaching and learning. Findings also showed a measure of comfort in using technology that was greater among students than instructors. A review of the qualitative findings, generated through instructor interviews and student focus groups, helped to further explore and substantiate some of the quantitative findings. Through analysis of instructor interviews and student focus groups, six primary themes emerged: a) Instructors demonstrate ambivalence towards educational technology, b) Workload and volume of content prevent faculty from adopting educational technologies, c) Emerging technology usage by instructors due to COVID-19 causing reevaluation of technology in the classroom, d) Students demonstrate mixed feelings regarding use of technology in the classroom, e) Students see educational technologies as a supplement to lecture and not a replacement to the teacher, and f) Students feel frustrated about the lack of effective technology usage in the classroom.

Responses from both instructors and students were somewhat equivocal, with instructors expressing a degree of positivity towards technology but also expressing concern about training and sustained support. Likewise, students also articulated a belief

in the benefits of technology with its potential for promoting a more fun and interactive learning environment. However, students also expressed concerns about instructor challenges using technology in their classrooms, the level of preparation for classroom activities, and the potential for technology to significantly change the instructor role in the classroom. The discussion, implications, and limitations of this study are listed below.

Discussion

This section discusses the findings of the study based upon each of the four research questions and how these findings correspond to previous findings noted in the literature. In addition, this discussion also evaluates demographic information and experience since these are factors, for both instructors and students, that have been examined in the literature.

RQ1: What Factors Influence Instructor Use of Educational Technology for Teaching Theoretical Knowledge of Nursing?

The purpose of this question was to determine what influences instructor use of educational technology in the nursing classroom. Some factors for instructors include practice settings, instructor traits, and feelings regarding the value of technology. Ertmer (1999) was an early researcher who examined technology integration in teaching and first articulated the terms *first-* and *second-order barriers* to technology integration in the classroom. First-order barriers include external factors such as access technology – hardware and software while second-order barriers consist of internal factors such as self-efficacy, perception of the usefulness to learning, and the presence of actual or perceived support (Ertmer, 1999). While many of the first-order factors have been satisfied nationally and in my local context by a focus on providing infrastructure such as internet

access and computers, there still remains many second-order challenges (Gil-Flores et al., 2017).

Inan and Lowther (2010) examined factors affecting teacher integration of technology. They found older teachers with greater number of years teaching had greater reluctance to incorporate technology in their pedagogy. Inan and Lowther (2010) further found that perceived levels of support, the availability of professional development, and an instructor's own feelings of ability (self-efficacy) were important considerations in their decisions to integrate technology into their practice. Numerous studies subsequently have explored and established these as important factors in the evolution of instructor pedagogy towards a digital-mediated learning environment (Harrell & Bynum, 2018; Li et al., 2015; Roney et al., 2017; Tondeur et al., 2017). These next sections will discuss the findings of this study from instructor survey and interview data and examine them in relation to data from the literature. It will examine these results considering research on the effect of educational technology on teaching along with its perceived effect on student learning.

Age / Years of Experience.

Age/Years of experience is one factor examined concerning instructors' perceptions regarding technology use at the nursing school. Inan and Lowther (2010) in their study of factors that influence the adoption of technology in the classroom found that number of years' experience as an instructor had an inverse relationship on the perceived value and intention to use technology in the classroom. Similar to Inan and Lowther's findings, the nursing school instructors' ages corresponded with the number of years teaching – four out of the five instructors with the greatest number of years'

experience were at least 55 years old. Of these five instructors, their answers were relatively homogenous regarding their survey answers about comfort with technology. While four out of the five experienced instructors answered *agree* or *strongly agree* to the survey item: *I feel comfortable in my knowledge on how to integrate educational technologies into my instruction in the classroom,* none of these instructors reported using common computer mediated games such as Kahoot! and Jeopardy, and none reported using audience response systems. These findings are like those of Roney et al. (2017) and Inan and Lowther (2010) who found negative correlations between instructor age and years of experience and their use of technology. McKnight et al. (2016) found that older instructors who had greater than 10 years' experience in teaching had less comfort with technology in the classroom. Likewise, Kotchelakota et al. (2017) in a study of 118 nursing faculty at a Midwestern nursing college found that instructors with greater numbers of years' experience were more reluctant to adopt technology into their teaching practice than educators with fewer years.

It has been noted that all instructors at the nursing school use technology in the classroom either using PowerPoint, videos, and access to the LMS. Though the survey requested that instructors consider uses of technology beyond PowerPoint, positive responses to this question may still reflect usage of these and other tools (e.g., email, Excel) rather than technology used to mediate instruction.

Perceived Technology Proficiency

Findings from the Instructor Technology Survey in this study were mixed when compared to literature that discussed instructor perceived technology proficiency as a factor in integrating technology. Inan and Lowther (2010) found that older, more

experienced instructors are often reluctant to incorporate technology into their pedagogy because of concerns regarding their proficiency with computers and technology. In contrast, Roney et al. (2017) reported findings similar to this study. Out of 272 nursing instructors surveyed, most (63%) reported expressing a high level of technology self-efficacy. However, when asked about integration of technology into their teaching, most instructors reported only moderate use of technology for didactic lectures. These differed from findings in this study because instructors at the nursing school reported feeling proficient in their use of technology and incorporating it in their teaching. Six of eight instructors at the nursing school where this study was conducted answered agree or strongly agree to the statement, *I believe I have enough computer skills to integrate technology tools into my classroom instruction* while the remaining two instructors disagreed or strongly disagreed to that statement.

These results appeared similar to those of Roney et al. (2017) who found that instructors tended to respond that they had confidence in their skills but showed only moderate integration of technology in the classroom. This similarity with the Roney literature may be related to the fact that participants in the present study primarily use PowerPoint as their leading mode of technology in the classroom and are comfortable using *this* technology but may be apprehensive about using other forms of technology for which they do not have the skills. These findings relate to the work of Venkatesh et al. (2016) on instructor use of technology where it was found that instructors used technology for communication and instructor-centered teaching using PowerPoint rather than active learning teaching methods such as simulations, blogs, or drill and practice exercises.

Effect on Classroom Teaching

Results of both quantitative survey and qualitative interviews with the instructors at the nursing school closely relate to the factors described in the literature. In the Instructor Technology Survey (ITS), instructors were asked about their perceptions of how educational technology affects their teaching. Fiedler et al. (2014), in a study of nursing faculty and students using a web-based virtual reality game, found that if an instructor felt a perceived benefit from educational technology through greater interaction and contextual learning, they would be more inclined to the incorporate technology in their classroom. The belief that educational technology would have a positive effect on learning was also instrumental in instructors overcoming barriers to incorporating technology in their pedagogy (Vongkulluksn et al., 2018).

Considering that an instructor's perception of the benefits of technology on their students' learning will have an effect on their use of such technology in their classroom, the present study looked to examine instructor perceptions to determine if there was a strong belief in these benefits. Results showed that instructors were primarily neutral to the statement about the perceived benefits of educational technology having a positive effect on student learning ($M = 3.0$, $SD = 0.76$). Instructors further disagreed with statements that expressed the belief that educational technology has had a positive effect on student work ($M = 2.75$, $SD = 1.28$).

The findings from the ITS are supported by participant responses from instructor interviews. One of the four themes emerging from the analysis included *ambivalence towards technology*. Instructor answers during individual interviews expanded on instructor perceptions but did not help to solidify a unified positive or negative opinion

towards educational technology expressed through the ITS. Interview responses appeared to support their relatively neutral responses on the survey. While some instructors stated that they would welcome any new technology that would benefit their profession and students, others felt that technology was more distracting and not needed. Also, instructors felt that students were not ready for the more interactive, student-centered methods of teaching that would be brought about through technology integration.

With this perceived lack of confidence in the benefits of educational technology towards their teaching, it is understandable that the scores on the ITS are so equivocal. In the next section, instructor perceptions on technology's effect on their students' learning will be evaluated.

Effect on Student Learning

Another factor shown to affect instructor use of educational technology in the classroom is the perceived effect such technologies would have on student learning. Sadaf et al. (2016) found that if teachers felt technology would affect students' ability to learn material, they would be more likely to incorporate technology in their pedagogy. In a similar way, Huizenga et al. (2017), in their study of instructor intention to use computer mediated games, found a primary factor that influenced instructor intention to adopt these technologies was the belief that they would facilitate learning. Likewise, Fielder et al. (2014) found that nursing faculty accepted and were eager to incorporate technology into their classrooms where they felt it would contextualize and enhance learning.

In this study, the second subscale of the ITS gauged instructors' perceptions on student learning through educational technology. Similar to their perceptions about

technology's benefits to their teaching, instructors showed a relatively *neutral* perception towards educational technology and its ability to facilitate student learning. Means in this subsection ranged between 2.75 to 3.75. In this same subscale of the ITS, the least instructor agreement was to a statement describing that educational technology increases student teacher collaboration (M = 2.88). Not all instructors were of similar opinion, however, because this element also had the highest standard deviation of the subscale (SD = 1.36). One telling factor of instructors' perceptions regarding the benefits of technology on student learning was revealed through an item in the subscale that specifically named educational technology tools such as games, clickers, and podcasts. To this item, instructor scores were exactly neutral (M = 3.00). Incidentally, it also had the lowest variation in responses in the subscale (SD = 0.76). These findings are in sharp contrast to the literature (Fielder et al., 2014; Huizenga et al., 2017; Sadaf et al., 2016) and brings into question the likelihood that instructors at the nursing school will adopt technology in their pedagogy if they have such mixed feelings about its benefit to learning.

