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An Investigation of Factors that Influence Registered Nurses' Intentions to Use E-Learning Systems in Completing Higher Degrees in Nursing

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An Investigation of Factors that Influence Registered Nurses' Intentions to
Use E-Learning Systems in Completing Higher Degrees in Nursing

by

Pauline Little

A dissertation submitted in partial fulfillment of the requirements
for the degree of Doctor of Philosophy
in
Computing Technology in Education

College of Engineering and Computing
Nova Southeastern University

2016

We hereby certify that this dissertation, submitted by Pauline Little, conforms to acceptable standards and is fully adequate in scope and quality to fulfill the dissertation requirements for the degree of Doctor of Philosophy.

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Nova Southeastern University

2016

An Abstract of a Dissertation Submitted to Nova Southeastern University
in Partial Fulfillment of the Requirements for the Degree of Doctor of Philosophy

An Investigation of Factors that Influence Registered Nurses' Intentions to Use E- Learning Systems in Completing Higher Degrees in Nursing

by
Pauline Little
September 2016

There is an increasing demand for more baccalaureate- and graduate-prepared registered nurses in the United States, to face the healthcare challenges of the 21st century. As a strategy to meet this need, educational institutions are expanding electronic learning in nursing education; however, technology acceptance in education continues to be a concern for educational institutions. In this context, the goal of the study was to investigate factors that potentially influence registered nurses' intentions to adopt e-learning systems. A theoretical model was used to determine whether perceived value, attitude toward e-learning systems, and resistance to change influence registered nurses' intentions to use e-learning systems.

A web-based survey was used to assess the effect of the aforementioned constructs on registered nurses' intentions to use e-learning systems. The web-survey instrument was developed as a multi-item questionnaire using Likert-type scales. A 35-item survey instrument was developed using previously validated measurable items. The target population of this study was registered nurses in South Florida. The sample for this study was 323 (over 21% response rate) registered nurses at two hospitals in South Florida.

Multivariate analysis was conducted using structural equation modeling and robust standard errors with the Satorra-Bentler adjustment. The results revealed that perceived value, attitude toward e-learning systems, and resistance to change influence registered nurses' intentions to use e-learning systems. Findings from this investigation may be of interest to educational institutions preparing to make investments in e-learning systems. The information provided in the study will allow administrators in higher educational institutions to make decisions on ways to address the challenges that may be affecting e-learning acceptance by registered nurses.

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Chapter 1

Introduction

Background

According to the Future of Nursing: Campaign for Action (FNCA), the Institute of Medicine (IOM), and the National League for Nursing (NLN), the challenges for nursing education in the 21st century include (a) providing efficient and effective continuing care for a diverse patient population, (b) the need to stay current with rapid advances in medical knowledge and technology, and (c) a shortage of qualified nurses (FNCA, 2014; IOM, 2011; NLN, 2012). To address these challenges, the IOM and the Robert Wood Johnson Foundation made recommendations, to academic nurse leaders across all schools of nursing, to improve nursing education (IOM, 2011). These recommendations include (a) increasing the proportion of nurses with baccalaureate degrees from 50% to 80% by 2020, (b) doubling the number of nurses with a doctorate by 2020, and (c) having at least 10% of baccalaureate program graduates enter master's or doctoral degree programs.

The American Association of Colleges of Nursing (AACN) seeks to advance the educational preparation of the nursing workforce at the baccalaureate, master's, and doctoral levels (AACN, 2013). The AACN, representing more than 732 university and four-year college education programs in nursing, works to establish a superior level of education for bachelor's and graduate degrees in nursing (AACN, 2013). The Tri-

Council for Nursing, which includes AACN, the American Nurses Association, the American Organization of Nurse Executives (AONE), and the NLN, believes that meeting the IOM recommendations will create a more highly educated nursing workforce (NLN, 2012). Likewise, the Health Resources and Services Administration (HRSA) Division of Nursing supports advanced nursing education programs for RNs preparing to become nurse practitioners, nurse midwives, nurse anesthetists, nurse administrators, and other specialties requiring advanced education (HRSA, 2014a). One approach utilized by this organization addresses the debts accrued through student loans. HRSA not only provides loan repayment programs such as the National Health Service Corps and the NURSE Corps, but also provides loan forgiveness for nurses who practice as primary care providers and nursing faculty in specific organizations. Finally, HRSA supports advanced nursing education for faculty development in technologies (HRSA, 2014a).

Due to the call for advancement in nursing, enrollment in baccalaureate, master's, and doctoral nursing programs increased in 2012; however, of the 374,478 qualified applicants to the baccalaureate and graduate nursing programs, only 305,542 were accepted (AACN, 2015). Therefore, 68,936 qualified applicants were turned away from the nursing programs, including more than 15,288 applications to graduate programs. Some nursing schools did not accept students in nursing programs due to a lack of clinical teaching sites, faculty, classroom space, and preceptors (AACN, 2014).

According to the 2013 Clerkship Survey – a collaboration of the AACN, the American Association of Colleges of Osteopathic Medicine (AACOM), the Association of American Medical Colleges (AAMC), and the Physician Assistant Education Association (PAEA) – locating and retaining clinical training sites continues to be a

challenging and a persistent concern due to the scarcity of willing and qualified educators

(AAMC, 2014). According to Sadizaker et al. (2015), personnel at otherwise qualified

sites are unwilling to assist in this area due to the following:

- Restrictions that may include faculty shortage

- Work overload of staff nurses

- Relationships between the administrators of the schools of nursing and the
  nursing institutions

- Lack of empowerment and compensations from leaders of clinical sites to
  increase participation of staff nurses in the training of students

To address the challenges in nursing education, schools around the country are

exploring creative ways to increase student capacity (AACN, 2013). Concurrently, the

entire healthcare market is globalizing quickly, and the Internet and information

technologies are allowing the exchange of information and knowledge worldwide (Park

& Gang, 2013). Educational institutions are investing in information technology (IT)

including electronic learning (e-learning) to increase student capacity (Romero, 2012).

According to Chavan (2012), the term e-learning is being used in many different

ways and has many different definitions. Chavan identifies three areas that best describe

e-learning. They include: (1) learning facilitated and supported by the application of

information and communication technologies (ICT), (2) a process of education using

computers, telecommunication, networks, and storage technology, and (3) the use of

network technologies to create, foster, deliver, and facilitate learning anytime and

anywhere without geographical barriers.

E-learning delivery techniques offer a more flexible and convenient approach to learning than traditional programs (Karaman, 2011) by providing students with the ability to complete assignments at their own pace and on their own time (Popa & Stănculea, 2012). E-learning can assist healthcare professionals in improving their education while maintaining work-life balances, assuring them of access to clinical knowledge with the most current learning materials and support from faculty (Park & Gang, 2013). In the pursuit of the education of nurses, e-learning is expected to play a key role (Cheng, 2013).

Problem Statement

One of the major concerns in the nation is the shortage of qualified nurses (HRSA, 2014b; NLN, 2013). An area of particular concern is nursing education, where along with the organizations noted above, the FNCA (2014) indicated that it is critical for the nursing workforce to become more educated as a means of providing safe and effective patient care.

The demand for qualified healthcare workers has increased. As a result of the Affordable Care Act, 76 million Americans are estimated to be newly eligible for expanded preventive services coverage (U. S. Department of Health and Human Services [HHS], 2014). There were 43.1 million people who were age 65 and older in 2012 (U. S. Census Bureau, 2012), with the projected population of those 65 and older to be at 82.7 million in 2050 (Ortman, Velkoff, & Hogan, 2014). In addition, the 2012 report from the U. S. Bureau of Labor Statistics projected that 712,000 new RN positions will be added to the workforce between 2010 and 2020 (U. S. Bureau of Labor Statistics, 2012).

There is a growth of online programs for completing the Bachelor of Science in Nursing (BSN) and graduate programs in nursing (National Advisory Council on Nurse Education and Practice [NACNEP], 2013). In the 2012-13 academic year, 85.5% of the master of science in nursing (MSN) programs, 71% of research-focused doctoral programs in nursing, and 90% of the number of doctor of nursing practice programs were delivered using some form of distance education, including online education (Fang, Li, & Bednash, 2013). Several institutions offer advanced nursing programs entirely online (Fang et al., 2013).

Between 2009 and 2013, enrollment in generic baccalaureate nursing degree programs increased by 16.8%, while graduation rates increased by 21.6% (Fang et al., 2013). At the same time, the number of enrolled master's degree students increased by 39.8%, while graduation rates increased by 57.7% (Fang et al., 2013). Furthermore, the number of enrolled doctoral degree students increased by 28.6%, while graduation rates increased by 11.7% (Fang et al., 2013). Although there was an increase in both enrollment and graduation in nursing programs in 2013, the growth is not sufficient to meet the projected demand for nursing services (AACN, 2014).

In 2012, a survey conducted by the Babson Survey Research Group indicated that the number of higher education students who were taking at least one online course had increased by over 570,000 when compared to 2011 (Allen & Seaman, 2013). However, academic leaders have expressed several concerns about the online enrollment growth rate of 9.3%, which was the lowest recorded in 10 years (Allen & Seaman, 2013). In addition, lower retention rates were identified by 73.5% of academic leaders as a barrier

to the growth of online programs (Allen & Seaman, 2013). According to Gazza and Hunker (2014), low retention rates – defined as low continued enrollments from admission through program completion – pose a significant problem in online nursing programs in the United States.

While the e-learning approach to learning meets the needs of many nursing professionals, it also poses unique challenges (Gazza & Hunker, 2014). For example, many universities encounter reluctance by students to accept e-learning services (Al-Adwan, Al-Adwan, & Smedley, 2012). According to Al-alak and Almnawas (2011), a new system will be accepted and implemented effectively, and a formerly implemented system will run successfully, if there is an understanding of user acceptance. Therefore, students' involvement and acceptance must be considered to prevent the advanced systems from failing (Al-Adwan et al., 2012).

The technology acceptance model (TAM) theory is frequently used by researchers to explain e-learning acceptance (Šumak, Heričko, & Pušnik, 2011). TAM was developed by Davis in 1989 and is based on the beliefs, attitudes, intentions, and behaviors adoption framework (Hashim, 2011). Many studies have extended TAM by adding external variables to explain and determine users' acceptance of information technology. Some examples include:

- perceptions of the value of e-learning (Allen & Seaman, 2013; Chang, 2013; Ying, Jusoh, & Khalifah, 2012)

- attitudes toward e-learning systems (Lina, Chen, & Fang, 2011; Mehra & Omidian, 2012; Yoo & Han, 2013)

- resistance to change (Chemingui & Lallouna, 2013; Halbach & Gong, 2011; Naccarato, 2013).

In this study, the perceived value, attitude, and resistance to change were assessed for their effect on RNs' intention to use e-learning systems. Ferdousi (2009) used these constructs in an empirical study to measure educators' acceptance of e-learning, but the variables have not been used in an e-learning acceptance study on RNs. Further, the variables are appropriate to determine RNs' e-learning acceptance because they have a direct or indirect relationship to the challenges in nursing education.

One of the challenges in nursing education is to produce competent nurses quickly while conserving the integrity and quality of the nursing education (AACN, 2013). Therefore, to enhance a quality learning experience in higher education, the value of the e-learning system must not be ignored (Male & Pattinson, 2011). According to Spitzer (2011), nurses' core values focus on actions that are good, have the right outcome, and are beneficial to their patients. Research revealed the importance of individuals' perceived value on behavioral intentions (Allen & Seaman, 2013). According to Johnson, Adams Becker, Estrada, and Freeman (2014), although the value of online learning is well understood, "as online learning and free educational content become more pervasive, institutional stakeholders must rethink the value of higher education from a student's perspective" (p. 32).

Subsequently, several researchers have validated learners' positive or negative feelings or attitudes toward participating in e-learning activities as factors in the acceptance and use of e-learning systems (Mehra & Omidian, 2012). According to

Johnson et al. (2014), although massive open online courses (MOOCs) were widely

embraced in 2012, in 2013 the leaders had a major change in attitude. As a result, critics

caution that there is a need to study the new approaches in education through critical

lenses (Johnson et al., 2014). Further, Karaman (2011) pointed out that a positive attitude

influences learning competence, motivation, and knowledge application. Chow et al.