These neutral responses towards the perception of benefits are understandable given that instructors have had little to no experience using the technologies outlined in the subscale. According to survey results, the most widely used technology was PowerPoint, followed by the use of instructional videos. Blogs or Vlogs (video blogs) were used by two instructors weekly but were rarely or never used by the remaining instructors. The other technologies were used rarely or not at all. No instructors reported using either computer-mediated games or audience response systems in their classroom instruction. This situation of instructors' limited technology use is not unusual. While limited information is available on how much technology is being incorporated into the

nursing classroom, the literature has recognized that students may have different learning needs and calls upon nursing faculty to adjust teaching designs and methods to accommodate multigenerational learners (Carter et al., 2016; Chicca & Shellenbarger, 2018; Shatto & Erwin, 2017).

There is an often used saying that *instructors teach the way they were taught.* This statement implies that instructors learn to teach based upon their past experiences as students as well as their experiences as new instructors learning through imitation and trial and error (Halpern & Hakel, 2003). Instructors starting out do not know different ideas about pedagogy and learning theories and would not readily have made technology part of their pedagogy if they were not exposed to active teaching methods using educational technology (Halpern & Hakel, 2003). However, instructors' past experience of teaching without technology does not mean they cannot learn to use technology in their present practice. In their work examining instructor experience and how they acquired their knowledge of teaching, Oleson and Hora (2013) found instructors regularly used modeling and imitation. However, they also concluded that the key to changing practice is not simply to offer new ideas, but to offer these ideas within the instructors' context of practice accounting for current skills sets, content knowledge, and challenges specific to their classrooms.

Self-efficacy

Examining instructors' willingness to integrate technology into their pedagogy, it is important to examine their perceptions about their ability or self-efficacy in being able to achieve a goal. Bandura (1997) first described the concept of self-efficacy as the belief in one's abilities to accomplish a task or achieve a goal. Belief in one's ability to

integrate technology has been seen as a significant factor in instructors' willingness to incorporate technology (Buchanan et al., 2013; Celik & Yesilyurt, 2013; Gonen & Lev-Ari, 2016; Marzilli et al., 2014; Roney et al., 2017; Washington et al., 2020). These studies indicate that instructor confidence in their use of technologies correlated with their willingness to integrate classroom technologies into their practices.

Quantitative and qualitative data from this study at the nursing school show these same factors come into play with the instructors' willingness or hesitancy with technology. Survey results revealed the nursing instructors had relatively neutral perspectives in the answer to the survey element describing their belief in their ability to integrate technology (M = 3.25, SD = 1.28). Likewise, instructors were relatively neutral in their response on the adequacy of training provided by the school to help them integrate technology (M = 3.25, SD = 1.17). The element that had the highest means score covered the belief/perception that the instructor had enough skills to integrate technology into instruction (M = 3.79, SD = 1.49). These responses appear to represent that while instructors may have a feeling that they are skilled enough to integrate technology tools into classroom instruction, they may have less comfort in doing so.

Examining information collected from surveys against the data collected from instructor interviews, one can see the underlying theme of *ambivalence towards educational technology* expressed in the categories *lack of support* and *lack of self-efficacy.* These categories are typified by instructor statements during the interview expressing concerns about looking like a fool, fumbling with technology without support, and the fear of causing problems or damage. These concerns about self-efficacy are not

uncommon and are cited as a top predictor of teachers' use of technology in the classroom (Gil-Flores et al., 2017; Li et al., 2018; Long et al., 2018).

In their study of both instructors and students and their use of educational technology, MacCallum and Jeffrey (2014) found that instructor anxiety about technology use impedes their development of digital literacy. They further found that technologic literacy and anxiety affect the acceptance of innovative technologies for teaching. The findings of the nursing school instructor survey and interviews seem to correspond with the literature. If instructors at the school do not feel confident in their abilities and do not see prospects to develop those abilities through adequate training, they may not feel secure in trying out new methods of teaching.

Perceived Usefulness / Value of Technology

One factor that this study considered was instructor perceptions of the usefulness and value of technology. This perception of technology's usefulness and the value it brings to the classroom have been found to be important factors regarding instructors' intent to use it in their classrooms (Ambag et al., 2019; Buchanan et al., 2013; Gil-Flores et al., 2017; Hartman et al., 2019; van der Spoel et al., 2020) with correlation found between perceived value and usage. Considering the results of this study, instructors' value of educational technology appears to be equivocal. Many survey items describing the benefits of educational technology had responses closer the value representing *neutral* with high standard deviations. Specifically, 16 of the 20 items in the subscale had standard deviations between 1.17 and 1.49. This represents a wider variation in responses of instructors regarding the perceived value of educational technology and its use in their classrooms. When surveyed on the ITS about their feelings towards educational

technology in the classroom, instructors at the nursing school reported mildly positive feelings about their comfort and knowledge about using technology (M = 3.25, SD = 1.28). However, when asked a more specific question about their feelings towards the usefulness of specific pedagogical tools such as games, clickers, and podcasts, instructors' responses scored lower and closer to the subscale response of *disagree* (M = 2.88, SD = 1.36).

A significant factor in instructor use of educational technology is the perceived value of technology. Up to this point, many teachers have used and valued technology primarily as a means of administration and communication (Ambag et al., 2019; Venkatesh et al., 2016). In order for teachers to want to use technology, they must find the value in it. An example of how instructors value technology can be illustrated in the response of Debbie, one of the instructors during individual interviews: "I don't see the need for a lot of these little games and things like that they're adults." This support or resistance to technology relates back to the theoretical framework for this study. One of Ajzen's (1991) constructs of his theory of planned behavior is a person's *attitude towards that behavior.* Ajzen relates that a person's attitude is affected by the perceived value of that action. If a person sees a value in that action, they are more likely to proceed with that action. In the case of the nursing school, it will be concerning if more instructors have similar feelings to Debbie in terms of educational technology and its value in the classroom.

Perceived Level of Support

Another common factor cited in the literature was instructors' perceived level of support by peers, administration, and students towards integrating technology into the

classroom. In their meta-analysis of studies related to teacher beliefs and their use of technology in the classroom, Tondeur et al. (2017) found that peer support and the sharing of ideas on technology integration were important factors in motivating instructors to incorporate technology into their practice. Instructors at the nursing school seemed to concur with these findings. In the ITS survey, they responded closest to the response of *agree* when responding to questions corresponding to perceived levels of support (M = 3.88, SD = 0.84). In contrast to this, instructor responses to a similar question about their perceived support by students to use technology, while still leaning toward agreement, showed a score closer to neutral (M = 3.25) with less variation of responses (SD = 0.71*)*. Gauging instructor perception of support from administration, we again see scores positive but closer to neutral (M= 3.25, SD = 0.71).

Evaluating instructor responses against the responses to interview questions, we see differences between the data. Regarding peer support, instructors had relatively little to say about peer-to-peer encouragement to use technology. Remi expressed her opinion that there was limited peer support: "there is not enough support…peer support." Karen and Louise, two senior instructors expressed their opinion that a significant outlet of peer support was lost when the practice of peer review was discontinued years before. Louise thought peer review was a valuable because it encouraged new ideas. Karen, discussing the use of peer review, recalled it as a positive method to see how others taught and be used as a way offer ideas to improve practice: "I would watch you do a lecture, and you would watch [another instructor] do a lecture and somebody else would watch…and we all gave each other constructive criticism."

Instructor interview responses regarding student support for technology differed from their survey answers. Though their ITS responses were weakly positive, when asked about students pressing for changes and the inclusion of more technology mediated learning in the classroom, the instructors disagreed because they believed that students were not interested in radical changes to their pedagogy.

Regarding administration and informational technology support for changes to pedagogy, faculty responses to the ITS, were relatively neutral but leaned weakly toward *Agree*. To the statement about the maintenance and upgrade of school technology by school/hospital administration, instructors answered 3.13 (*SD* = 1.36). The element statement describing adequate hospital support for technology at the school scored closer to the value *Agree* (*M* = 3.50, *SD* = 1.20). Instructors also agreed that the hospital provided students with adequate hardware and software during the school year (*M* = 3.25, *SD* = 1.29).

These findings appear to be unexpected when compared to responses given by instructors during individual interviews. During interviews, instructors reported little involvement or support from administration. It should be noted that during the time of this data collection, the school had a vacant leadership position and, therefore, there was little guidance, support, or encouragement provided to the instructors for an extended period. This can be reflected in the responses of the instructors. Cathy described the benefit of having a supportive administration on encouraging technology integration in the classroom: "if you had the administrator…if you had somebody that was very positive and pro-technology and was willing to give you a lot of resources related to the development of [educational technology] in your classroom." Debbie agreed that

enacting a program integrating technology in the classroom would be challenging because of the lack of leadership and support.

Reviewing the responses for each question in the subscale of the ITS, the strongest degree of positive perception was demonstrated in the item regarding instructor perceived level of support from their colleagues in their efforts to incorporate technology in the classroom. This item scored the highest degree of positivity ($M = 3.88$, $SD = 0.84$), where instructors primarily answered *Agree* and *Strongly agree* to statements regarding their perceived support from colleges regarding their personal efforts to integrate technology. These results are not surprising based upon the researcher's personal experiences at the school. Seven of the eight instructors have been teaching at the school for greater than 10 years and the environment at the school is one of professionalism and support among instructor colleagues.

Achievements among the staff are celebrated and all my instructor colleagues were supportive of my decision to pursue a doctoral degree in education. This is most demonstrative in their willingness to participate in surveys, interviews, and member checking. This support is something that is seen as valuable in the literature as well. Hartman et al. (2019) in a survey of 42 college, graduate, and professional studies educators found that professional development and collaboration among peers to be important factors that supported their efforts to try new technologies. Likewise, Long et al. (2017) in their qualitative research conducted with eight university instructors on the implementation of flipped classroom models using technology found peer assistance and support play an important role in successfully integrating the model. All participants of

the study found peer communication and learning from their colleague's valuable in their understanding.

Qualitative findings using instructor interviews further supported and triangulated the ideas from instructor surveys regarding factors which influence instructor use of educational technology in the classroom. Throughout the literature review, there were recurrent themes regarding instructor concerns about technology and the perceived ability to integrate it in the classroom (Buchanan et al., 2013; Celik & Yesilyurt, 2013; Gonen & Lev-Ari, 2016; Long et al., 2019; Roney et al., 2017). These concerns are not unlike the findings of Washington et al. (2020) who found that instructors were hesitant to try new technology because they lacked the skill they felt were needed.

Because it appeared that this variable of self-efficacy is a significant factor for instructors to incorporate technology, it is important to understand why this matters and the ways in which it can be supported. Looking at the framework of Ajzen's theory of planned behavior, Ajzen (1991) asserts that a person's action or behavior is influenced by the beliefs about whether most people (in this case, peers) approve or disapprove of the action or behavior. Actions that are met with approval will affect the person's attitude towards that action which could reinforce the person's desire to continue the action in the future.

Feelings of Technical Support

Another factor in instructor use of educational technology is the availability of technical support should instructors need assistance during real-time use of educational technology tools. The importance of having the right support to integrate technology into learning was recognized early by Venkatesh et al. (2003) who described the importance

of having *facilitating conditions* in order to promote the acceptance of the use of informational technology in classrooms: “facilitating conditions are defined as the degree to which an individual believes that an organizational and technical infrastructure exists to support the use of the system” (p. 453). Inan and Lowther (2010) found that available technical support, while not the most important factor, played a role in teachers’ using educational technology in their classrooms. Technical support needs were also cited by other researchers as one of the components needed to further technologic integration (Long et al., 2018).

The need for technical support was one of the concerns that was expressed during instructor interviews. Three of the eight instructors interviewed mentioned its importance in managing and incorporating technology in their teaching and their concerns about having more technical support to accomplish this. However, when examining instructor responses on the ITS, it is curious that their responses to the element about the school providing adequate support was the highest in the subscale with the lowest standard deviation (M = 3.5, SD = 1.20). Upon considering the context of technology support at the nursing school, it is not surprising that responses to the ITS appeared to be more positive than what one would expect given the instructor’s previous responses due to current staffing of informational technology personnel at the school.

The school employs one full-time technology support person (pseudonym - Deirdre) whose title is *Information Literacy Officer*. Deirdre has a background in education and has been employed by the school for several years and is very well liked by the faculty. She is also very responsive to faculty needs for issues that might occur throughout the day such as Wi-Fi connectivity issues, assistance with the LMS, Moodle,

and classroom support for minor technical issues such as projector connectivity problems. Because she is well liked and respected by the instructors, they might have been unwilling to answer in ways that might reflect poorly on her role as an information literacy officer. During a conversation with Deirdre about this dissertation, she acknowledged how important it is to provide technical support to integrate technology but acknowledges that she gets little to no requests for assistance and would be willing to assist in providing technical support for instructors interested in using technology in their classroom teaching.

RQ2: How Do Instructors Use Educational Technology in Teaching Theoretical Knowledge of Nursing?

As mentioned previously, instructors at the nursing school use a limited amount of educational technology in their teaching. It is common knowledge at the school that the primary instruction method at the school is PowerPoint mediated lecture. This was confirmed during instructor interviews where all instructors advised that they use PowerPoint for instruction. This was also demonstrated in the results of the technology use section of the ITS survey items. The last item of the ITS listed certain types of educational technology and instructors were asked to rate how often they used in the classroom. Seven out of the eight instructors answered *very frequently*, while the remaining instructor answered *frequently*. Other than PowerPoint, the most widely used type of technology in the classroom was videos, imbedded in PowerPoints, obtained through the library, or sourced from the internet. Instructors rarely used other media such as blogs, and all denied using computer-mediated games, or polling / audience response systems.

Instructor interview responses closely matched their answers to the ITS in that, other than PowerPoint, there was limited use of technology in the classroom. Over the course of the interviews, while asking about their current use of technology, instructors also provided insight as to the reasons for not using technology. These answers directly related back to RQ1 and the factors influencing instructors use of technology. Sarah, who admitted that she primarily used PowerPoint and previously showed videos when students attended in person (prior to the COVID-19 pandemic), stated that she had not used this media for some time: “No, because I've never been able to figure out how to show them a video [in the online classroom].” One instructor, Cathy, asked if she used any of the capabilities of smartboards located in all of the classrooms, replied: “I do not because I'm very afraid of the smartboard.” Another instructor, Mandy, when asked about her use of educational technology in the classroom replied: “Basically, it means pretty much PowerPoint and then I might throw in a YouTube video in there and that’s really the extent of it.”

This reluctance for using technology other than PowerPoint is multifactorial in nature and can be considered through Ajzen’s theory of planned behavior. Researchers have found that years of experience (Kotchelakota et al., 2017), past experiences with technology (Huizenga et al. 2017), perceived value of technology (Ambag et al., 2019), and support both from peers and administration (Hartman et al., 2019) are all factors in instructors’ decisions. These same reasons were highlighted by instructors in both interviews and their survey responses to technology use. Ajzen’s (1991) construct of perceived behavioral control describes a person’s ability to accomplish an action. If a person believes they have the ability to accomplish a task, they are more likely to attempt

to accomplish that task. Conversely, if a person perceives that they are lacking in ability to accomplish an action, they are less likely to attempt and complete that task. Considering the instructors at the school, if instructors lack perceived behavioral control, this deficiency can undermine and inhibit their willingness and behavior to use or even attempt to use educational technology in the classroom.

In addition to the concept of perceived behavioral control, Ajzen's concept of subjective norms can be applied to understand reasons affecting instructor's use of technology. Subjective norms describe perceptions of others towards an action: "the perceived social pressure to perform or not perform the behavior" (Ajzen, 1991, p. 188). This concept was captured poignantly during the interview with Remi, one of the instructors at the nursing school. Remi had described how she previously used clicker technology while teaching in another school. She remarked how the students enjoyed using clickers and she felt that it aided in their learning. However, when asked about why she did not carry that practice over to the nursing school, she remarked: "we don't use it. That's not practiced here…the faculty practice at this location." Clearly, it can be seen how subjective norms can influence the adoption of technology practices into one's personal pedagogy.

In addition to understanding instructors' intention to use technology, it is important to understand how that technology relates to its use by the instructor in the classroom. This can be illustrated through the framework of the technological, pedagogical, and content knowledge (TPACK) which is used to illustrate and consider the different areas of competency needed for effective teaching with educational technology. Developed by Mishra and Koehler (2006), TPACK stands for three different

knowledge domains: a) pedagogical knowledge (PK) representing knowledge on how to teach, b) technological knowledge (TK) representing knowledge on how to use technology, and c) content knowledge (CK) representing knowledge of one's subject matter.

Mishra and Koehler (2006) found that, in addition to having knowledge of all three domains, it is important to have knowledge on how the domains combine with one another. The combination of the different domains represents the instructor's knowledge and use of those domains represented. The combination of technological and pedagogical knowledge represents how instructors use their technical knowledge to instruct. Where technological and content knowledge converge, it expresses how the instructor could represent subject content in an electronic manner. Finally, where pedagogical and content knowledge meet, it represents how instructors use their knowledge of how to best express the information of their subject matter. The more the domains converge, the better the understanding of their uses occur, and more effective teaching will take place (Koehler et al., 2013).

The instructors at the nursing school have all worked as nurses and are experts in their respective subject matter (content knowledge). Most have taught for a long time and have good understanding about the methods of teaching (pedagogical knowledge). It is in the use of educational technology where they will need to understand technologic methods of presenting content along with technologic methods best served in presenting their content (technological knowledge). Professional development, in the form of instruction on methods of incorporating technology into their pedagogy, could provide this technologic knowledge to complete the TPACK framework. It is hoped that having

this framework and understanding, instructors will be able to use these to provide a more effective learning environment for their students (Koehler et al., 2013).

RQ3: What are Student Perceptions About Using Educational Technologies to Learn Theoretical Knowledge of Nursing?

Analysis of the quantitative and qualitative findings showed that the surveyed students have an overall positive perception towards the use of educational technology but have some reservations about how technology fits into their learning. Students generally viewed technology favorably with positive answers on the CTI and TAS surveys, as well as during focus group interviews. Survey and interview responses showed that students felt comfortable with technology and believed it could improve their learning by making lectures more interesting and interactive. Even when specific elements of the CTI and TAS necessitated the reverse coding of responses, students generally agreed with statements that portrayed technology in a positive light and disagreed with statements that highlighted negative connotations or challenges. These findings are not unlike those found in the literature review where researchers found that educational technologies like game-based platforms helped increase enjoyment, motivation, and learning (Tan Ai Lin et al., 2018; Wang & Lieberoth, 2016). The following paragraphs will discuss the favorable views of technology as well as the beliefs that technology had the potential to make learning more interesting and interactive for students.

Favorable Views / Confidence in Use of Technology

Some survey items and interview questions were geared towards determining students' views towards and their confidence in using technology. Evaluation of student

answers to both the quantitative survey and qualitative focus group responses revealed that the students in this study have an overall positive view and outlook towards educational technology. The subscales composed of questions from the TAS consider student attitudes towards technology and its ability to help them learn. Two subscales ask the student to rate statements related to *confidence in technology* and *lack of self-efficacy in the use of technology.* Students were asked to rate their agreement or disagreement with statements regarding their confidence and benefits of using technology as well as perceived concerns or lack of self-efficacy. All individual elements of the subscale expressed positive statements regarding technology except for the two elements in the subscale *technology really won't make my performance as a student any better* and *if I work hard to learn about technology, I will do better.* Almost all the items in this subscale ranged between 4.60 and 5.39. Strongest agreement was to a statement about the importance of technology in their future career. (*M* = 5.39, *SD* = 1.13*).* Other elements that scored high in agreement were enjoyment at using technology (*M* = 4.94, *SD* = 1.27) and the ability of technology to facilitate learning (*M* = 5.02, *SD* = 1.26).