(2013) completed a study on the intention to use a clinical imaging portal for enhancing

healthcare education and concluded that there should be more studies on attitude and

intention to use technology.

Finally, the healthcare system has embarked on changes that will affect the

practice of nurses, develop and create new roles, and provide many opportunities for

nurses to participate in shaping the future healthcare delivery system (Buerhaus et al.,

2012). According to HHS (2013), the recent Health Information Technology for

Economic and Clinical Health (HITECH) Act is a major initiative focused on bringing

information technology into healthcare. The HITECH Act seeks to improve American

healthcare delivery and patient care (HHS, 2013). Additionally, one of the Health IT

Workforce Development Programs, the Strategic Health IT Advanced Research Projects

(SHARP), funds research focusing on discovering solutions to address problems that

impede the acceptance of health IT (HHS, 2013). Therefore, the education system will

need to expand, and the focus of curricula will need to be restructured to ensure that

nurses are appropriately educated (IOM, 2011).

Individuals who are more resistant to change may have greater difficulty adjusting

to continuous changes in their professional field (Culmer, 2012; HHS, 2013). Therefore,

openness to change is the most effective factor in motivating individuals to use e-learning

systems (Sawang, Newton, & Jamieson, 2013). Since nurses' resistance to change continues to be focused on the techniques used to teach nursing (Clark, 2013), researchers should complete more studies on nurses' resistance to change and its effect on their intentions to use e-learning systems.

According to Hashim (2011), more quantitative and qualitative studies are needed to identify other factors that potentially affect the adoption of e-learning systems by students in higher education. Understanding the factors that affect RNs' use of e-learning systems is critical to educators in making decisions regarding RNs' use of e-learning systems in completing higher degrees in nursing. Further, the perceptions of RNs toward e-learning, which may affect their intentions to use e-learning systems, are not well documented (Bolliger & Halupab, 2012).

Dissertation Goal

The main goal of the study was to assess perceived value, attitude, and resistance to change on RNs' intentions to use e-learning systems in completing higher degrees in nursing. The conceptual model for this research was an adaptation of the one developed by Ferdousi (2009) on factors that affect instructors' intentions to use e-learning systems in two-year colleges. The conceptual model in this research included perceived value, attitude, and resistance to change and their effects on RNs' intention to use e-learning systems in completing higher degrees in nursing. Figure 1 provides the model for this research.
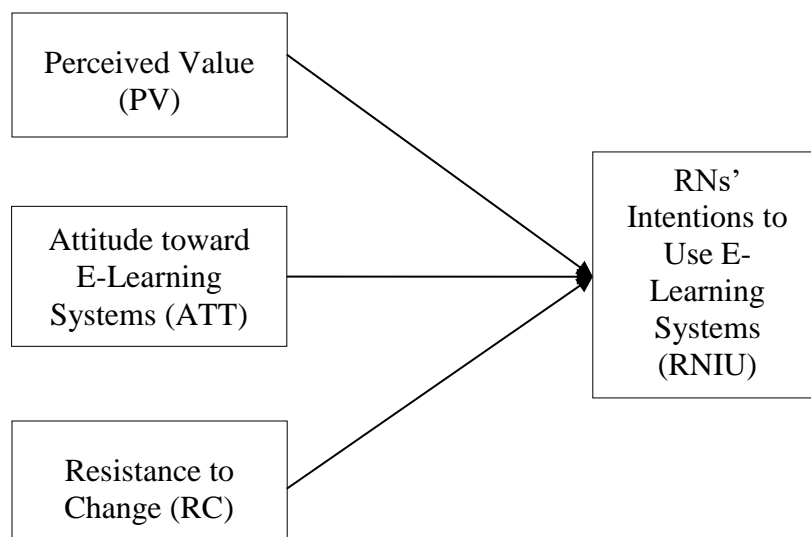
Figure 1. The conceptual research diagram.

This dissertation was built on previously researched constructs: perceived value

(Allen & Seaman, 2013; Chang, 2013; Ying et al., 2012), attitude toward e-learning

systems (Chow et al., 2013; Mehra & Omidian, 2012; Yoo & Han, 2013), and resistance

to change (Chemingui & Lallouna, 2013; Halbach & Gong, 2011; Naccarato, 2013). The

dependent variable, intention to use e-learning systems, has been used in technology

acceptance research studies as a valid influence of individuals' actual behavior (Lin &

Chen, 2012; Lina et al., 2011).

Research Questions

This study addressed the following three specific research questions:

1. To what extent does perceived value affect RNs' intentions to use e-

    learning systems in completing higher degrees in nursing?

2. To what extent does attitude toward e-learning systems affect RNs' intentions to use e-learning systems in completing higher degrees in nursing?

3. To what extent does resistance to change affect RNs' intentions to use e-learning systems in completing higher degrees in nursing?

Relevance and Significance

The study on e-learning was important because nursing organizations across the United States are putting more focus on improving nursing education as a means to advance patient care. Nursing organizations, such as NACNEP, a driving force for nursing education, have increased interest in the use of online learning to improve nursing education (NACNEP, 2013). In the education field, the phrase "e-learning" has been a focus for many recent research studies (Popa & Stănculea, 2012). According to Ali (2012), the "advantages of e-learning for learners include increased accessibility to information, better content delivery, personalized instruction, content standardization, accountability, on-demand availability, self-pacing, interactivity, confidence, and increased convenience" (p. 202). Nevertheless, students' perceived satisfaction with e-learning affects their use of the system (Ali, 2012; Chang, 2013; Yu et al., 2014; Yun, 2013).

Bowen (2013) demonstrated the need for this study on factors that influence RNs' intentions to use e-learning systems. According to Bowen (2013), connecting IT through the medium of online learning requires differentiating the target populations to meet the needs of the individual learners and identify the different education requirements.

According to Smith, Passmore, and Faught (2009), because nursing is a subject that involves human interaction and caring, it requires a unique education system. In addition, e-learning in the nursing discipline delivers practical information in human interactive settings. Since the information learned in nursing is applied to individuals, it is consequently unpredictable and requires nurses to use critical thinking skills (Smith et al., 2009). Additionally, because the issues of nursing are in many ways different than the issues of other disciplines, the e-learning delivery should be modified in unique ways (Smith et al., 2009).

Consequently, this study was significant because there is a widespread need for RNs to complete higher in nursing and e-learning is one possible means by which this problem can be addressed. There is a shortage of qualified nurses to meet the healthcare challenges in the United States (AACN, 2014). Baccalaureate- and graduate-prepared RNs in the United States are needed as primary care providers, nurse researchers, and nurse faculty (ANA, 2014c). In 2012, 55% of RNs held degrees at the baccalaureate level and above (HRSA, 2013). In that regard, organizations are allocating major portions of their financial resources to the expansion and support of e-learning as evidenced by the growth of online baccalaureate and graduate programs in nursing (NACNEP, 2013). For example, there are 34 new RN-to-Baccalaureate and 29 new RN-to-Master's programs under expansion (AACN, 2014), created specifically to respond to the current healthcare demands of nursing education.

Solutions identified in the study have many benefits, both nationally and globally. This study is a model for other communities seeking to promote future e-learning programs. Furthermore, there will be an increase in the number of RNs with advanced

degrees to meet the IOM and the Robert Wood Johnson Foundation recommendations to improve nursing education by 2020 (IOM, 2011). Finally, completing higher degrees in nursing will support today's evolving and emerging roles of RNs and will pave the way for the next century of nursing care (HHS, 2014).

The main goal of the proposed study was to assess the effects of perceived value, attitude, and resistance to change on RNs' intentions to use e-learning systems in completing higher degrees in nursing. This study was directed to RNs who are or will be students in nursing programs. The findings of this study are expected to assist nursing institutions in strategically planning the educational programs for nurses to ensure maximum gains from IT and to confirm that technologies are implemented to optimize usability. This study adds to the growing studies in technology acceptance literature by identifying factors that influence RNs' acceptance of e-learning in nursing education (Shanmugam, Savarimuthu, & Wen, 2014; Yun, 2013). Moreover, management in institutions of higher education may remove hindrances that prevent the RNs from optimally using the e-learning systems and promote factors to encourage acceptance of e-learning systems.

In nursing education, faculty and students experience the effects of distance-education technologies on teaching and learning, as e-learning is being integrated into curricula (Ali, 2012). The results of the study may provide evidence that e-learning offers increased learning opportunities for nursing staff – specifically RNs. For example, even if degree programs were not included in the study, the e-learning approach will provide assistance in completing the many continuing educational requirements placed on health professions personnel.

The major consequence of not solving the problem is an increase in the nursing

shortage. Furthermore, there will be a lack of skilled nurses to provide efficient and

effective continuing care for patients (FNCA, 2014; NLN 2012). According to the ANA

(2014c), RNs are needed to meet the demands of the developing healthcare system. They

have a direct influence on patient care because they work in hospitals, nursing homes,

clinics, schools, workplaces, and ambulatory settings. Also, nurses attend to the major

part of patients' physical, social, mental, and spiritual needs.

Barriers and Issues

One of the obstacles in completing this research was the difficulty in obtaining the

cooperation of the hospitals in sending a participation letter with the survey link to the

nurses' emails. To protect the nurses' privacy, the hospitals' IRB was reluctant to

provide the researcher with the nurses' email addresses. To meet the concern regarding

the nurses' privacy, it was decided that the Research Managers of the hospitals would

send the participation letter with the survey link to the nursing leadership who would then

forward it to the nurses.

Another obstacle was obtaining the cooperation of the nurses to participate in the

survey. A busy work schedule can have an influence on the response rate of nurses

("Quantitative research," 2012). As aforementioned, to encourage participation from the

nurses, reminder e-mails were sent to the nurses: one reminder in the second week of the

survey and a final reminder in the last week of the survey (Fan & Yan, 2010). In

addition, the nurses were informed of the benefits in completing the survey. The benefits

include: (1) a better understanding of the factors that may affect their decisions to use e-

learning systems to complete higher degrees in nursing; (2) better decisions by nursing administrators when implementing IT systems in their institutions; and (3) a contribution to the broader research on increasing nurse-patient ratio. Additional request from the IRB included a statement that the nurses' responses would not negatively affect their jobs.

Assumptions, Limitations, and Delimitations

Assumptions

Assumptions in a study are things that are somewhat out of the researcher's control, but if they disappear the study would become irrelevant (Simon, 2011). One assumption of this study was that the participants would honestly answer all of the survey questions because they were informed that their anonymity and confidentiality would be preserved. Furthermore, because they are required to complete their yearly competencies online, the researcher assumed that the participants had the basic computer skills to complete the study.

Limitations

According to Creswell (2012), limitations are potential weaknesses of a study that may result in internal validity threats and bias the results, thus preventing drawing correct conclusions from the data. There were two limitations in this study. First, the present study was conducted at two hospitals in South Florida. Therefore, the generalizability of this study may be limited to the two hospitals. However, additional studies need to be done at other hospitals in different areas to generalize the findings of this study in a broader scope.

A second limitation was the method used to distribute the survey instrument. A link to the survey was sent to the work email of the potential nurse participants asking them to take part in this study. Some of the nurses may not have read the initial email. Therefore, two additional emails were sent to the nurses regarding the survey.

Delimitations

Delimitations define the parameters of a study (Simon, 2011). There are two delimitations that may have affected generalizability of the results. First, the study focused only on the perceived value, attitude, and resistance to change that may influence RNs use of e-learning. Based on a review of the literature, there are several variables that may affect an individual's intention to use e-learning systems in addition to those of interest in this particular study. To be manageable, and due to time constraints, only three variables were included in the survey used for this research. However, it is hoped that the study will become the foundation for further research on additional variables that affect RNs' intention to use e-learning and other information technology.

Also, this study included a cross-sectional analysis that might not have produced a complete representation of nurses' e-learning acceptance. Future researchers may consider the use of a longitudinal analysis that examines changes within that population over time (Creswell, 2012). This approach would be more likely to provide a long-term interpretation of changes in factors that influence the nurses' acceptance e-learning. Due to time constraints, this study limited the research approach to a cross-sectional analysis.

Definition of Terms

Attitude (ATT). ATT is "an individual's positive or negative feelings about performing the target behavior" (Fishbein & Ajzen, 1975, p. 216).

E-learning. E-learning refers to education facilitated and supported by the application of information and communication technologies (ICT); a process of learning using computers, telecommunication, networks and storage technology; and the use of network technologies to create, foster, deliver and facilitate learning anytime and anywhere without any geographical barriers (Chavan, 2012).

E-learning Systems. "A learning technology system that uses web-browsers as the primary means of interaction with learners, and the Internet or an intranet as the primary means of communication among its subsystems and with other systems. These systems work as platform to facilitate teaching and learning" (Ngai, Poon, & Chan, 2007, p. 252).

Intentions to Use (IU) E-learning Systems: In this study, the intention to use e-learning systems is assessed in terms of the likelihood of registered nurses using such systems in completing higher degrees in nursing.

*Learning Management System (LMS): "*Software that provides an integrated suite of online resources and communications capabilities in support of traditional courses and can also serve as a platform for fully online courses" (Lang & Pirani, 2013).

Perceived Ease of Use (PEOU). PEOU is the extent to which the potential user feels the effort exerted into the system will be minimal (Davis, 1989).

Perceived Usefulness (PU). PU is the degree to which the prospective user feels the behavior will be beneficial to the user's work performance (Davis, 1989).

Perceived Value (PV). "Values are core beliefs that are related to a mode of conduct" (Levy, 2006, p. 16).

Practice of Professional Nursing. Practice of professional nursing is "the performance of those acts requiring substantial specialized knowledge, judgment, and nursing skill based upon applied principles of psychological, biological, physical, and social sciences" (Florida Board of Nursing [FBN], 2014, p. 1).

Registered Nurse (RN). A RN is any person licensed to practice professional nursing (FBN, 2014).

Resistance to Change (RC). The set of responses to change that are negative along emotional, cognitive, and intentional dimensions (Piderit, 2000).

*Simulation. "*Simulation technology provides a representation of a clinical situation in order to teach, practice, or evaluates skills. Simulators present a model of a patient with medical conditions and displays of vital signs, such as heartbeat and blood pressure."

Summary

Chapter 1 identified the research problem and presented the goal of this dissertation. The research problem that this study addressed was the need for the nursing workforce to become more educated as a means of providing safe and effective patient care. The main goal of the current study was to assess PV, ATT, and RC on RNs' IU e-learning systems in completing higher degrees in nursing. Figure 1 is the conceptual model to explain the relationship between the dependent variables and independent variable of interest in this study. The main research question of this study

was: What is the effect of perceived value, attitude toward e-learning systems, and resistance to change on RNs' intentions to use e-learning systems in completing higher degrees in nursing?

Additionally, the relevance and significance of the study were discussed to provide further support for both the problem statement and goal of the study. Identified barriers and issues were considered as part of examining how the problem and solution were inherently difficult to solve. Finally, assumptions, potential limitations, and delimitations were explained, followed by the definition of terms.

Chapter 2

Review of the Literature

A comprehensive review of literature was completed in the nursing, technology, education, and psychology domains specific to the topics in this chapter, to lay the foundation for this study. According to Booth, Papaioannou, and Sutton (2012), an adequate literature review includes both relevant systematic reviews and related studies. The foundational fields of literature chosen for discussion included the history of nursing education, e-learning and learning management systems, e-learning studies, and theories on behavioral intention to use e-learning. Additionally, the three constructs of interest in this study – perceived value, attitude toward e-learning systems, and resistance to change – have each been documented in the literature as significant for technology acceptance and will be reviewed in succession. Strengths, weaknesses, and research methods of similar studies was identified and discussed. This review assisted in identifying gaps in the literature and provided a quantitative basis for updating this new research (Booth et al., 2012). Finally, this process of systematically examining existing studies ensured that this research will make a significant contribution to meeting educational needs in the field of nursing and IT.

History of Nursing Education

Florence Nightingale believed that nurses' education should be continuous via lifelong learning (Meehan, 2013). Nightingale established modern nursing during and after the Crimean War of 1853-1856 (Domrose, 2011). In Crimea, Nightingale's sanitation methods lowered the mortality rates of troops in the war (Domrose, 2011). Nightingale established nursing training programs, which became successful and led to the establishment of Nightingale-modeled nursing schools in the United States in the late 19th century (Brodie, 2010). The Nightingale model consisted of (a) a curriculum, (b) paid instructors, (c) equipment for practicing nursing skills, (d) a library, and (e) arrangements for student experiences in surrounding hospitals (Egenes, 2009). The first permanent school of nursing, the Women's Hospital of Philadelphia, founded in 1887, followed the Nightingale model. A diploma in nursing program, lasting for three years and completed in a hospital was once the most common form of nursing education in the United States (ANA, 2014b).

The American Society of Superintendents of Training Schools for Nurses, established in 1893 and later known as the NLN, was the first nursing organization in the United States (NLN, 2014). Currently, the NLN offers faculty development programs, networking opportunities, testing and assessment, nursing research grants, and public policy initiatives (NLN, 2014). Subsequently, the Nurses' Associated Alumnae of the United States and Canada was established in 1911 and later became the ANA (ANA, 2014a). The ANA is a professional organization that represents the interests of nurses through its state nurses' associations and improves the nursing profession by promoting high standards of nursing practice (ANA, 2014a). In addition, the ANA promotes the

rights of nurses in the workplace, projects a positive and accurate view of nursing, and lobbies in Congress and regulatory agencies on healthcare issues affecting nurses and the public (ANA, 2014a).

According to Scheckel (2009), there were many changes in the field of nursing in the 20th century. In the 1950s, many colleges and universities began schools of nursing. Nursing organizations promoted the establishment of state nurse licensure laws to protect the public from unskilled workers and improved the quality of nursing care (Brodie, 2010). According to the FBN (2014), an RN is any person licensed to practice professional nursing in Florida. FBN defines the term "practice of professional nursing" as the "performance of those acts requiring substantial specialized knowledge, judgment, and nursing skill based upon applied principles of psychological, biological, physical, and social sciences" (p. 1). During each biennium, each licensed nurse should earn one contact hour for each calendar month of the licensure cycle (FBN, 2014).

In the latter part of the 20th century there was an increase in advances in medicine and technology (Scheckel, 2009), and RNs were expected to provide compassionate, high quality, and safe care in an increasingly technical environment (Niemeier & Suchomski, 2014). In 1988, the NLN, based on a request from nursing leaders for a curriculum revolution, unsuccessfully attempted to change the traditional approach to nursing education (NLN, 2003). Again, in 2003, NLN called for an intense reform and improvement in nursing education (NLN, 2003). The reform included creating and shaping the future of nursing practice at all levels of nursing education by changing traditional nursing education and designing flexible, need-based, collaborative, and

evidence-based nursing curricula that was integrated with the existing technology (NLN, 2003).

In 2008, the IOM and the Robert Wood Johnson Foundation began an investigation of the nursing profession. After two years of deliberation, they organized a report entitled *The Future of Nursing: Leading Change, Advancing Health* (IOM, 2011) to outline and emphasize several messages. One of the messages was that "nurses should achieve higher levels of education and training through improved education system that promotes seamless academic progression" (p. 4).

Changing Approaches to Nurse Education

In her discussion of traditional approaches to training in nursing programs, Klein-Collins (2011) describes primary modes as consisting of face-to-face classroom and clinical sections focusing on the use of skills and knowledge. The instructor and student are expected to complete the theoretical portion in the classroom and then spend several weeks in the clinical setting because licensing organization and nursing schools require students to have a specific number of clinical hours to prepare for the licensing examination. However, many nursing schools continue to have limited capacity to train multiple students simultaneously due to lack of both qualified instructors and clinical sites (Klein-Collins, 2011). Additionally, there is a lack of theory or evidence to support the quality of the traditional face-to-face mode of teaching. The traditional mode of learning can be time-consuming, as well as expensive for nursing organizations (Spiva et al., 2012), thereby underpinning the need for updated approaches.

Distance education (DE) began in the 18th century and has evolved significantly throughout history (Casey, 2008). While traditional education is based primarily on

synchronous teaching and learning activities functioning within specific time and space

constraints, DE describes teaching and learning – often with the inclusion of

asynchronous activities – when students and teachers are separated by time and space

(Billings, 2011). In an earlier article, Armstrong, Gessner, and Cooper (2000) reviewed

and discussed several authors' personal experiences with the evolution of DE and its

eventual introduction into the world of nursing education. The first DE learning course

was job-related in nature, and nursing instructors sent the information to students via

postal service. In the early 20th century, radio, the first DE technology, was adopted by

the University of Wisconsin. Later, telephones were used, eventually including additions

for audio conferencing such as handsets, speaker phones, and audio bridges to connect

multiple phone lines, thereby providing two-way audio for immediate feedback.

Unfortunately, these approaches often resulted in a high dropout rate due to the limited

communication between instructors and students, compounded by low motivation among

students to complete their learning. In the late 20th century, with the growing prevalence

of television, nurse education developed to include a variety of video-based systems with

two-way audio and visual interchange.

Several organizations have successfully implemented Computer-Assisted

Learning (CAL) into graduate level programs as a means to bridge the gap between the

diverse learning styles of multiple individual learners (Klein-Collins, 2011).

Additionally, CAL provides students with the ability to learn at their pace and in their

preferred physical setting. Examples of CAL includes online learning, web-based

learning, computer-based learning, virtual classroom and digital collaboration, and e-

learning (Popa & Stănculea, 2012). Recently, the additional capabilities of computer

systems to provide learner control and immediate feedback have created an increase in educational courses for nurses.

CAL also involves the use of simulators. According to the Society for Simulation in Healthcare (SSH) (2015), simulation-based learning connects classroom learning and real-life clinical experience. In the past, training options for nurses consisting of low-technology approaches such as paper-based case studies grew to include the utilization of mannequins (Klein-Collins, 2011). By performing repeated activities on mannequins, learners gain skills in caring for patients (SSH, 2015). Simulation technology evolved to the use of high-fidelity patient simulators that are computerized mannequins that perform dozens of human functions (SSH, 2015). Past concerns related to simulation technology often included the overwhelming time and expense in developing quality scenarios, as well as acquiring and maintaining the technology. However, nursing education using simulators are currently widely available on computers and even smartphones, thereby reducing the cost of physical simulators.

According to Klein-Collins (2011), program developers can incorporate simulation-based learning into various parts of the course. This approach:

- Reduces the use of traditional clinical placements and the need to use live patients for the entire clinical experience.

- Improves students' training while increasing the growth of nursing programs.

- Reduces the demand for clinical sites and instructors, when combined with traditional clinical rotations.

- Allows nursing students to complete their practical experiences in safe environments of simulation labs or simulated hospital settings. After gaining experience, they can work with real patients.

Smartphone Usage as an Analogy for Development of E-learning

Imagine the technological transition from having no phone to using a smartphone - such a change is likely to be challenging and present a series of adjustments. Similarly, nurses must make appropriate modifications to complete higher degrees using e-learning systems. The following section provides a review of moving from no phone to a regular phone to a smartphone. This context serves as a model for the acceptance of e-learning systems.

Cell phones were initially designed to be devices that individuals carried everywhere and regarded as personal, convenient, and easy to use (Wagner, 2005). The Motorola DynaTAC 8000X, marketed in 1983, was the first commercially available cell phone, and it allowed individuals to communicate with each other for a little over half an hour. Traveling business executives, security personnel, and the wealthy were originally the primary users (Darcey & Conder, 2009). Early cell phones typically included high costs due to monthly service fees, per-minute and roaming charges, and few features including SEND, END, and CLR buttons. Later, the phones had cellular networks that supported voice, imaging, video, and data services using a structure of cells, in particular, geographical locations (Littman, 2002). Next, a combination of terrestrial wireless and satellite transmissions enabled web browsing – both broad bandwidth and high-speed frequencies, increased roaming capability, and allowed access to the Internet during travel (Traynor, Enck, McDaniel, & La Porta, 2008).

However, any technology adoption process must also consider important constraints and challenges in accepting the new technology (Johnson, Smith, Willis, Levine, & Haywood, 2011). Although many students now use cellphones and other mobile devices as their first choice for accessing the Internet (Johnson et al., 2011), some individuals resist innovations and changes that accompany mobile technology (Brown & Diaz, 2010). Also, the technology may be perceived as having a more recreational purpose as phones and other internet-enabled devices are used by students to stay connected online to their peers (Swartzwelder, 2011).