Findings from the qualitative examination of student opinions through focus groups appear to concur with the subscale findings. One student, Yolanda, summarized her confidence in using technology for learning by calling upon instructors to adapt to using technology: "You can't continue with an old system in a new system of how people are learning." Another student, Tracy, found the use of educational technology stimulated her interest in the material. Karin, another student, found that technology helps to make the material in lecture more interesting, especially during long classes.

Potential to Make Learning Interesting and Interactive

Educational technology and its potential ability to help make learning more interesting and interactive for students was explored. Quantitative findings through the evaluation of the subscales of the CTI reveal that the students believe that educational technology has the potential to help learning be more interesting, interactive, and enhance learning. Research has shown that technology can increase student engagement and classroom interaction. Dehghanzadeh and Jafaraghaee (2018) studying nursing and midwifery students used a flipped classroom model incorporating video clips to formulate a story line related to the material being covered in the classroom. Rubinstein and Schubert (2017) evaluated the use of iPads for undergraduate nursing students using them for a variety of classroom, clinical, and laboratory activities including in-class polling, case studies, concept mapping, and clinical documentation. Toothaker (2018) studied the impact of using audience response systems among 99 nursing students in two courses. Most students in the studies cited found the interventions to be interesting and have value to their education. Likewise, educational technology in the classroom has been shown to increase learning and retention of information (Chang et al., 2020; del Blanco et al., 2017; Sheng et al., 2019).

Perceptions of the students at the nursing school were generally congruent with the research literature. Students believed that technology would help to provide a stimulating environment (M = 1.72, SD = 0.70); it would make class more interactive and exciting (M = 1.71, SD = 0.79); it would help provide opportunities to critically think and problem solve (M = 1.77, SD = 0.68); and it would help to better understand abstract

concepts (M = 1.51, SD = 0.69). It is significant to note that students' opinions were relatively homogenous with standard deviations remaining low, between 0.65 and 0.90.

Favorable views towards technology were mirrored in the responses of the students who participated in focus groups. Ariel was happy to have a class where the instructor used games to conduct a formative evaluation of learning without the pressure of getting something wrong. Likewise, Martha agreed that playing games was a good way to learn material while being less concerned about "messing up." Yolanda cited the benefits of technology reinforcing information learned in lecture.

Perceived Need for Change

Another consideration from the findings of this study was the perception of the need to change current practice. Perceived need for change to accommodate for technology and student learning preferences were reasons cited to motivate instructors to use technology (Seemiller & Grace, 2017; Shatto & Erwin, 2017). In contrast to the research regarding the perceived need for change, instructors at the nursing school did not feel this was a pressing need due to an underling complacency with current student success on the nurse licensing exam. This was exemplified by a comment by Debbie, one of the instructors: "part of my mindset is 'if it ain't broke, don't fix it." A primary benchmark of a nursing school is the ability of its students to pass the national professional nurse licensing exam called the NCLEX, administered by the National Council for State Boards of Nursing (NCSBN). Pass rate scores are calculated as a percentage of students who passed the NCLEX the first time taken and these rates are used, in part, as justification for nursing school accreditation (Spector et al., 2018). Although rates fluctuate semester to semester since the school graduates students each

semester, the NCLEX pass rate has been relatively consistent in remaining above the national average. Over the course of the past two years, the NCLEX pass rate has ranged between 88% and 96%. These figures are higher than the national and state average of 86% and 86.4%, respectively (New York State Education Department [NYSED], 2020). With the NCLEX pass rate, there may be a perception that significant change to pedagogy is not necessary or might even be risky with changes that could cause a reduction in pass rates.

Demographics

One factor considered in this study was the impact of age on the perceptions of educational technology. Examined were the concepts of the *digital native* and the *digital immigrant.* At the onset of this study, I believed that I might see students fall into the classification of *digital native* and instructors fall into the designation of *digital immigrant.* As previously discussed, following the review of the literature regarding these terms, I found that these terms were not exclusive to a specific population and, like Gallardo-Echenique et al (2015) found, were more a matter of context and experience than strictly age. Likewise, my study findings did not support the idea that the nursing students would fall into characteristic traits of a digital native. The findings of this study show that the average student age at the nursing school is older than the national average (National League for Nursing [NLN], 2018). In some ways, this demographic might seem to support the notion that these older students might be more aligned with Prensky's definition of a *digital immigrant*. However, this age range still falls within his definition of the *digital native* (Prensky, 2001). In addition, students, while self-reporting comfort in using technology, acknowledged that they continued to prefer instructor-centered

learning, which would run counter to the learning environment desired by digital natives (Prensky, 2001).

Based upon the findings of this study, it would seem that the students at the nursing school did not fit the moniker of *digital native* or *digital immigrant*. These terms have been a source of debate and examination (Bullen et al., 2011; Rappetti & Cantoni, 2013). In their literature review conducted on 127 quantitative and qualitative studies that reviewed traits of a *new generation of students*, Gallardo-Echenique et al (2015) found that, descriptors aside, students should not be classified in the simplistic terms of *native* or *immigrant*. This simplifies complex phenomena which – while including age – also must account for gender, educational background, cultural upbringing, experience with digital technology, institutional context, socio-economic background, and subject being taught (Gallardo-Echenique et al., 2015).

RQ4: What are Student Perceptions of How Educational Technologies are Used in Teaching Theoretical Knowledge of Nursing?

Questions contained in the CTI/TAS did not specifically ask about attitudes students had about their instructors' current use of educational technology in the classroom. However, they did measure the current frequency of use of educational technology in their classes. In addition, student focus groups revealed information regarding student attitudes towards current use of technology in the classroom. Results from the CTI/TAS questionnaire and focus groups showed that students overall had a positive attitude towards technology use in the classroom. Students perceived that technology in the classroom fosters a more stimulating environment ($M = 1.72$, $SD = 0.70$), makes it more interactive ($M = 1.71$, $SD = 0.79$), and helps them to better

understand more abstract concepts (M = 1.51, SD = 0.69). During focus groups, students described their attitudes towards the current use of technology in their classrooms. Like their questionnaire responses, students were overall positive about technology in the classroom, especially related to piquing interest and enhancing their learning experience. However, they were able to articulate their concerns and frustrations regarding technology integration in their nursing classroom. Some students felt that technology, when malfunctioning or when not handled skillfully by instructors, could be a source of distraction and lost instruction time. Others voiced concerns over the quality of PowerPoints and outdated videos. The students also expressed concerns about incorporating *too much* technology in a highly technologic, active-learning classroom situation where students would have to prepare a large volume of information before the start of class. Students were resistant towards this type of instructional environment, citing limitations of time with competing priorities such as work, family, and other obligations.

In the review of literature regarding student attitudes towards educational technology, students generally had similarly positive views and concerns regarding the use of educational technology. Students reported that technology helps increase interest in subject matter (Bianchi et al., 2020); provide immediate feedback (McKnight et al., 2016; Wang & Tahir, 2020); and help to make the classroom a more interactive and interesting place. In their large-scale study at 12 universities in Quebec involving 14,928 students and 2,626 instructors, Venkatesh et al. (2016) found that students valued media-related tools such as blogs, forums, and wikis, as well as computer mediated learning such as simulations and virtual experiments.

However, student attitudes towards technology do not indicate that they are ready for a complete change to student-centered learning mediated by educational technology. Murphy and Groen's (2020) research on active learning classrooms that incorporated technology at a Canadian university surveyed 100 students and 18 instructors. Survey results from students indicated that while technology was valued, there was still a strong desire to have low-tech interactive methods such as discussion groups and white boards. Students and instructors alike sometimes found technology to be too distracting. Likewise, Sheng et al. (2019) in their study of 236 undergraduate nursing students about the use and benefits of audience response system *TopHat* found that students responded positively to the audience response system technology. Students believed the technology was easy to integrate, promoted engagement, and enhanced their learning. Like the concerns expressed by this study's student participants, Sheng et al. (2019) found that technical difficulties and the ability of instructors to effectively use the technology were sources of frustration and challenge for students.

Implications

In my personal implications I will discuss how this study has changed me and enabled me to expand my knowledge and practice as a researcher. I will examine how it has helped me to better understand myself and how I have learned to examine my positions through theoretical framework. It has also helped me to recognize and value how reflection is essential to understanding and minimizing bias. Following these personal implications, I will consider how this research can affect my local practice and discuss its wider implications for additional action research in the future.

Personal Implications

Over the course of this study, I have learned several important lessons that have helped me develop my proficiency as a practitioner and ability as an action researcher. In this section, I will discuss a) the value of mixed-methods design, b) the importance of an extensive literature review, c) the use of theoretical framework to guide my research and to frame my understanding of results, d) the unexpected findings regarding student attitudes towards educational technology, e) my considerations regarding bias, and f) the sharing and communicating of my findings.

Mixed-Method Design

This study has helped me better understand and appreciate the value of a convergent mixed methods design where the results of both quantitative and qualitative research are examined to more fully understand the attitudes and perceptions of instructors and students (Creswell & Plano Clark, 2018). By using this mixed methods design, I was able to obtain a much deeper understanding of the preferences, fears, and concerns both instructors and students have about using educational technology.

Literature Review

The extensive literature review conducted over the course of this study enabled me to examine the topic of educational technology, consider the narrative or notion of the digital native and the demand for educational technology, evaluate perceived benefits from technology, and reflect upon the reasons for limited implementation of technology integration into the nursing classroom. Evaluating the notion of digital native, first posited by Prensky (2001), I came to appreciate that this idea of an immersed, fully integrated learner who requires technology-mediated instruction is a questionable notion

(Gallardo-Echenique et al., 2015; Kirschner & DeBruyckere, 2017). The call to radically overhaul the classroom environment to accommodate these learners is also one open for debate (McKnight et al., 2016; Washington et al.,2020). The review of the literature also helped me to better frame rationales for limited technology integration related to key factors such as self-efficacy (Roney et al., 2017), the value placed upon technology (Bowen & Watson, 2017), and the perceptions of support (Murphy & Groen, 2020; Ruggerio & Mong, 2015).