Although some students were unable to purchase smartphones in the past, more students can currently purchase smartphones and other technology because of the lower costs (Brown, 2015). Additionally, students often receive cell phone service discounts through affiliation with their universities. In 2014, ownership of smartphones was 86% and was projected to be 90% in 2015 (Brown, 2015). Furthermore, Wireless Application Protocol (WAP) allows direct phone access to the Internet for full color, text, images, and various media including JavaScript and Flash to improve the user's experience.

According to Amini et al. (2013), mobile websites and applications, as well as standard websites, consist of browser-based HTML pages that are linked together and accessed over the Internet. Amini et al. identified the following advantages of mobile web applications:

- Small handheld display and touchscreen interfaces
- Standard website capabilities plus mobile-specific features
- Connections provided to the widest possible mobile audience (run on the device's web browser)

- Written in HTML, CSS, JavaScript, and server-side languages or web application frameworks of the developer's choice (e.g., Java, PHP, Rails, .NET, or Python)
- Require only one set of code across all platforms

Mobile technology might be in students' hands, but the expertise needed to use it effectively for coursework and assignments might not be (Brown & Diaz, 2010). Therefore, universities have teams to support faculty and students using cellphones and other mobile devices. A survey was conducted on a sample of undergraduate and graduate students at one university in the United States (Chen & Denoyelles, 2013). The survey revealed that students with lower grades are using mobile devices for academic purposes more frequently than higher achievers. Educators and researchers must understand why innovative technologies do not fulfill the promise of enhancing teaching and learning. The researchers concluded that students need the following:

1. Initial guidance in managing the increased connectivity that mobile technology facilitates.
2. Training for assistance in adopting knowledge and learning practices or digital literacy curriculum.
3. Support to use information effectively and efficiently via mobile technologies.
4. Encouragement to become technologically literate.

The evolution of individuals moving from no phone to regular phone to smartphones serves as a model for acceptance of e-learning systems. These changes in technology have affected the education of nurses and the methods of conducting nursing research (Buerhaus et al., 2012). According to Bowen (2013), technology can be used to reduce time and increase rates in completing nursing degrees. Bowen suggested ways to

meet the challenges of raising the standards of nursing education and educating more

nursing students. These approaches include changes in the educational system that would

move nursing education from a static set of programs and rigidly scheduled meetings to

more of an emphasis on the use of technology. Additionally, Bowen suggested

identifying key questions, testing out ideas, and modifying approaches to improve online

learning.

E-learning

E-learning can assist nurses in balancing their personal and professional

commitments while meeting their professional goals (Cathro, 2011). By understanding

the issues that are affecting students in online education, the education of nurses can be

more productive (Smith et al., 2009). This section provides information on e-learning

approaches, learning management system software, and e-learning research in several

disciplines including nursing.

The term "e-learning" began in the mid-1990s (Friesen, 2009). According to

Zekanović-Korona, Mateljan, and Miočić (2012), e-learning is a form of distance

learning that develops simultaneously with advances in information and communication

technologies. According to Allen and Seaman (2013), there are three types of instruction

using e-learning in schools of higher education: online, face-to-face, and blended or

hybrid. Online courses are defined as having at least 80% of the course content delivered

online. Courses with up to 29% of the course content delivered online are considered

face-to-face, and this includes both traditional and web-facilitated courses. Blended or

hybrid instruction has between 30% and 80% of the course content delivered online.

Blanchard and Thacker (2010) described the following six e-learning approaches:

1. computer-based training (CBT): employee training through the use of computer-assisted instruction;

2. programmed instruction (PI): for usage in computer-based programs consisting of text, graphics, and multimedia enhancements stored in memory and connected to one another electronically;

3. intelligent computer-assisted instruction (ICAI) system: monitors trainee knowledge and provides training based on the trainee's response;

4. intelligent tutoring systems (ITS): provide advanced training;

5. simulations: provide demonstrations of different situations and tasks; and

6. virtual reality: an advanced form of computer simulation in which the trainee is placed in a simulated environment.

Learning Management System

Since its inception in 1997 (Brown, 2015), the learning management system (LMS) is the main software in most e-learning systems (Blanchard & Thacker (2010). According to Wright, Lopes, Montgomerie, Reju, and Schmoller (2014), LMS is comprehensive, integrated software that supports the development, delivery, assessment, and administration of courses in traditional face-to-face, blended, or online learning environments. Additionally, LMS is a primary way for students to obtain course materials including videos, simulation, various media, and traditional text documents. In addition, a typical LMS provides the following services to students: (a) databases, wikis, and other resource libraries; (b) assignments and quizzes; (c) monitoring of students' activities; and (d) grade reporting (Lang & Pirani, 2014). The LMS systems are referred

to as course management system (CMS), learning content management system (LCMS), virtual learning environment (VLE), virtual learning system (VLS), learning portal, or e-learning platform (Wright et al., 2014). Blanchard and Thacker (2010) explain the process to create and deliver e-learning in an LMS. First, content experts create a knowledge base with the training material. Next, developers use the authoring and learning development tools to translate the information into an electronic format. Finally, the developers use the authoring and learning development tools to import the information into a LMS.

For example, Digitec Interactive (2012) described the LMS Knowledge Direct E-Learning platform as an LMS with Direct-to-WEB and a built-in PowerPoint-to-flash conversion tool. E-learning designers use Direct-to-WEB to create interactive e-learning courses directly in PowerPoint and export them for delivery to students on the web (Digitec Interactive, 2012). The information is available to students through the Internet or an intranet, CDs or DVDs, local area networks, or local computers (Blanchard & Thacker, 2010).

Ninety-three percent of institutions use one of the top five LMSs (Lang & Pirani, 2014) (Table 1). According to Wright et al. (2014), Blackboard and Desire2Learn are proprietary software that are developed and owned by a profit-generating entity platform, and the advantages of these systems include:

- Reliability - built by professionals
- Supported by a successful company that provides training, technical support, and warranty service
- Regular updating – the software is kept current and competitive

- Links with financial, human resources, and administrative data enterprise

    software systems

Table 1

Learning Management System Market Share

Learning Management System	Percentage
Blackboard Learn	42%
Moodle (Moodle Trust)	17%
Desire2Learn	10%
Other	7%
Sakai CLE (Sakai Foundation)	5%
Blackboard Learn-Angel Edition (Angel LMS)	5%
Moodlerooms Joule	4%
Instructure Canvas	4%
Sakai CLE (rSmart)	3%
Blackboard Learn-CE (Web CT Campus Edition)	2%

However, disadvantages include the fact that, as proprietary software, there is a

closed system that does not allow users access to make adjustments to the computer code.

These systems can be expensive for organizations due to small enrollments, licensing

fees, and the costs of maintaining user licenses. Additionally, the systems may be

designed to be installed on a server, not on personal computers or laptops.

Ituma (2011) described Blackboard as a standard e-learning system and identified the

features and functions. Specifically, Blackboard serves as an exemplar for most

e-learning platforms in higher educational institutions in that it is used to connect learners

with educators and to retrieve digital resources. Other features include online discussion

forums, chat rooms, and online learning pathways. Also, educators can modify methods of communication and assessment for individual students as well as groups.

E-learning and Nursing Accreditation

FBN has no specific requirements to distance education in nursing (NCSBN, 2015). The Accreditation Commission for Education in Nursing (ACEN) and the Commission on Collegiate Nursing Education (CCNE) are nongovernmental accrediting agencies that evaluate nursing programs (Lowery & Spector, 2014). Although CCNE does not have different standards for distance education programs (Lowery & Spector, 2014), ACEN has three criteria for distance education programs (ACEN, 2013). These criteria include the following:

1. Distance education, when utilized, is congruent with the mission of the governing organization and the mission/philosophy of the nursing education unit.

2. Faculty (full- and part-time) engage in ongoing development and receive support for instructional and distance technologies.

3. Information related to technology requirements and policies specific to distance education are accurate, clear, consistent, and accessible.

E-learning Studies

The perceptions of nursing students about online learning vary. According to Plante and Asselin (2014), students often feel isolated and disconnected when participating in online learning. The challenge for faculty is to create a sense of social presence in which students feel connected within the learning environment. By contrast, other nursing students believed that the feedback, timeliness, and professionalism shown

by the facilitators demonstrated a sense of community, and not merely interpersonal connections and relationships (Rebar, 2010).

Some studies on e-learning have grouped barriers to e-learning as well as factors that encourage students to use e-learning. Sawang et al. (2013) discussed groups of barriers to e-learning as individual learner characteristics, specifically efficacy and openness to change; features of the e-learning itself, specifically authenticity and complexity; organizational support; intention to adopt e-learning in the future; and overall satisfaction with e-learning. The study revealed that to use e-learning systems, employees must be highly open to change, perceive high administrative support, and low difficulty relating to the use of e-learning systems (Sawang et al., 2013). Of particular interest to the current study, Thomas (2010) placed RNs' barriers to online learning into categories. These categories include academic skills, administrative and instructors' issues, cost of and access to the Internet, motivation, social interactions, technical problems, time, and support. The results indicated that a perceived lack of technical skills was the greatest impediment to online learning.

Karaman (2011) discovered that greater computer usage is an indication of positive perceptions of online learning. Ituma (2011) explored students' patterns of use and perceptions of a typical e-learning system. The findings suggest that a large percentage of the students had positive perceptions of e-learning systems, and the frequency of usage of the e-learning systems was also very high.

Acceptance or rejection of e-learning in the nursing education is different than the expectation in other professions for several reasons. As aforementioned, national recommendations call for an increase in nurses prepared at the bachelor's and doctoral

levels (Lowery & Spector, 2014). Also, the increasing workforce demands and projected nursing supply shortages have resulted in requests for innovative educational models to seamlessly prepare nurses as leaders in increasingly complex healthcare systems (Lowery & Spector, 2014; IOM, 2011). Furthermore, "innovative use of technology in a distance format is one strategy changing the landscape of nursing education" (Lowery & Spector, 2014, p. 24).

Theories on Behavioral Intention to Use E-learning

Research studies have examined the variables associated with technology acceptance in several situations (Davis, 1989; Fishbein & Ajzen, 1975). As a result, several theories including the theory of reasoned action, the theory of planned behavior, and the technology acceptance model were developed to explain the gap between users' intentions to use technology and actual use.

Theory of Reasoned Action

Fishbein and Ajzen (1975) developed the Theory of Reasoned Action (TRA), which posited that behavioral intentions drive individual behavior, which in turn is affected by individuals' attitudes toward the behavior and the subjective norms surrounding the performance of the behavior. According to Fishbein and Ajzen, the factors that affect an individual's behavior include: behavioral beliefs, attitude toward the behavior, normative beliefs, subjective norm, behavioral intentions, and actual behavioral control. Figure 2 illustrates the relationships between the factors.
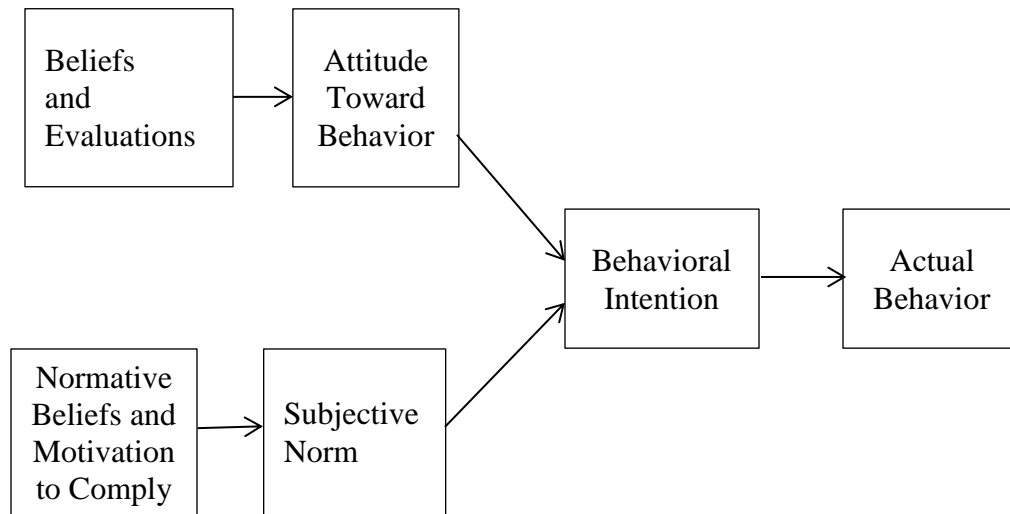
Figure 2. Theory of reasoned action (TRA)

From "User acceptance of computer technology: A comparison of two theoretical models," by F. D. Davis, R. P. Bagozzi, and P. R. Warshaw, 1989, *Management Science, 35*(8), p. 984. Copyright © 1989, The Institute for Operations Research and the Management Sciences, 5521 Research Park Drive, Suite 200, Catonsville, Maryland 21228 USA. Reprinted by permission (Appendix A).