Theoretical Framework

Prior to starting this study, I had little understanding regarding the need for a theoretical framework in a dissertation. Through my research, data collection, and analysis of my findings, I have a much better understanding of the purposes for using a theory. Creswell (2014) advises that a theoretical framework helps to provide a lens through which the researcher views his subject or phenomenon allowing for a perspective that shapes how questions are asked and how data is interpreted. For this study, I chose to use Ajzen's (1991) theory of planned behavior. By considering my subjects through this theory, I have gained a much fuller perspective regarding the motivations of both instructors and students regarding the use of educational technology in the classroom.

Unexpected Findings

During the data collection and analysis, I was surprised to find that while students viewed technology positively, they had reservations regarding extensive changes in the classroom. I was expecting that students would be more interested in student-centered instruction mediated with technology and might use focus groups to lament the lack of technology in the classroom. This was not the case. According to the focus group

responses, students still valued teacher-centered instruction. In related literature, integration of technology has been seen as valued by students (Bianchi et al., 2020; Washington et al., 2020). However, like my results, Murphy and Groen (2020) found that students still have a strong inclination for low-tech instruction, especially if the instructor is dynamic and provides an active-learning experience in the classroom. These seemingly contradictory findings make more sense when considering the context in which instruction is given has a significant impact on student and instructor perceptions alike (Bianchi et al., 2020; McKnight et at., 2016; Tondeur et al.,2017).

Bias

As a registered nurse and an educator, I remind my students every semester about the presence and importance of acknowledging bias in our thoughts and actions. In my teaching, this bias is usually related to the importance of avoiding hasty judgments against patients or students coming to conclusions without knowing all the facts. I remind my students of the concept of ethnocentrism, originally used in a nursing context described by Lininger (1990), where nurses risk imposing their own beliefs and norms on patients of different cultures. The same importance of avoiding bias is attached to scholarly research. Creswell (2014) acknowledges the importance of this and calls upon the researcher to avoid bias in both their methods and conclusions. Over the course of my program, I have learned to better appreciate my bias and how this can affect my evaluation of a phenomenon and its thorough investigation.

Reflecting upon my study, I originally considered the thoughts of Prensky (2001), who believes that digital natives are hardwired by their continuous exposure to technology from birth to have significant merit. In light of my daughters' experiences in

middle and high school, and the omnipresence of technology in their classroom, I believed that technology would be something my upcoming students would want as a large part of their education. However, as I conducted research, I found Prensky's premise less a definitive pronouncement and more an opinion as I discovered articles that demonstrated how digital natives face considerable challenges in learning and performance if instructors do not develop effective materials with which to instruct (Gallardo-Echenique et al., 2015; Kirschner & DeBruyckere, 2017).

Sharing and Communicating Findings

The sharing and communication of my findings have important personal implications for me because, if I wish to effect change in my practice environment, I will need to communicate my findings to key stakeholders. Following my data collection and analysis, I communicated with a handful of students who participated in my focus groups and surveys. I spoke to them about my findings that students appeared to value technology in the classroom as a *mental break* from the length and breadth of instructor-centered lecture and were hesitant to increase the amount of preparation time before class in order to be involved in an interactive student-centered environment. They agreed that students already felt oversubscribed with pressures of schoolwork, job, and family which can be limiting factors to extensive pre-lecture preparation. Understanding and confirming the student perspective will be important because changes to pedagogy will directly affect the way they interact with their instructors and the learning materials.

In addition to a handful of students, I shared my findings with our recently installed dean. This administrator agreed with my findings that the students report feeling oversubscribed and that instructors can be hesitant to incorporate new methods of

teaching. He seemed supportive of ideas that would help to increase understanding and exposure of different technologies to the instructors such as the concept of Community of Practice (CoP) and increasing the number of educational programs. Having the support of the school's primary administrator could help to increase instructor feeling of support and could motivate to consider new ideas in their pedagogy.

Implications for Local Practice

This study furthers understanding about the use of educational technology in a small, hospital-based school of nursing. In addition to study, it will be important for me to disseminate my findings to my colleagues and look for opportunities to influence these perceptions and to provide encouragement. As a means of facilitating this, I plan on working within my position as an instructor to foster the development of a community of practice among my peers.

Community of Practice

A CoP is a framework for collaboration among like-minded individuals for the purpose of expanding knowledge (Wenger, 2011). More specifically, Wenger defines it as: "groups of people who share a concern or a passion for something that they do and learn how to do it better as they interact regularly" (p. 1). Three primary characteristics that define a community of practice are: a) a domain of interest, b) a community, and c) a skill or practice. A CoP is more than just a gathering of acquaintances, but an association of people with a shared sphere of interest. This grouping of interested people form a type of formal or informal identity through building relationships that enable them to question and learn about their practice. This group forms a community – a mutual support network – where members share activities, assist, encourage, and advocate for each other and

share information. The group is composed of people who are practitioners of a related profession. The establishment of a CoP can be informal such as the gathering of nurses who eat lunch together and share stories of practice where they learn from each other's experiences (Wenger, 2011). It can also be a formalized collection of practitioners who are recognized at their institution and by their leadership as an agency of change or vehicle of continued improvement in practice (de Carvalho-Filho et al., 2019).

The CoP can be a benefit as a medium for learning, growth, and development of not only the practitioners involved, but their organization, and the profession as a whole (de Carvalho-Filho et al., 2019). CoPs, envisioned by Wenger (2011), engage in a variety of activities such as solving problems faced by its members; answering questions from members and the community; providing experienced guidance; utilizing shared resources; examining practices to identify deficiencies and gaps; and drawing upon shared knowledge and history to define, explain, and overcome problems. The CoP, composed of skilled practitioners with various backgrounds and experiences, can work to influence, develop, challenge, and change practice as ideas related to teaching and education are discussed, debated, and refined by members (Andrew et al., 2008). The CoP has also been seen as a way to help acclimate new faculty into their professional role and offer a means through which new members can develop their identity and hone their practice (de Carvalho-Filho et al., 2019).

Reflecting on the results of this study, its implications, and the current environment at the school, I believe that the nursing school is at an ideal point to establish a CoP. Through my experience in working at the nursing school, I have noted that there has been limited sharing of information about an individual instructor's

pedagogy. While the instructors at the school are friendly, cordial, and professional to each other, there is little sharing of pedagogical knowledge among them. Methods of classroom organization, PowerPoint presentations, and learning management system organization are generally not shared among instructors. It is unclear why there is limited sharing of information. It can be speculated that instructors may be concerned or feel vulnerable if someone questions their practice or feel hesitant to offer constructive feedback. One benefit of the CoP is its premise is to foster mutual respect and an environment of continual professional development. If such an environment is realized, it could serve as a catalyst for evolving professional practice and be transformative in its impact.

Starting a CoP at the nursing school could have presented a challenge due to my positionality as an instructor with a limited amount of practice as compared to some of the senior instructors. However, due to circumstances at the school, a more favorable environment for sustained development of a CoP is occurring. My position at the school has changed and I am to assume the role as course coordinator for a course. This position change will allow me more flexibility in planning coursework. This position will also allow me increased participation in committees through which I may be able to exert more influence and affect change.

In addition to favorable circumstances at the school, establishment of a CoP could be facilitated by guidance from sources obtained through my literature review. De Carvalho-Filho et al. (2019), established a CoP among medical educators in Brazil and outlined a 12-step method for the establishment and ongoing sustainability of a CoP.

Using the structure of this 12-step method could be instrumental in creating a climate open to further incorporating educational technology into the classroom.

Implications for Further Action Research

This study examines the attitudes and perceptions of instructors and students towards technology, however further research is needed to examine the role of instructor perceptions towards the use of specific technologies in the classroom. Having a better understanding as to how instructors perceive and value the use of specific technologies will be important to understanding their intentions to adopt these technologies for their classrooms (Ottenbreit-Leftwich et al., 2010; Vongkulluksn et al.,2018).

This research has implications for the nursing education community in general. Results from this research raised many questions regarding the benefits of teaching with technology and its effects on student learning. Future studies could involve empirical research on specific technologies to determine instructor perception, intention of use, and acceptance of integration. Student perceptions and attitudes may also be examined following the introduction of specific technologies.

In addition to narrowing down examination of a specific piece of educational technology or software, future research may be conducted comparing the perceptions and attitudes towards the *amount* of integration of technology in the classroom. During the course of my research, and upon reflection of the data obtained from students using quantitative survey and qualitative focus groups, I found it curious that while students had apparently positive outlooks regarding the use of technology in the classroom, they were not entirely clear as to how much they would consider beneficial. When asked about the possibility of integrating a large portion of technology into the classroom with the

necessity of students to prepare in advance before coming into the classroom, students rejected such an idea. According to the students in the focus groups, this change in instructional method would lead to an excessive amount of work in their already oversubscribed schedules. Students also expressed concerns that such a change in pedagogy would reduce the explanatory role of the instructor leading to students struggling to understand complex concepts. Future studies of both instructor and student attitudes and perceptions would clarify acceptable levels of integration in order to provide the most effective learning environment (Tondeur et al., 2017).

Limitations

Like any research study, there are limits to the ability to fully capture all the factors involved in the phenomena studied. These could be in the form of methodological limitations, limited number of research subjects, and even changes to the research environment. In this section I will discuss these limitations which include sample size, different learning settings, sample bias, and additional issues grouped into what I termed *COVID Confounding.*

Sample Size

The number of students recruited in the study for completion of surveys and focus groups was robust with 65 of 92 (nearly 71%) participating in the completion of the survey. Of those 65 who completed the survey, 19 went on to participate in student focus groups. However, a limitation of this research was the small number of instructors in the sample. Even with 100% participation, all eight instructors represent a small sample. Such a small sample size limits the generalization of results to wider populations.