The factors displayed in Figure 2 can be elaborated as follows:

- Behavioral beliefs link the behavior of interest to predicted outcomes. These beliefs and the subjective values of the expected outcomes govern the main attitude toward the behavior.

- Attitude toward a behavior is the degree to which exhibition of the behavior is valued (positively or negatively).

- Normative beliefs are the perceived behavioral expectations of significant individuals or groups - family or coworkers. The assumptions are that these beliefs, combined with motivation to comply with the significant individuals or groups, will determine the prevailing subjective norm.

- Subjective norm is the perceived group pressure to be involved or not to be involved in a behavior and include the strength of each normative belief.

- Intentions are indications of a people's readiness to perform behaviors. Intentions are immediate predictors of behaviors and are accredited to attitudes toward the behavior, subjective norms, and perceived behavioral controls. The predictors are valued as significance in relation to the behavior and population of interest.

- Behaviors are the visible responses in situations targets. Theoretically, strong perceived behavioral controls restrain the effect of intention on behavior producing favorable intentions produces the behavior.

Theory of Planned Behavior

Fishbein and Ajzen (1975) built the Theory of Planned Behavior (TPB) on the groundwork of the TRA by adding the construct of perceived behavioral control. According to Fishbein and Ajzen, actual behavioral controls refer to the extent to which individuals have the skills, resources, and other prerequisites to perform specified behaviors. Moreover, successful performance of behaviors is dependent on positive intentions and necessary levels of behavioral controls. Furthermore, control beliefs are the individuals' perceived presence of influences that may allow or impede the performance of a behavior in combination with the perceived power of various control factors.

Yoon and Kim (2013), propose that the actual behavior is affected by behavioral intention, which is affected by behavioral attitude and subjective norm. Park, Saplan-Catchapero, and Jaegal (2012) examined and compared the predictive power of TPB and

the technology acceptance model using employee data collected from five public

organizations. The structural equation modeling results revealed that the models

performed well in terms of their ability to predict intention.

Technology Acceptance Model

    The Technology Acceptance Model (TAM), developed from TRA, explains the

causes of user acceptance of technology (Davis, 1989). Whereas TRA and TPB are

theories of human behavior, TAM is used to recognize, clarify, and anticipate factors that

may affect the intentions of technology end users (Davis, 1989). According to Šumak et

al. (2011), TAM, presented in Figure 3, is the most common ground theory in e-learning

acceptance studies. In addition, "TAM has become well-established as a robust,

powerful, and parsimonious model for predicting user acceptance" (Venkatesh & Davis,

2000, p. 187).
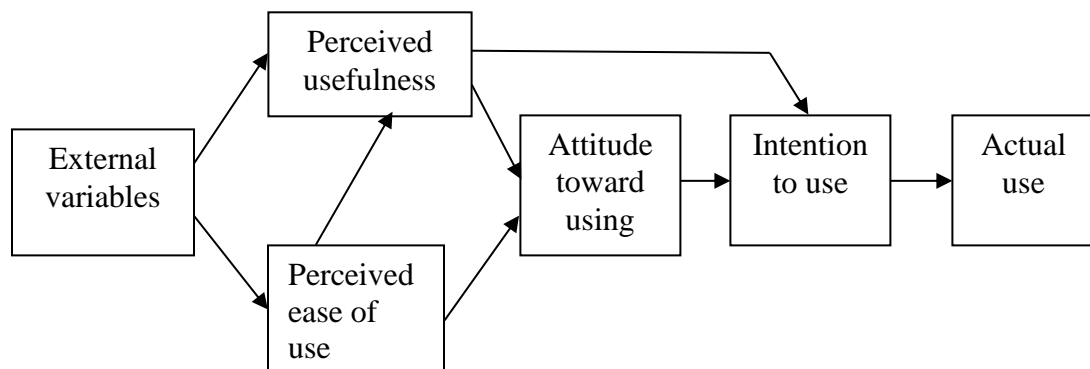
Figure 3. Technology acceptance model (TAM)

From "User acceptance of computer technology: A comparison of two theoretical models," by F. D. Davis, R. P. Bagozzi, and P. R. Warshaw, 1989, *Management Science, 35*(8), p. 985. Copyright © 1989, The Institute for Operations Research and the Management Sciences, 5521 Research Park Drive, Suite 200, Catonsville, Maryland 21228 USA. Reprinted by permission (Appendix A).

TAM proposes that perceived usefulness and perceived ease of use are factors affecting user acceptance of technology (Davis, 1989). Perceived usefulness is "the degree to which a person believes that using a particular system would enhance his/her job performance," and perceived ease of use is "the degree to which a person believes that using a particular system would be free of physical and mental effort" (Davis, 1989, p. 320). TAM further predicts that perceived ease of use and perceived usefulness can directly alter one's attitude toward the use of technology, and that perceived ease of use can positively affect perceived usefulness (Cheung & Vogel, 2013).

Extended Technology Acceptance Model

TAM has been criticized for missing essential sources of variance. For example, there are logistical barriers that might prevent an individual from using IT. These barriers include an individual's access to resources such as time, money, and equipment (Lee, 2008). Venkatesh and Davis (2000) developed an extended model, referred to as TAM2, to test perceived usefulness and usage intentions in terms of social influence and cognitive instrumental processes. Venkatesh and Davis completed a study using longitudinal data collection. Constructs were measured during pre-implementation, one- month post-implementation, and three-month post-implementation. Results revealed that social influence processes (subjective norm, voluntariness, and image) and cognitive instrumental processes (job relevance, output quality, result demonstrability, and perceived ease of use) significantly influenced user acceptance.

Hashim (2011) also extended the original TAM and developed a research model on perceived usefulness, perceived ease of use, system quality, service quality,

information quality, subjective norm, computer self-efficacy, and attitude influence on intention to use, and actual use. According to Hashim, intention to use has a significant direct effect on actual system use. Hashim recommended additional research to investigate the impact of other constructs on the adoption of web-based LMS by faculty and students in higher education.

Researchers frequently explain the intentions of users towards using an e-learning technology by using or extending the TAM research model (Purnomo & Lee, 2013). The following section provides a review of TAM-based e-learning acceptance studies. These studies extended TAM models and validated the influence of perceived value, attitude toward e-learning systems, and resistance to change on intention to use technology.

Perceived Value

According to McDonald (2012), perception: (1) is the way one sees the world; (2) is uniquely individualized experience; (3) is an individual's view, making it a powerful driving force for action; (4) involves the processing of sensory information and relating to past experiences; (5) enables an individual to create a lens in which to view the world through a filter of sociocultural influences. According to Spitzer (2011), individuals begin to know who and what they are from a young age. They also learn to value who and what they are. This value defines their characters and it affects their professional and personal lives. Self-value must be nurtured to allow individuals to work together, contribute, and commit to growth. It also enables better communication to pursue ideas and share resolutions (Emerson, Nabatchi, & Balogh, 2012).

McDonald (2012) discusses the impact of perception in a clinical setting. In the clinical setting, nurses have personal life experiences that influence perceptions. Nurses need to explore what is influencing their perceptions and utilize these findings to develop strategies to positively impact health (McDonald, 2012). Research establishes the influence of perceived value on behavioral intentions in nursing. Kowitlawakul, Baghi, and Kopac (2011) completed a study on factors affecting both nurses' intentions to use and their actual use of the eICU® technology. The study revealed the importance of perceived value influencing behavioral intentions in several environments. Furthermore, any new technology that appears to take nurses away from patient care could lead to the belief that it would not be useful, resulting in negative attitudes toward the technology (Kowitlawakul et al., 2011).

In academic libraries, individuals' perceptions of value affect their use of e-learning systems (Chang, 2013). In the tourism industry, pleasure and arousal have positive and significant effects on tourists' perceptions of value (Hanzaee & Javanbakht, 2013). In education, the low perceived value of e-learning is one of the obstacles to educators' use of e-learning systems (Allen & Seaman, 2013), and educators' perceptions can influence learners' perceptions (Marrs, 2013). According to Emerson et al. (2012), in organizations, perceived value must be connected to employees to achieve the organizations' goal. Spitzer (2011) elucidated nurses' core values as (a) motivation, (b) revolving around the delivery of excellence in patient care, and (c) not sacrificing quality patient care for personal gain or recognition.

Some researchers have suggested that a relationship exists between perceived value and other variables in acceptance models (Ying et al., 2012). Ying et al. (2012)

investigated the effect of service quality on the relationship between experience and perceived value. The study revealed that service quality has an indirect effect on loyalty when facilitated by perceived value and satisfaction. Chang (2013) explored the relationships between web quality (system quality, information quality, and service quality), perceived value, and satisfaction in conjunction with an ongoing intention to use e-learning systems. The findings demonstrated that perceived value and user satisfaction can be affected by web quality. Yu et al. (2014) completed a study of the relationships among service quality, perceived value, customer satisfaction, and behavioral intention. The findings revealed that high-quality services elevated perceived value and satisfaction.

Attitude Toward E-learning Systems

In the context of technology usage, attitude is the extent to which an individual is interested in using a system (Cheung & Vogel, 2013). In a study to explain factors affecting their intentions to use technology, Chow et al. (2013) surveyed 128 nursing students. Their research identified students' attitudes toward using technology as having the strongest effect on their behavioral intentions to use technology. A similar study by Yoo and Han (2013) on factors influencing employees' intentions to use e-learning in the workplace revealed that attitudes of the employees towards technology considerably and directly affected employees' intentions to use technology in the workplace.

Several authors used TAM to evaluate the effects of learners' attitudes on other constructs (Shanmugam et al., 2014; Usta, 2011). In addition, Usta (2011) completed a study using TAM to determine whether online self-regulated learning skills affect

students' attitudes toward the Internet and web-based education. The study revealed that online self-regulated learning skill levels had a direct effect on students' attitudes towards the Internet and web-based education.

Koivunen, Kontio, Pitkänen, Katajisto, and Välimäki (2013) investigated occupational stress and implementation of IT among nurses. Nurses with very positive attitudes towards Internet usage reported less stress and more job satisfaction than nurses with neutral attitudes towards Internet usage. By reinforcing positive attitudes towards information technology in their daily work, nurses' job satisfaction increased and consequently reduced their stress experiences.

Bezboruah, Paulson, and Smith (2014) explored the attitudes of nursing home administrators and key managerial staff toward health IT. The results revealed that there were factors that affected systematic planning and decision-making toward health IT adoption. These factors include a lack of information regarding the real costs and benefits of implementing health IT.

Resistance to Change

Resistance to change is a refusal to accept new ideas or changes (Mayor, 2009). Change can be affected by nurses' values (Smith, 2012). For example, the perceived value of the change depends on the individual's thoughts and the connection with nurses' values. Resistance to change may be less about reluctance to move forward and more about the perceived value of the anticipated change (Smith, 2012). In addition, sometimes resistance to change is an indication of satisfaction with the established processes. According to Bateh, Castaneda, and Farah (2013), individuals need to know

the rationale and benefits of the change. They are more likely to accept change if the benefits will be worth more than the disruption of the change process.

According to Heller, Oros, and Durney-Crowley (2013), IT is constantly changing, and the Internet allows clients to have access to information that was previously only accessible to healthcare workers. The changes include an increase in the speed of computer technology, ease of access to data, and new ways of observation and communication. Furthermore, the rapid increase in the advances in processing capacity and speed, the development of interactive user interfaces, expansions in image storage and transfer, changes in telecommunications technology, and the increased affordability of personal computers are affecting healthcare delivery (Heller et al., 2013).

Health Information Technology for Economic and Clinical Health Act

One of the major changes in healthcare IT is the Health Information Technology for Economic and Clinical Health (HITECH) Act legislated as part of the American Recovery and Reinvestment Act of 2009. The HITECH Act is a federal law that includes the promotion and expansion of health information technology to improve patient safety (HHS, 2013). Beginning in 2011, healthcare providers were offered monetary incentives for showing meaningful use of electronic health records (EHRs); since 2015, healthcare providers may acquire penalties for lack of EHR use (Health Information Management Systems Society [HIMSS], 2015). According to Pushpangadan and Seckman (2015), nurses have a dual role as both consumer and supporter in the adoption of patients' health records. As handlers of patient records, nurses understand the healthcare process and the significance of securing accurate data and information.

To accommodate this change, the Office of the National Coordinator for Health Information Technology (ONC) now provides training programs to support the HITECH Act. ONC aims to build a foundation for every American to benefit from the EHR by improving the system of care delivery (HHS, 2013). Also, the ONC Health IT Workforce Development Program is training a new workforce that includes RNs in implementing EHRs to improve healthcare quality, safety, and cost-effectiveness. According to HIMSS (2014), ONC Health IT Workforce Development Program includes:

1. Community College Consortia Program

2. University-Based Health IT Training Programs

3. Competency Examination Program

4. American Medical Informatics Association's 10 x10 Program

5. Marine Biology Laboratory's Informatics Class

6. Health Information Management Systems Society

7. National Library of Medicine

8. The Alliance for Health Reform

The HIMSS has an eLearning Academy (HIMSS, 2014). The HIMSS eLearning Academy is a comprehensive online source. It provides high-quality distance education in healthcare information technology for industry expertise and practical Health IT training for the busy healthcare professional such as RNs. The Academy offers nurses:

1. Research Library that contains:

    - Annual Conference Recordings

    - eLearning Courses

    - Past Virtual Event Recordings

- Past Webinar Recordings

2. Continuing Education (CE)

3. Courses for new personnel using Health IT that include:

   - Health Informatics Training System

   - Information Technology in Healthcare

   - New-to-Health-IT Learning Package

Vendors train a core group of hospital employees including nurses who are called "super users" to implement the EHRs in the hospitals (California HealthCare Foundation, 2010). The super users then train nurses in all departments. Mastery is demonstrated using dummy patients. For example, supervisors' names may be recorded as patients during the evaluation process. Nurses are then allowed to complete records on real patients. The super users are available to provide support for the nurses who will also receive continuous structured follow-up training.

Some of the factors affecting EHR implementation are insufficient training, system shortfalls, and unclear communication on implementation details (McCann, 2013). To prevent issues with EHR implementation, administrators must systematically plan the adoption of health IT, inform employees of the benefits of health IT in management adoption, and allow employees to voice their opinions prior to initiating changes (Bezboruah et al., 2014). Fuller, a critical care nurse with more than 35 years of experience in healthcare and IT, established a set of guidelines to improve EHR implementation (Merrill, 2010). The key considerations include:

1. Right Leadership

2. Shared Vision

3. Culture of Change

4. Governance

5. Early Engagement and Accountability of Key Stakeholders

6. Resources

7. Clinical Content Standardization

8. Realistic Time Lines and Expectations

9. Training and Communication Plan

10. Right Vendor Partnership Relationship

Fuller stated that the journey of change in implementing EHRs prepared

individuals for other IT changes in the future (Merrill, 2010). The skills learned to

accommodate the transition into EHR potentially impact nurses' readiness to use e-

learning systems. In an article written by Lavin, Harper, and Barr (2015), several

individuals identified nurses as having been incorporated in the development phases to

make the systems more user-friendly. Lavin et al. (2015) suggested involving nurses in

the following:

1. Planning of new systems since they can be the first source of guidance and information when introducing a new technology.

2. Implementing a system that supports easy adoption by other RNs and patients.

3. Providing support during installation and ongoing education and follow-up.

4. Providing feedback as end-users to make changes and additions to improve satisfaction, communication, and patient outcomes.

Department of Health and Human Services and Congress on E-learning

In the past, Mary Wakefield, who currently serves as the Acting Deputy Secretary of HHS, chaired the committee that produced the 2005 report "Quality Through Collaboration: The Future of Rural Health Care" (IOM, 2005). In the report, the committee identified the need for many health-related IT applications to have access to high-speed Internet connections. The result would enable residents of small towns to participate in distance education that is important for building the healthcare workforce and promoting health literacy (IOM, 2005). Also, the report identified the Nursing Satellite Program at the University of Iowa's Registered Nurse-Bachelor of Science as an innovative program. This program includes the use distance learning in education at community colleges and the University of Iowa's Colleges of Nursing and Pharmacy.

The need still exists for innovative programs such as e-learning as a teaching approach in nursing curricula for current and evolving educational strategies (Lowery & Spector, 2014). The NACNEP (2013) presents annual reports to the Secretary of the HHS and the U.S. Congress. These reports include advice on policy issues connected to Division of Nursing (DN), including RNs' education, practice improvement, and workforce supply. The NACNEP (2010) ninth annual report revealed that a wide range of IT such as e-learning has applications in nursing education. NACNEP recommended the following:

- Access to instructional material to a greater number of students
- Assistance to schools of nursing in regulating limited resources to expand teaching capacity

- Collaboration of institutional programs to support future faculty remaining

  employed in healthcare while obtaining higher nursing degrees

  In the eleventh annual report, the NACNEP (2013) continued to identify the

influences of distance education in nursing education. These influences include:

- Changing the way educational material is retrieved, distributed, and assessed

- Improving access for RNs, who are place-bound, face time-related barriers,

  competing life demands, and living in rural areas

- Improving electronic communication between students and faculty in rural and

  underserved areas

Resistance to Change and Technology Acceptance Model

Several authors have also extended the original TAM to evaluate resistance to

change. Halbach and Gong (2011) completed a study on bank leaders' intention to use

mobile commerce applications. The Oreg's (2003) resistance to change model (RTC)

was one of the instruments used in this study. Halbach and Gong discovered that RTC

did not predict the willingness to use m-Commerce in this study.

Chemingui and Lallouna (2013) evaluated consumers' resistance and motivational

factors affecting the intention of using mobile financial services. The four motivational

dimensions – compatibility, trialability, perceived enjoyment, and system quality – each

had a positive effect on intention to use mobile financial services. However, tradition

was associated with a strong resistance to the use of mobile services.

Naccarato (2013) examined RNs role in pressure ulcer (PU) prevention,

specifically knowledge, skills, attitudes, and intentions toward implementation of PU

prevention guidelines. The results revealed that knowledge, attitudes, and environmental

factors can affect nurses' use of PU prevention. In addition, readiness for change is the foundation to implementing organizational or individual changes.

Summary of What is Known and Unknown about the Topic

The topic of the study was the investigation of factors that influence RNs' intentions to use e-learning systems in completing higher degrees in nursing. A review was conducted on the history of nursing education, e-learning and learning management systems, and e-learning studies, as they each relate to the topic of the study. Additionally, theories of behavioral intention to use e-learning systems were reviewed. Based on those theories and studies, three constructs – perceived value, attitude toward e-learning systems, and resistance to change – have been identified as constructs affecting individuals' use of IT in education. The literature search identified what is currently known and unknown within this area of research. The information gleaned from this process assisted in the goal of identifying the strengths and weaknesses of existing studies, as well as gaps in the literature.

A review of the field of nursing education revealed the need for nurses to obtain advanced degrees to meet increasing healthcare demands. Previous studies reveal an ongoing change in e-learning education due to ever-evolving technology trends. E-learning adapts in conjunction with the development of information and communication technologies. The skills learned to accommodate technology in nursing may influence nurses' readiness to use e-learning systems.

In the past, the call for innovative methods such as e-learning to play a crucial part in nursing education (Cheng, 2013), is still relevant today. According to NACNEP

(2013), e-learning is making a contribution to meet the education challenges of nursing and health related professions. NACNEP continues to make recommendations to Secretary of HHS and Congress regarding e-learning approach in nursing education in the changing healthcare system.

When examining literature on technology acceptance, TRA (Fishbein & Ajzen, 1975) and TAM (Davis, 1989) are two theories that have been found to be good indicators of actual use in IU. TAM was based on the TRA model but added the concepts of perceived usefulness and perceived ease of use as determinants of intention. Based on the previously mentioned theories, several researchers have developed models using other constructs that are hypothesized to influence e-learning acceptance. Additionally, the constructs of PV, ATT, and RC have consistently been found to have significant impacts on technology acceptance for new or continued use of technology. Therefore, research studies related to these three constructs of interest – PV, ATT, and RC – were included in the literature review. However, current literature did not reveal a study using the aforementioned variables in e-learning acceptance of nurses specifically. The investigation of these constructs, as well as studies examining intention to use, provided the specific framework for the research questions in this study.

The dependent variable of interest in this study was intention to use e-learning systems. Intention to use e-learning systems was assessed in terms of the likelihood of registered nurses' using such systems in completing higher degrees in nursing. The independent variables were PV, ATT, and RC. According to Levy (2006), perceived value is a "core belief that is related to a mode of conduct" (p. 16). ATT is "an individual's positive or negative feelings about performing the target behavior" (Fishbein

& Ajzen, 1975, p. 216). RC is a set of responses to change that are negative along emotional, cognitive, and intentional dimensions (Piderit, 2000).

The review revealed that several obstacles to the effective use of e-learning in education still exist. These obstacles are related to various aspects of education including the service quality and the effect on perceived value and satisfaction (Yu et al., 2014). Other obstacles include online self-regulated learning skill levels and students' attitudes towards the Internet and web-based education (Usta, 2011). Nevertheless, a willingness to change and high levels of support can offset reluctance in individuals who are low in technological ability to adopt e-learning systems (Sawang et al., 2013).

The Contribution of this Study

This study contributed to nursing education by extending technology acceptance research related to perceived value, attitude toward e-learning systems, and resistance to change as they specifically apply to nurses' intention to use e-learning systems. Understanding the nurses' use of e-learning systems is expected to address the demand for more baccalaureate- and graduate-prepared registered nurses in the United States. The literature review identified specific areas in nursing that need to be improved to advance nursing education. Finally, existing studies confirmed that this research will make a significant contribution to meeting educational needs in the field of nursing.

In addition, this research contributed to research on technology acceptance. This study extended the TAM to include the roles of PV, ATT, and RC on technology acceptance and intention to use e-learning systems in educational environments for

nurses. The study may be used by other researchers as a base when extending other constructs in other institutions.

Summary

This chapter began with a discussion of the history of nursing education. The review identified several e-learning delivery systems and e-learning studies. Additionally, the review included the benefits and challenges regarding the use of e-learning systems in nursing education.

The theory of reasoned action, the theory of planned behavior, and the technology acceptance model were presented. Factors that may affect nurses' intentions to use e-learning – perceived value, attitudes toward e-learning systems, and resistance to change – were subsequently discussed as an extension of the TAM model. Finally, the chapter concluded by providing a summary of the known and unknown areas of the topic and the contribution that the study will make in the field on nursing and information technology.

Chapter 3

Methodology

Overview of Research Methodology

This dissertation was an empirical study using a quantitative survey methodology to assess the effect of RNs' perceived value, attitude toward e-learning systems, and resistance to change on their intentions to use e-learning systems in completing higher degrees in nursing. According to Ary, Jacobs, Sorensen, and Walker (2013), quantitative research is frequently used in the field of education and involves collecting, analyzing, interpreting, and writing to explain a particular phenomenon. A survey design was appropriate for this study, because it allowed nurses to describe their attitudes, opinions, behaviors, or characteristics (Creswell, 2012).

The following sections in this chapter describe the steps employed in this study: (a) specific research methods employed; (b) instrument development and validation; (c) sample; (d) data analysis; (e) formats for presenting results; and (f) resource requirements.

Specific Research Methods Employed

This study addressed the following three specific research questions:

1. To what extent does perceived value affect RNs' intentions to use e-learning systems in completing higher degrees in nursing?

2. To what extent does attitude toward e-learning systems affect RNs'
    intentions to use e-learning systems in completing higher degrees in
    nursing?

3. To what extent does resistance to change affect RNs' intentions to use e-
    learning systems in completing higher degrees in nursing?

In order to answer the specific research questions noted above, data were
collected through a web-enabled survey instrument. Web-based surveys are economical,
allow for quick responses, and reduce the risk of data entry errors (Harzing, Reiche, &
Pudelko, 2013). Although the response rate of web-based surveys involving individuals
from higher educational institutions are usually weak, they may be increased (Perkins,
2011). In this study, two strategies to increase the response rate included: (1) composing
appropriate survey questions to meet the research objective, and (2) keeping the survey
design clean, precise, and logical (Perkins, 2011).