Survey Instruments

In this study, I used three different types of Likert type scales in my survey instruments to obtain quantitative data from both instructors and students. For the instructors, I used a single 5-point Likert scale. For evaluation of students, I used subscales from the CTI and the TAS. Subscale questions from the CTI were answered using a 4-point Likert scale while questions from the TAS were answered on a 6-point Likert scale. In addition, the answer choices – in terms of agreement or disagreement to a subscale statement – on the TAS were reversed compared to questions of the CTI. Although headings of the sections in the survey were clearly marked with introductions informing participants of the differences in values, it is possible that this could have caused confusion resulting in less reliable responses. In future studies, in order to avoid any confusion, survey instruments should be used where their scales are similar and measure sentiment in the same direction.

Survey Answer Choices

Surveys used during this study were either previously validated or based upon previously validated instruments. However, because these were geared towards learning about perceptions about a educational technology, which is a very general term, I decided to narrow its definition in the survey by outlining specific technologies in the answer choices. Technologies listed on surveys included audience response systems (ARS), instructional videos, blogs and vlogs (video blogs), computer mediated games, and simulations. While this helped to better define the scope of the survey questions, it limited the participants to only those choices listed in the survey instrument. A better

choice would have been to include the term *other* in order to include other educational technologies used for instruction that we not otherwise listed.

Language / Use of Terms

Another limitation in this study is the use of language to describe educational technology. For the purposes of this study, the use of educational technology was defined as the incorporation of technology into one's pedagogy in order to facilitate learning. Over the course of the study, through the use of headings on survey instruments and the verbalization of the definition during interviews and focus groups, participants were reminded of this definition and its context. However, it is possible that participants assigned different meanings to this term. Some may have interpreted the meaning of educational technology as hardware used to convey instruction, others may have considered it software applications used to convey instruction. Still others may have interpreted it as a combination of both hardware and software. Future studies may consider providing a clearer or more defined definition of educational technology to more narrowly define the scope of their inquiry.

Variation of Learning Settings

Educating nursing students generally takes place in three distinct settings – the classroom for didactic lecture where students learn about underlying concepts of practice, pathophysiology, pharmacology, and treatment; the clinical laboratory where students practice skills, usually on simulation mannequins or each other; and the clinical nursing unit where students practice skills on actual patients who are placed partially under their care. In many instances, the experiences in the laboratory and nursing unit are areas where students are exposed to and use technology on a regular basis. The focus of this

study was on the nursing classroom where information is primary provided through PowerPoint mediated lecture. However, when asked on survey about their experiences in the nursing classroom, the students may have mistaken the intent of the question and considered their use of technology in laboratory and clinical settings. This became suspect during my focus group interviews. Several times, the students would refer to virtual simulations (vSims) or other technology such as e-book resources which are used regularly in the skills laboratory or for review prior to caring for patients on the clinical nursing unit. In addition, students would describe their experiences of using technology for learning in terms of virtual meeting rooms such as Zoom, Google Meet, or Microsoft Teams.

Sample Bias

When considering the results obtained, it is also important to consider sample bias. This sample bias may be seen in both my instructor colleagues and students. I have been working at the school for the last five years and have come to know my colleagues well and maintain good working relationships with all of them. All of my colleagues participated in completing the ITS and took part in individual interviews. Because my colleagues were supportive of my work and knew of my study, they may have answered in certain ways that they may have perceived as being more helpful or supportive towards my research. As such, they may have answered positively to questions concerning educational technology but may not have had those actual feelings. This same sample bias might also be seen in student responses due to my familiarity with the students. As the nursing basics instructor, I am one of the first instructors that students meet at the nursing school. As such, I have taught every student at the school. On school surveys, I

have achieved high marks in student satisfaction. Students also know that I have been pursuing my doctoral degree in educational technology. As part of my teaching style, I regularly speak about my clinical experiences as well as personal experiences with my family and work as an educator. I have shared my daughters' experiences with educational technology in their middle school classes, and how this piqued my interest in seeing the role educational technology could play in the nursing classroom. It is possible that, having knowledge of my study and my interest in educational technology, students may have felt compelled to respond to survey or focus group questions with a more positive light than what they actually felt.

COVID Confounding

The COVID-19 pandemic occurred during the spring of 2020 and continued through data collection and results write-up for this study. Over the course of the pandemic, especially during the period from March 2020 through May 2021, in-person didactic lecture classes – our primary format of teaching content – were suspended and held remotely using the online meeting platform Google Meet. Students were required to complete the previously mentioned vSims and other assignments through their electronic textbook to satisfy their skills laboratory and clinical coursework. In addition, because the pandemic prevented in-person assessments, the school transitioned to using online test-taking platforms initially through the school's learning management system Moodle, and then to the remote testing system ExamSoft.

As is common with the introduction of new technology, both instructors and students faced some challenges in the implementation and the execution of exams especially considering the speed with which the technology had to be onboarded. These

challenging experiences coincided with the timeframe of my study and most certainly would have had an impact on how instructors and students alike viewed technology and its impact on teaching. During focus groups, students expressed frustrations over the ability to get into the Google Meet platform; described instances where time was lost during online exams due to connectivity issues; and recounted assignments that they were unable to hand in because discussion forums were not opened. While I was able to redirect some of these departures from the primary topic of study, it was clear that the challenges and frustrations of study during the pandemic had significant effect on perceptions towards educational technology.

Likewise, instructor opinions may have been distorted by the radical transformation of their classroom setting caused by the COVID-19 pandemic. During our interviews, instructors described feelings of inadequacy having to switch, almost overnight, from a face-to-face classroom format to a remote format where there was much more limited interaction with students. Some felt that the transition to an online format helped while others thought the change to an online format was confusing. These transformations, coinciding so closely to my data collection – for better or worse – could have had the effect on their responses as to their viewpoints towards the use of educational technology.

Recommendations

Through this study, I have explored the attitudes and perceptions of instructors and students regarding educational technology and have discussed the implications of incorporating educational technology in the nursing classroom. As previously described, many of the instructors at the nursing school had positive perceptions towards educational technology but appeared challenged in its implementation in the classroom

and its incorporation into their individual pedagogy. The reasons for this included concern for the amount of time it might take to learn a new technology, time to incorporate the technology into their existing course, concerns of failure and embarrassment, and the lack of available professional development. Through reflection upon my findings and discussion, I have prepared recommendations that could be useful in outlining ways in which some of these barriers might be overcome and how educational technology could be more integrated into practice. These recommendations, listed below, consider the findings of this study as well as my contextual knowledge of the study site.

Disseminating Study Results

One way of beginning to effect change at my study site will be to share the results of my research. As mentioned in the *plan for sharing findings* section of this dissertation, my study and its results will be shared with the school's instructors and Dean during a meeting of the faculty development committee. Findings of my research will be presented, and instructors will have the opportunity to ask questions and learn more about my results and recommendations. It is hoped that better awareness about the perceptions of both their instructor colleagues and the students will help engender a desire to further explore technology use in the classroom.

Increase Involvement in Committees that Affect Change

Another way to affect change at my work setting is through increased involvement in committees that encourage continued development of instructors. The Faculty Development committee at the nursing school is tasked with aiding in developing instructor knowledge and promoting experiences of benefit to their professional growth.

The committee works with the Dean and instructors to provide educational opportunities that are of interest and have relevance to practice. I have recently requested appointment to this committee and will work with its members to put together programs that will encourage the creation of more active learning environments. McKnight et al. (2016) found that the context in which technology is introduced is important to its acceptance. These researchers noted that when an instructional model promoting active learning is introduced first, followed by enabling technologies, instructors viewed the technology as a tool to affect the creation of a more active learning environment. By participating in this committee, I hope to raise awareness of active teaching strategies and how educational technologies could help to facilitate these activities in the classroom.

Work With Existing Technologies

Over the course of my individual interviews with the instructors, some expressed frustrations at times with the suddenness of the need to use technology due to the COVID-19 pandemic. They also recalled the benefits of how technology enabled them to continue to work and educate their students in an online environment. Following initial struggles with operating communication technology such as Google Meets, Microsoft Teams; learning advanced capabilities of their textbook online resources and Moodle, the learning management system; and management of online test-taking software such as ExamSoft, instructors eventually began to feel more comfortable and at ease. Roney et al. (2017) noted that participants in their study were more likely to use technology of which they felt comfortable, familiar, and had the ability to use. It would be beneficial to encourage the expanded use of these technologies by offering trainings through the resident Information Technology Officer at the school as an approach to allay concerns

about introducing new technology and as a way to increase instructor self-efficacy. This increased awareness of the value of the tools could raise positive attitudes and perceived behavioral control which may be the encouragement needed by some to further integrate technology in their classrooms.

During the height of the pandemic, the school's information officer worked quickly and closely with instructors to provide education about basic supplemental capabilities of these programs. Focusing on expanding the use of these technologies outside of their emergent use with a specialist they are familiar with could help instructors achieve a greater comfort level regarding their use and integration. Considering Ajzen's theory of planned behavior, these activities could increase an instructor's behavioral beliefs – those beliefs that a behavior, in this case increased technology use, will lead to a positive outcome – which could motivate the instructor and increase interest to use other technologies as their confidence in their ability grows.

Encourage Mutual Collegial Support

Over the course of the instructor interviews, one instructor (Karen) informed me of a previous practice at the school where instructors would sit in on a colleague's lecture and observe their methods of instruction. Far from being a concerning method of employee evaluation, Karen advised that peer observation provided benefits to both the instructor being observed and the one observing because it exposed them to different ideas and methods in a setting of mutual respect. Restarting such a practice at the school, possibly through the endorsement of some of the more senior faculty members could be helpful to create a more open practice environment where colleagues input is both welcomed and appreciated.

Measured Introduction of Educational Technology into Pedagogy

In my position at the nursing school, I will use my professional relationships with colleagues to encourage experimentation with educational technology. I will encourage instructors to attempt to use one piece of educational technology within their subject matter each semester. I will offer my support as well as request assistance from the school's information technology officer as needed. As each educator becomes more familiar with educational technology, it is hoped that they will see benefits in the classroom through increased student interest and involvement which could further encourage its adoption into their pedagogy.

Conduct and Encourage Participation in Research

The pursuit of this degree has raised my awareness regarding the importance of the study and creation of knowledge. As part of my personal implications of practice, I plan to continue to study educational technology and its implications in the field of nursing education. I will work within my current course, Medical-Surgical Nursing, to incorporate specific educational technologies and hope to measure students' perceptions on their interest and enthusiasm for novel approaches to learning. It is hoped that this future action research will encourage others within the school to see the benefits from and work to incorporate technology into their own practices.

Conclusion / Closing Thoughts

This descriptive study addressed instructor and student attitudes and perceptions about the use of educational technology at a small hospital-based nursing school in New York. Due to the ever-increasing availability of technology and the reality that today's nursing students have been exposed to the technology throughout their lifespan, this researcher was interested in exploring perceptions of these two groups and how they

relate to teaching and learning theoretical knowledge of the profession of nursing. These two groups are vastly different regarding their makeup, with the instructors being relatively homogenous in terms of age and experience with technology (i.e., digital immigrants) and students being more heterogenous in their makeup with many growing up surrounded by technology (i.e., digital natives). It was thought that there would be vast differences in perceptions and attitudes towards using educational technology in the classroom. Current practices at the school demonstrate limited use of technology for teaching theoretical knowledge of nursing with the primary use of technology limited to PowerPoint and some videos hosted through the school's learning management system.

Examining of the findings of my surveys and interviews and focus groups regarding the perceptions and attitudes of both instructors and students, I noted that these were not *vastly* different, with both groups acknowledging the benefits and challenges of incorporating technology in the classroom. Instructors expressed their belief that educational technology tools were valuable but struggled with the need to integrate it more fully into their didactic classroom due to constraints of time. It was felt by some that the necessary support was not available to maintain the growth and development of new methods of teaching. Still others questioned the necessity of using more educational technology to "fix something that ain't broken." In a similar way, students believed that educational technology could help increase interest and participation in coursework while creating a more interactive, student-centered environment. However, students were also concerned about the abilities of instructors to incorporate technology and the potential for added workload in preparing prior to class.

This study concluded that educational technology could play an important role in educating the next generation of nurses. However, to effect change at the nursing school, it would be important to foster better understanding of the benefits of educational technology and its effects on learning. To help rouse interest and sustain motivation, I recommend working with other instructors and stakeholders in creating a CoP where instructors are encouraged to explore the use and examine the benefits of educational technology in an environment of support and respect as colleagues work to expand their skills and advance their practice.

Closing Thoughts, Researcher's Perspective

The goal of any education is to effect change – a change in a person, a class, an organization, a profession, a society. Through this action research, I have had the opportunity to seriously evaluate and reflect upon my practice. This study, and the coursework involved in this program, have provided me the opportunity to expand my knowledge as an educator, a researcher, and a change agent. This is just the beginning. From this research, I will take the lessons learned through this action research and work to effect change in the context of my current practice. It will be through the knowledge, skills, and relationships developed during this program of study that I will be able to work with colleagues and stakeholders to bring about lasting change for the benefit of both instructor and student.

It is ironic that the Doctor of Education degree is called a *terminal degree*, making it sound like the completion of one's education. In my opinion, it is almost the opposite because it most certainly does not mean my academic journey is ending. I would argue that through my coursework at the University of South Carolina and the process of

developing this dissertation, it has more expanded my desire not only to pursue knowledge, but to develop it for the purpose of affecting change and development of my students and profession. I believe teaching is one of the best professions in existence – to have the ability to educate and develop knowledge in others, especially those who will follow you, is both powerful and humbling experience. I am fortunate to be able to expand my knowledge and thankful to have this opportunity to affect change.

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APPENDIX A: INVITATION LETTER (STUDENT)

Dear Student,

I am a Doctoral candidate in the Educational Studies Department at the University of South Carolina. I am conducting a research study as part of the requirements of my Doctoral degree in Learning Design and Technologies, and I would like to invite you to participate in this study.

This study will examine the use of Educational Technologies in the Nursing School Classroom. If you decide to participate, you will be asked to complete some surveys about your experiences with educational technologies and may be asked to participate in a group discussion about how educational technologies affect your learning.

In particular, you will be asked questions about technology used in your classrooms and we will discuss how educational technology has impacted your learning. You do not have to answer any questions that you do not wish to answer. Surveys will be conducted via Google Forms and sent through your [removed]email address. If selected and you wish to participate in a focus group, the meeting will take place at a mutually agreed upon time, and it should last about 60 minutes. The focus group session will be audio recorded so that I can accurately transcribe what is discussed. Survey data and audio files will only be reviewed by members of the research team.

Participation is confidential. Study information will be kept in a secure location at the University of South Carolina. The results of the study may be published or presented at professional meetings, but your identity will not be revealed.

If you choose to participate in focus groups, others in the group will hear what you say, and it is possible that they could tell someone else. Because we will be talking in a group, I cannot promise that what you say will remain completely private, but we will ask that you and all other group members respect the privacy of everyone in the group.

As a token of appreciation for participating in completing the survey, you will receive a [removed]School of Nursing t-shirt. For those participating in one of the focus groups, you will be eligible to win a $25 gift card. Chances of winning will be 1:5.

Participation in this research study is voluntary. Participation, non-participation or withdrawal from the study will not affect your grades in any way. However, I hope this research will provide valuable insights into how we use Educational Technology and its role in educating nursing students in the future.

I will be happy to answer any questions you have about the study. You may contact me at dstanghellini@riversidehealth.org or (914) 964-4286, or my faculty advisor, Dr. Lucas Vasconcelos, at limadel@mailbox.sc.edu or 803-576-8407.

Thank you for your consideration. If you would like to participate, please enter your name in the box below. Then, click to go to the next page and begin completing the study survey.

_____ _____

Signature Email

With kind regards,

David Stanghellini, RN, MSN
(914) 964-4286
DStanghellini@riversidehealth.org

APPENDIX B: INVITATION LETTER (INSTRUCTOR)

Dear Colleague,

As you know, for the last two years I have been a Doctoral student in the Educational Studies Department at the University of South Carolina. I am conducting a research study as part of the requirements of my Doctoral degree in Learning Design and Technologies, and I would like to invite you to participate in this study.

This study will examine the use of Educational Technologies in the Nursing School Classroom. If you decide to participate, you will be asked to complete a survey about your experiences with educational technologies and be interviewed about how educational technologies affect your teaching.

In particular, you will be asked questions about how technology is used in your classrooms, and we will discuss how educational technology has impacted your teaching. You do not have to answer any questions that you do not wish to answer. Surveys will be conducted via Google Forms and sent through your [removed] email address. Interviews will take place at a mutually agreed upon time, and it should last about 60 minutes. The interview will be audio recorded so that I can accurately transcribe what is discussed. Survey data and audio files will only be reviewed by members of the research team.

Participation is confidential. Study information will be kept in a secure location at the University of South Carolina. The results of the study may be published or presented at professional meetings, but your identity will not be revealed.

As a token of appreciation for participating in completing the survey, you will receive $25 gift card. For your participation in the interview, you will be eligible for a drawing to win a $50 gift card to a local restaurant. Chances of winning will be 1:8.

Participation in this research study is voluntary. Participation, non-participation or withdrawal from the study will not affect your employment or seniority status in any way. However, I hope this research will provide valuable insights into how we use Educational Technology and its role in educating nursing students in the future.

I will be happy to answer any questions you have about the study. You may contact me at dstanghellini@riversidehealth.org or (914) 964-4286, or my faculty advisor, Dr. Lucas Vasconcelos, at limadel@mailbox.sc.edu or 803-576-8407.

Thank you for your consideration. If you would like to participate, please enter your name in the box below. Then, click to go to the next page and begin completing the study survey.

_____ _____

Signature Email

With kind regards,

David Stanghellini, RN, MSN
(914) 964-4286
DStanghellini@riversidehealth.org

APPENDIX C: INSTRUCTOR TECHONOLOGY QUESTIONNAIRE (ITS)

Demographic Information:

1. Which category below includes your age?

   _____35-39 _____40-44 _____45-49 _____50-54 _____55 +

2. Are you male or female? _____ Male _____ Female

3. What is the highest level of school you have completed or the highest degree you have received?

   _____ Master's Degree _____ Doctorate or professional degree

4. Do you have a computer at work? _____ Yes _____ No

5. How often do you use the following in the classroom? Please note that this excludes use in skills lab, simulation, and clinical.

	Never	Rarely, Once a semester	Once a month	2-3 times a month	Once a week
YouTube, other instructional videos					
Blogs / Vlogs (video blog)					
Computer Mediated Games (ex. Kahoot, Jeopardy, etc.)					
Audience Response Systems (also known as "clickers.")					
Simulation (outside of lab/clinical)					

6. Before the COVID-19 pandemic, had you ever received any type of training to incorporate technology into your teaching? _____ Yes _____ No

7. Following the COVID-19 pandemic, have you received any type of training to incorporate technology into your teaching? _____ Yes _____ No

8. How long have you been lecturing at the University / College /Nursing School Level (include lectures at any other colleges in addition to [removed]?

___0-5 yrs ___6-10 yrs ___11-15 yrs ___16-20 yrs ___21-25 yrs

___25 + yrs

Effect on Classroom Teaching:

Please read each statement and then mark the column which best answers how you feel.

	Strongly Disagree (1)	Disagree (2)	Neutral (3)	Agree (4)	Strongly Agree (5)
1. Technology enables me to make my lectures more student-centered and participatory.					
2. Other than PowerPoint, I regularly use technology in my lecture/classroom teaching.					
3. I believe my use of technology in my classroom has had a positive effect on my students' learning.					
4. Technology allows me to be more interactive in teaching lecture topics.					