The web-survey instrument was developed as a multi-item questionnaire using
Likert-type scales to measure perceived value, attitude toward e-learning systems,
resistance to change, and behavioral intentions. Likert-type scales are very common
when survey instruments are used to measure variables in a study (Simon & Goes, 2013).
Also, participants can choose from the scale of one to five options regarding their
attitudes, perceptions, positions, feelings, thoughts, or points of view. An example a 5-
point Likert scale is as follows:

Using the e-learning system improves my learning performance.

- Strongly agree = 5

- Agree = 4

- Neither disagree nor agree = 3

- Disagree = 2

- Strongly disagree = 1

According to Rukmana (2010), the Likert scale is an interval scale measurement frequently used in experimental research. An interval scale is a level of measurement that measures attributes on specific numerical scores or values with equal distances between the attributes. Some researchers argue that the responses in the Likert scale are not interval scales but ordinal scales (see Table 2) because the distance between rankings is not equal (Rukmana, 2010). Therefore, the Likert scale as an ordinal scale measurement is frequently used in social and behavioral research (Multon & Coleman, 2010).

According to Multon and Coleman (2010), an ordinal scale uses a hierarchical ranking system to indicate comparative levels including satisfaction, confidence, and agreement. Also, constructs varying in degree among individuals such as opinions, attitudes, level of anxiety, specific personality characteristics may be included. Additionally, since these constructs are self-report methods and cannot be observed directly, they are considered ordinal.

Other researchers argue that since each attribute in the Likert scales is given a number, there is equal distance between attributes and they are interval scales (Rukmana, 2010). Likert-type scales measure in terms of such values as more or less, larger or smaller, but without specifying the size of the intervals (Simon & Goes, 2013). Therefore, the Likert scales are considered to be an ordinal scale of measurement. Using an ordinal scale allows the researcher to "rank order the items in terms of which has less

and which has more of the quality represented by the variables" (Rovai, Baker, & Ponton, 2013, p. 493). This type of measurement is consistent with the application of these items and instruments in previous research (Ferdousi, 2009). Table 2 provides brief definitions of scale types.

Table 2

Levels of Measurement and Definitions

Level	Quality	Examples	Observation
Nominal (categories)	Assignment of labels	Gender preference, voting record	Each observation belongs to its own category
Ordinal (category and order)	Assignment of values along some underlying dimension	Rank in college, order of finishing a race	One observation is ranked above or below and may not have equally appearing intervals
Interval (category, order, and spacing of equal intervals)	Equal distances between points	Number of words spelled correctly, intelligence test scores, temperature	Scores differ on some measure that has equally appearing intervals
Ratio (category, order, and spacing of equal intervals and a zero point)	Meaningful and nonarbitrary zero	Age, weight, time	One value is twice as much as another

Note. Adapted from *"Exploring Research,"* by N. Salkind, 2012. New York, NY: Pearson, p. 2.

Instrument Development and Validation

The survey included the following content sections:

- Cover letter, which included a link to the survey site.

- Study information: The researcher's information and signature, research

participants' rights, instructions to complete the survey, and response

time (Fan & Yan, 2010).

- Participant demographics: The demographic information included the

  participants' age, gender, race, and educational level (Quazi & Talukder,

  2011). The demographic information was collected for bias analysis to

  determine if the responding sample is representative of the population

  (Connelly, 2013). Additionally, the analysis provided a more accurate

  interpretation of the findings. The population parameters for RNs

  demographics were based on the most recent data derived from the Florida

  Center for Nursing (FCN) (2013), NCSBN (2013), and HRSA (2015).

- The survey instrument: The constructs that were measured included

  perceived value (PV), attitude (ATT), resistance to change (RC), and

  intention to use (IU).

In order to address the specific research questions noted above, a 35-item survey

instrument was developed using previously validated measurable items from Ferdousi

and Levy (2010)'s instrument. The instrument was presented in the article "Development

and validation of a model to investigate the impact of individual factors on instructors'

intention to use e-learning Systems." Also, the instrument was used by Ferdousi (2009)

in a study to identify factors that affect instructors' intentions to use e-learning systems.

According to Creswell (2012), existing instruments previously assessed for validity and

reliability are frequently used in research studies.

According to Ferdousi (2009) the items PV1 through PV5 were adapted from the measures developed by Davis (1989). In addition, the items PV6 through PV9 were adapted from Selim (2003). Davis's and Salem's items achieved Cronbach's alpha (α) reliability scores over .90. The item PV10 was adapted from Greer and Murtaza's measure and achieved a Cronbach's α reliability of .95. Items to measure PV11 through PV16 were developed by consolidating survey items developed and validated by Chui et al. (2005). Chui et al. (2005) developed the instrument to measure PV using the List of Value (Kahle, Betty, & Homer, 1986) and the Rokeach Value Survey (1973). Chui et al. validated PV in terms of reliability, convergent validity, and discriminant validity. The PV scale attained Cronbach's α reliability of .90. The item PV17 in the survey was adapted from Levy's revised instrument and exhibited a Cronbach's α reliability of .91. Ferdousi (2009) further validated the items PV1 through PV17 by using content and construct validity. The items achieved Cronbach's α reliability of .98. PV was measured using a 5-item Likert-type scale: 5 = very important, 4 = important, 3 = slightly important, 2 = not so important, 1 = not important = 1 (Ferdousi, 2009).

Additionally, items ATT1 through ATT4 were adapted from Karahanna, Straub, and Chervany (1999). The value of Cronbach's α for ATT was .90. The item ATT5 in the instrument was adapted from Chen, Gillenson, and Sherrell (2004) and exhibited a Cronbach's α of .73. Items ATT6 through ATT7 were adapted from Shih (2008) and obtained a Cronbach's α of .87. Items ATT8 through ATT10 were adapted from Ngai, Poon, and Chan (2007) and exhibited a Cronbach's α of .91. Ferdousi (2009) validated the items ATT1 through ATT10 by using content and construct validity. The items achieved Cronbach's α reliability of .96. ATT was measured using a 5-item Likert-type

scale: strongly agree = 5, agree = 4, neither disagree nor agree = 3, disagree = 2, strongly

disagree = 1 (Ferdousi, 2009).

Next, instrument items RC1 through RC4 were adapted from the survey items

developed by Giangreco (2002). The RC items attained Cronbach's α reliability of .88

for items related to pro-change behaviors. Ferdousi (2009) further validated the items by

using content and construct validity. Ferdousi's items achieved Cronbach's α reliability

of .96. RC was measured using a 5-item Likert-type scale: very likely = 5, likely = 4,

neither unlikely nor likely = 3, unlikely = 2, and very unlikely =1 (Ferdousi, 2009).

Finally, instrument items IU1 through IU2 were adapted from the survey items

developed and validated by Brown and Venkatesh (2005). The composite reliability for

the IU construct was .90. The items IU3 through IU4 in the instrument were adapted

from Selim (2003). The items achieved Cronbach's α reliability of .91. Ferdousi (2009)

further validated the items IU1 through IU4 by using content and construct validity. The

items achieved Cronbach's α reliability of .98. IU was measured using a 5-item Likert-

type scale: very likely = 5, likely = 4, neither unlikely nor likely = 3, unlikely = 2, very

unlikely = 1 (Ferdousi, 2009).

Reliability and Validity

Reliability and validity are two important criteria used to assess the quality of a

research study and are common methods used to measure research variables (Polit &

Beck, 2013). According to Engberg and Berben (2012), two criteria for choosing a

suitable instrument are the reliability and validity of its scores. To ensure that the study

was reliable and valid, reliability and validity tests were completed on each construct in this study.

Reliability

Reliability refers to the accuracy and consistency of information obtained in a study (Polit & Beck, 2013). Furthermore, reliability is important in interpreting the results obtained using statistical analyses. For example, the reliability of an instrument is the degree to which its measurements will yield the same score when administered by different persons, at different times, and in different situations (Drost, 2011).

Table 3 presents several types of reliability, as well as what and how they measure. For example, test-retest reliability is evident when similar scores are obtained even when completing the same test on different occasions. Parallel forms reliability measures the consistency across different forms of an instrument. Also, inter-rater reliability examines the consistency between individuals assigning ratings to behaviors or responses. These investigations were not appropriate for this study because the survey was completed only once, using one form of the test. In addition, the study did not include the rating of behaviors or responses.

Internal consistency reliability (see Table 3) "addresses how consistently individuals respond to the items within a scale that are measuring the same construct" (Rovai et al., 2013, p. 479). One of the most commonly used statistical tools is Cronbach's alpha (α). In this study, the coefficient α, defined by Cronbach in 1951, was used to measure the internal reliability of each construct's items within the survey instrument. According to Drost (2011), the value of α can vary for several reasons. For example, the value of α should be .70 or higher in the early stages of research on

predictor tests of the construct. The value of α should ideally be at least .90 when an exact score is required in a study, but again, it can also vary with the variety of constructs being examined. In this study, Cronbach's α was used to determine internal consistency, to measure, and report the reliability of the following constructs: perceived value of e-learning systems (PV), attitude towards e-learning systems (ATT), resistance to change (RC), and intention to use (IU).

Table 3

Types of Reliability and Purposes

Type of Reliability	Measure	Test	Reliability Coefficient
Test-retest	Stability	Perform the same test at two different times to the same participants	Test 1-Test 2
Parallel-forms	Equivalence	Perform two different forms of the same test to the same participants	Form 1-Form 2
Inter-rater	Agreement	Two individuals rate behaviors and determine the amount of agreement between them	Percentage of agreements
Internal consistency	Consistency of the measurement of each item on the same underlying construct	Correlate performance on each item with overall performance across participants	Cronbach's α, Kuder-Richardson

Note. Adapted from *"Exploring Research,"* by N. Salkind, 2012. New York, NY: Pearson, p. 9.

Validity

Polit and Beck (2013) recognized that validity in research is more complex than reliability. According to Polit and Beck, validity provides solid conceptual definition of research variables, as well as the measures used to evaluate their effectiveness. In addition, when research findings are said to be valid, they are expected to be well-grounded, congruent, and unbiased evaluations of measures. Finally, validity authenticates the quality of research concerning the effect of the independent variable on the dependent variables.

According to Schreiber and Asner-Self (2011), internal validity is a concern that develops when the characteristics of a research study may negatively affect the quality of the results. Salkind (2012) identified the participant selection process as a potential threat to the internal validity of a study because the process may comprise a systematic bias which makes the participating groups differ from each other. The selection of RNs in this study was not a threat to internal validity since the researcher was only interested in exploring RN perceptions. Furthermore, all RNs in the two hospitals were given the opportunity to participate.

Maturation, in social science research, refers to changes over time often caused by biological or psychological forces (Salkind, 2012). The RNs participating in the research were allowed one opportunity to complete the survey. Although there may be changes over time, the study required the participants' opinion within a relatively short timeframe. Furthermore, since the research was not experimental in nature, the completion time was not an issue.

According to Rovai et al. (2013), external validity describes the ability of a study to generalize across groups of individuals and settings within the same target population. Rovai et al. (2013) identified and described two types of external validity: population and ecological. Population validity determines how well the results can be generalized from a specific sample to the target population. Ecological validity identifies the degree to which a study can be used in other environments with conditions similar to the original studies. According to Taylor (2013), specific threats to external validity include:

1. Selection: Will the results of this study be the same for people who are not volunteering in a study?

2. Situation: Will the results of this study be the same in a different setting, with different providers?

3. History: Will the results of this study be the same two years hence? Would they have been the same two years ago?

To ensure population validity for this study, the researcher focused on representativeness by comparing demographic information of the sample and the target population (Polit & Beck, 2013). This study included a sample drawn from RNs in two hospitals. According to Taylor (2013), one of the most effective strategies to ensure external validity is replication. Studies that are duplicated in various settings, with different samples, and at various times, are described as having more robust results (Taylor, 2013). The variables of interest in this study – perceived value attitude, and resistance to change – have been identified in previous research as important variables in predicting technology acceptance and specifically e-learning acceptance across several

settings, with different samples, and at various times. Therefore, threats to validity were reduced when using the variables in this study.