Effect on Students:

Please read each statement and then mark the column which best answers how you feel.

	Strongly Disagree (1)	Disagree (2)	Neutral (3)	Agree (4)	Strongly Agree (5)
5. Educational technology tools have increased student involvement in class.					
6. Educational technology has increased collaboration among students and myself.					
7. I believe most of my students can effectively use educational technology such					

as games, clickers, and podcasts.
8. I believe the use of educational technologies such as games, clickers, and podcasts have a positive effect on my students' learning.
9. Use of educational technologies in class and assignments have increased the quality of my students' work.

Instructor Technology Survey (ITS)

Comfort and Ability to Integrate Technology:

Please read each statement and then mark the column which best answers how you feel.

	Strongly Disagree (1)	Disagree (2)	Neutral (3)	Agree (4)	Strongly Agree (5)
9. I feel comfortable in my knowledge on how to integrate educational technologies into my instruction in the classroom.					
10. I believe the school provides adequate training to me about using technology in my classroom.					
11. I believe I have enough computer skills to integrate technology tools into my classroom instruction.					

Feeling of Support:

Please read each statement and then mark the column which best answers how you feel.

	Strongly Disagree (1)	Disagree (2)	Neutral (3)	Agree (4)	Strongly Agree (5)
12. I feel supported by my students who want to use educational technology tools to learn in the classroom.					
13. I feel supported by my administrators in using educational technology such as games, clickers, and podcasts in my classroom.					
14. My school has a technology plan in place.					
15. The technology plan at my school directs how we will obtain, update, and support technology for use in the classroom.					

16. I feel supported by my colleagues in my efforts to increase the integration of technology into the classroom.	

Instructor Technology Survey

Technical Support:

Please read each statement and then mark the column which best answers how you feel.

	Strongly Disagree (1)	Disagree (2)	Neutral (3)	Agree (4)	Strongly Agree (5)
16. I believe the school/hospital provides adequate technology support for me and my colleagues.					
17. I believe the school's computers are well-maintained and updated regularly.					
18. The information technology (IT) department provides a range of hardware and software for students to use during the academic year.					

Additional Questions:

Use of Technology:
Please read the following questions related to your technology use inside your lecture classroom and answer which most closely reflects how your feel.

I use the following technology in my ***lecture classroom***:

	Never (1)	Very Rarely (2)	Rarely (3)	Occasionally (4)	Frequently (5)	Very Frequently (6)
1. PowerPoint.						
2. YouTube or other educational videos.						

3. Blogs / Vlogs (video blogs). 4. Educational games (ex. Kahoot!, Jeopardy, TopHat). 5. Audience Response Systems (aka “Clickers?” 6. Simulations

APPENDIX D: COMPUTER TECHNOLOGY INTERGRATION (CTI)

SURVEY (KEENGWE, 2007) & TECHNOLOGY ATTITUDE SURVEY

(TAS; MAAG, 2006; MCFARLANE ET AL., 1997)

This survey is designed to examine your experience with specific technologies used in your education as well as your perceptions and attitudes towards technology in the nursing classroom

Because the use of PowerPoint and Learning Management Systems such as Moodle and Blackboard are widespread at the school, this survey will ask you about the use of other technologies in your classroom. This survey will collect demographic data as well as your responses to questions about different technologies as well as your perceptions regarding how your instructors integrate these technologies into the classroom.

For the purpose of this survey, the term *Educational Technology* will refer to the use of one or all of the following technologies listed, below, in the *nursing classroom* (excludes skills lab and clinical).

Demographic Information:

1. Which category below includes your age?

   _____ under 20 _____ 20-24 _____ 25-29 _____ 30-34 _____35-39
   _____40-44 _____45-49 _____50-54 _____55 +

2. Are you male or female? _____ Male _____ Female

3. What is the highest level of school you have completed or the highest degree you have received prior to enrolling in nursing school?

   _____ High School Diploma _____ Associate Degree _____ Bachelor degree
   _____ Master's Degree _____ Doctorate or other professional degree

4. Do you have a computer at work? _____ Yes _____ No

5. How often do you use the following in the classroom? Please note that this excludes use in skills lab, simulation, and clinical.

	Never	Rarely, Once a semester	Once a month	2-3 times a month	Once a week
YouTube, other instructional videos					
Blogs / Vlogs (video blog)					
Computer Mediated Games (ex. Kahoot, Jeopardy, etc.)					
Audience Response Systems (also known as "clickers")					
Simulation (outside of lab/clinical)					

Computer Technology Integration (CTI) Survey:

Please use the following scale for all of the questions listed below:

(1) Strongly Agree
(2) Agree
(3) Disagree
(4) Strongly Disagree

Educational technologies use in the didactic (classroom) portion of my courses enhances my learning in the following ways:

For the purposes of this survey, Educational Technology refers to the following technologies: • YouTube or similar instructional videos • Blogs / Vlogs (video blogs) • Computer-based games (ex. Kahoot!, Jeopardy, TopHat, etc.) • Audience Response Systems (also known as "clickers") • Simulation software (outside of lab or clinical)	Strongly Agree (1)	Agree (2)	Disagree (3)	Strongly Disagree (4)
Use of educational technologies in the classroom…				

1. Provides me with stimulating environments to get more engaged and involved in a class or course-related activities.	
2. Helps me to practice the concepts or content presented in class for improving learning.	
3. Helps me to better visualize or understand abstract concepts presented in the class.	
4. Helps me to better organize my classwork for improved learning.	
5. Makes the class learning sessions more interactive, more exciting, and less boring.	
6. Provides me with greater access to learning resources such as Internet resources, for improved learning.	
7. Provides me with more opportunities to think in a more critical way to solve given course tasks, such as completing class projects.	
8. Provides me with more opportunities for me to communicate with my peers and instructor.	

9. Enables students with disabilities to overcome learning barriers.
10. Helps me to learn at my own rate in a non-threatening environment for better grades.
11. Creates more anxiety that affects my overall class learning activities.
12. Disrupts effective learning especially if the computer system crashes or there is general computer network congestion.
13. Creates learning problems, such as trying to find information from the World Wide Web.
14. Increases my chances of making mistakes that are difficult to correct.
15. Slows my learning process especially when required to complete computer tasks outside regular class sessions.
16. Takes time away from actual classroom instruction.
17. Decreases my self-confidence to learn effectively in the class.
18. Creates competition with class lectures which could affect my ability to learn effectively.
19. Creates "computer dependency"; I can't learn effectively in other environments not supported by computers.
20. Slows my learning process especially when faculty guidance is not readily available.

Thank you for completing this survey.

Technology Attitude Survey (TAS) (Maag, 2006; McFarlane et al., 1997)

Please use the following scale for all of the questions listed below:

(1) Strongly Disagree
(2) Disagree
(3) Slightly Disagree
(4) Slightly Agree
(5) Agree
(6) Strongly Agree

Confidence in and benefits of using technology:

	Strongly Disagree (1)	Disagree (2)	Slightly Disagree (3)	Slightly Agree (4)	Agree (5)	Strongly Agree (6)
1. Knowing how to use technology is a necessary skill for me.						
2. I like using technology.						
3. I feel confident with my ability to learn about technology.						
4. Learning about technology is worthwhile.						
6. I will use my knowledge of technology in many ways as a student.						
8. It is important to know about technology in my future career.						
10. Using technology will facilitate my learning.						
11. I know if I work hard to learn about technology, I will do better.						

13. Knowing about technology will make me a better student.						
15. Technology really won't make my performance as a student any better.						

Lack of self-efficacy in the use of technology:

	Strongly Disagree (1)	Disagree (2)	Slightly Disagree (3)	Slightly Agree (4)	Agree (5)	Strongly Agree (6)
5. Working with technology makes me feel nervous.						
7. Technology makes me feel stupid.						
9. I'm not the type to do well with technology.						
12. I think using technology will be difficult for me.						
14. I feel uncomfortable using most technology.						

Additional Questions Related to Technology Incorporation:

	Strongly Disagree (1)	Disagree (2)	Slightly Disagree (3)	Slightly Agree (4)	Agree (5)	Strongly Agree (6)
1. I feel that my instructor is knowledgeable in using technology for classroom instruction.						
2. I believe my instructors feel						

pressured to use more technology due to expectations of administration.	
3. I believe my instructors feel pressured to use more technology due to expectations of their students.	

APPENDIX E: IRB APPROVAL LETTER

UNIVERSITY OF
SOUTH CAROLINA

OFFICE OF RESEARCH COMPLIANCE

INSTITUTIONAL REVIEW BOARD FOR HUMAN RESEARCH
APPROVAL LETTER for EXEMPT REVIEW

David Stanghellini
Wardlaw College
820 Main Street
Columbia, SC 29208 USA

Re: **Pro00105187**

Dear Mr. David Stanghellini:

This is to certify that the research study ***A DESCRIPTIVE STUDY ABOUT INSTRUCTOR AND STUDENT ATTITUDES TOWARDS USE OF EDUCATIONAL TECHNOLOGY IN NURSING INSTRUCTION*** was reviewed in accordance with 45 CFR 46.104(d)(2) and 45 CFR 46.111(a)(7), the study received an exemption from Human Research Subject Regulations on **10/21/2020**. No further action or Institutional Review Board (IRB) oversight is required, as long as the study remains the same. However, the Principal Investigator must inform the Office of Research Compliance of any changes in procedures involving human subjects. Changes to the current research study could result in a reclassification of the study and further review by the IRB.

Because this study was determined to be exempt from further IRB oversight, consent document(s), if applicable, are not stamped with an expiration date.

All research related records are to be retained for at least three (3) years after termination of the study.

The Office of Research Compliance is an administrative office that supports the University of South Carolina Institutional Review Board (USC IRB). If you have questions, contact Lisa Johnson at lisaj@mailbox.sc.edu or (803) 777-6670.
Sincerely,

Lisa M. Johnson
ORC Assistant Director and IRB Manager