Another criterion for choosing a suitable instrument is the validity of its scores (Engberg & Berben, 2012). Instrument validity refers to whether the instrument measured what it was supposed to measure (Kitchenham & Peeger, 2008). Therefore, to develop a valid and reliable instrument, this study examined content validity, construct validity, convergent validity, and discriminant validity.

Content validity is the extent to which the items on the questionnaire are sampling the content area or domain of interest in a representative manner (Schreiber & Asner-Self, 2011). This study established content validity by using survey items from Ferdousi's previously validated instrument. As part of the initial instrument design, Ferdousi obtained expert opinions regarding format, content, understandability, and terminology, as well as the ease of use and the time required for the survey completion. In addition, experts identified specific items that should be modified or deleted from the survey and made suggestions for enhancements. In this study, there were minor changes to Ferdousi's instrument to tailor it to the present work, and experts evaluated the instrument for any errors. In addition, nurses from various departments within the participating hospitals completed the survey to assess functionality. The results revealed that the survey did not require any modifications.

Construct validity focused on how well the questions measure the constructs they were intended to measure (Kitchenham & Peeger, 2008). By performing a pilot study and establishing content validity, this guaranteed that construct validity was achieved in this study (Schreiber & Asner-Self, 2011). Kitchenham and Peeger (2008) identified

convergent and discriminant validity as two variants of construct validity. Convergent

validity describes to what degree multiple questions intended to measure the same

concept in reality do. In contrast, discriminant validity explains to what degree the

questions do not correlate, although they are intended to measure the same concept.

In this study, construct validity was assessed using exploratory paralleled factor analysis.

Threats to Validity and Reliability

Oluwatayo (2012) identified multiple threats to validity and reliability in

educational research. These threats include conceptual bias arising from the faulty logic

of the researcher, resulting in improper conceptualization of the research problem,

interpretations, and conclusions. Additionally, design bias can originate from faulty

design, methods, sampling procedures, and the use of incorrect techniques of analysis

resulting in variation between the perceived value and the actual value. Also, sampling

bias may occur when the researcher's sample does not represent the target population.

Finally, process bias, the sum of all errors from the sampling design to data analysis, can

occur because of an invalid or unreliable instrument that was used to generate data.

However, threats to validity and reliability were reduced in this study by

following the required measures outlined by Oluwatayo (2012) for completing research

studies. These guidelines included clearly defining the research problem, using the

correct research design, and using a valid and reliable instrument for data collection.

Other guidelines included choosing a representative and unbiased sample, employing the

appropriate statistical tools for analysis, and avoiding errors in interpreting the results.

Sample

The target population for this research was RNs employed in hospitals in South

Florida. According to the FBN (2014), there are 42, 255 RNs in South Florida with 63%

working in hospitals. According to Creswell (2012), the target population is the

population about which the researcher would preferably like to generalize the results.

Determining the Sample Size

Determining the necessary sample size for a quantitative study can be challenging

(Timberlake, 2011). A sample is a subset of the population used to determine the

characteristics of a target population (McMillan & Schumacher, 2010). Israel (2009)

identified published tables and formulas to determine sample sizes. According to Israel,

the tables and formulas provide sample sizes for given combinations of accuracy,

confidence levels, and variability. The following formula was developed by Yamane

(1967) to calculate the sample sizes in a table. The formula incorporates a 95%

confidence level, N = target population, n = sample size, and e = level of precision.

Therefore, for a population 42, 255 RNs, with a confidence level = 95%, and a margin of

error = 5%, the formula shows a responding sample size of 396 RNs.

$$n = \frac{N}{1 + N(e)^2}$$

$$n = \frac{42255}{1 + 42255(.05)^2} = 396 \ RNs$$

According to Israel (2009), the sample size in the tables reflects the number of

responses that need to be obtained to achieve the desired confidence and precision levels.

The responding sample size may be reduced during the elimination of unusable data by

the pre-analysis data screening procedure (Sheskin, 2010). However, the invited sample size is frequently increased to compensate for nonresponses (Israel, 2009).

To increase the sample size, Israel (2009) suggested factoring in the estimated response rate. According to Harzing et al. (2013), one of the factors most important in explaining a response rate is the type of population studied. A 50% response rate was the achievable target for the nurses because of their busy work schedule ("Quantitative research," 2012). For this study, a 50% response rate was factored in to estimate the sample size (396/0.5 = 792).

A non-random or a convenience sample was used in this study because of the size of the population and the availability of the participants (McMillan & Schumacher, 2010). There are similar studies that have used convenience sampling (Attis, 2014; Marrs, 2013). Attis (2014) investigated variables that predict teacher e-learning acceptance, and the sample in that particular study included 112 instructors who taught K-12 in a virtual school. Convenience sampling was used in the selection of these participants, because they were the most accessible to the researcher. Marrs (2013) investigated factors that influence educators' and students' acceptance of mobile learning in one university. The target population was 44,000 online students and 2,900 faculty members. A convenience sample of 620 students and 600 faculty members who were actively attending class and teaching during the fall semester comprised the invited sample. The responding samples were 123 students and 294 faculty members. Marrs completed a convenience sample because a random sample would be impractical for such a large population.

However, a non-random convenience sample can present difficulties in generalizing results (Creswell, 2012). According to Onyejuruwa (2014), the disadvantage of using convenience sampling is that the responding sample may not be representative of the target population. According to Israel (2009) and "Quantitative research" (2012), a large sample size will increase confidence that the sample represents the population; with a small population, it is important to sample the majority of the population to be confident that the data are representative of the population. Further, a large sample from a population will reduce sampling errors (Creswell, 2012); "Quantitative research," 2012). Therefore, all RNs employed in two public hospitals in South Florida were invited to participate in this study. The hospitals chosen met three criteria for selection: (1) the nurses were experienced in using e-learning systems to complete their hospital-based nursing competencies; (2) the hospitals' administrators were willing to have the nurses participate in this research (Appendix B and Appendix C); and (3) the nurses were likely to obtain higher degrees in nursing since the institution offered educational financial assistance.

Similar to Marrs (2013) and Attis (2014), the researcher made every effort to obtain a high response rate and increase the generalizability of the results for the current study by sending reminder e-mails to the nurses: one reminder in the second week of the survey and a final reminder in the last week of the survey (Fan & Yan, 2010). Also, the nurses received clear explanations of the process, the length of the survey, and the time available for completion (Fan & Yan, 2010).

The study explored the effect of independent variables on a dependent variable. Similar to the quantitative exploratory research completed by Newell (2013), this study

provided insight surrounding the effect of independent variables on a dependent variable. Additionally, the study was not a qualitative research that explored a central phenomenon or discovered new variables or factors.

All participants in this study were volunteers based on the Institutional Review Board (IRB) protocol. Due to past unethical practices during research, conducting this research that included human beings required permission from all institutions' IRB (Cook, Hoas, & Joyner, 2013). This study met the following requirements for conducting research involving human beings (Nova Southeastern University, 2014):

1. The IRB process began immediately after the approval of the dissertation idea paper and after the researcher was instructed by the chair.

2. The instruments and protocols were reviewed and approved by the Nova Southeastern University's IRB as well as the sponsoring hospitals' IRB before beginning this research.

3. The participants were volunteers based on the IRB protocol.

4. Survey instruments were distributed after IRB approvals and dissertation proposal completion.

The researcher completed the following steps in the IRB process (Nova Southeastern University, 2014):

1. Completed the "SCIS" set of training modules in the Collaborative Institutional Training Initiative (CITI) Training Program.

2. Completed the required forms: IRB Submission Form and Research Protocol.

3. Notify the advisor and requested an indication in dissertation tracking system (DTS) for IRB review.

4. The researcher and advisor received the status of the IRB review, including the final Nova Southeastern University's IRB approval in an email (See Appendix D).

5. The researcher obtained IRB approval from the participating hospitals (See Appendix E and Appendix F).

6. Finally, the researcher obtained permission from the dissertation committee to complete the study.

Pilot Test

As aforementioned, a previously developed and validated instrument was used to address the research questions in this study. In this study, permission was obtained to use the instrument presented in the article written by Ferdousi and Levy (2010) (Appendix G). Therefore, this study adapted and modified items from Ferdousi and Levy (2010)'s instrument to fit the context of this study (Appendix H). There were minor alterations to the wording of the instrument to ensure relevancy to the target population studied (Marrs, 2013).

According to Schreiber and Asner-Self (2011), whether the researcher creates or chooses to use a previously developed the instrument, the researcher should pretest or pilot test the instrument. The researcher completes a pilot test to identify possible issues with the survey administration process (Schreiber & Asner-Self, 2011). Schreiber and Asner-Self (2011) suggest enlisting a few colleagues to pre-test the instrument or procedure. These initial volunteers assist in identifying the time needed to complete the tasks, as well as any potential problems in completing the study that may prevent future issues and reduce frustration and stress.

Kocour (2014) used previously validated instruments to develop an online survey questionnaire. As an initial step, Kocour administered the online pilot survey to 20 participants who were not part of the actual study group. The participants completed a fill-in-the-blank section with comments on various features of the survey. The results of the survey were then analyzed to determine whether there were any functional issues. The survey was refined, tested for validity and reliability, and distributed to the sample employees.

Taking a slightly different approach, Ferdousi (2009) also used survey items from previously validated instruments. Ferdousi obtained experts opinions for the initial design of the online survey. The experts were required to identify items to be modified or deleted and then make suggestions for improvements. After reviewing the feedback, Ferdousi made adjustments to the items and tested the results for validity and reliability.

In this study, experts in the field of nursing and education were invited to identify items to be modified or deleted and then make suggestions for improvement of the survey instrument. After the IRB approval by Nova Southeastern University and the participating institutions, the new instrument for this study was pilot tested to identify any potential problems (Schreiber & Asner-Self, 2011) and to check functionality and completion time. The pilot test of the instrument utilized in the current study was administered to $n = 6$ nurses from the overall population of RNs at the research hospitals. Following the pilot study, it was not necessary to make any changes to the instrument. The RNs involved in the pilot test did not participate in the research study.

To promote trustworthiness, the hospitals' research managers initiated the contact with the RNs at the hospitals for both the pilot test and the formal study survey by:

- Inviting the researcher to nursing leadership meeting at the hospitals to present the study.

- Forwarding the study participation letter with the survey link (Appendix I), received from the researcher, to the nursing leadership at both hospitals.

The nursing leadership emailed the participation letter to the nurses. The RNs were directed to the survey web page of the SurveyMonkey® software. The survey required the participants to answer all the questions prior to submission. The Web Link Collector of the SurveyMonkey® software was modified to keep the participants anonymous (SurveyMonkey, 2014). The participants were allowed to complete the survey on their smartphones and computers. However, editing options were set to off so that respondents could not change their answers once they clicked "done" in the survey. After completing the survey, the participants could not access the survey again. The questionnaire was designed to be completed in less than 10 minutes. A thank you note was displayed by the SurveyMonkey® software after the participants completed the survey.

Pre-analysis Data Screening

According to Creswell (2012), the researcher ensures the accuracy of the collected data and eliminates missing data during pre-analysis data screening. Errors may occur either when participants provide scores outside the range of options or when there are missing data points (Creswell, 2012). In this study, the data were exported directly from the electronic survey data collection tool (SurveyMonkey, 2014) to the R software for statistical computing and graphics (R Development Core Team, 2015). Therefore, data

entry and typing errors were not concerns in the data screening. Additionally, the survey software was set to restrict the participant's response to a single option and required all questions to be answered before submission, eliminating the issue of double answers and missing data. Response set – defined as a tendency to provide responses regardless of the question, all in agreement or all in disagreement – was addressed by removing cases in which 100% of item submissions contained the same response.

Data Analysis

The data were collected using a 35-item survey instrument, developed using previously validated measurable items. The items included three independent variables – perceived value, attitude, and resistance to change - which were assessed as indicators of intention to use e-learning. In addition, the data gathered included demographic information on RNs' age, race, gender, and education level to verify that the sample represented the population.

The web-enabled survey used for this study was developed as a multi-item using Likert-type scale to collect quantitative data for analysis. In this research, the Likert-type scale responses were treated as ordinal data. Because ordinal data are rank data, descriptive statistics and nonparametric analyses were selected.

The descriptive statistics were completed for the study variables. Descriptive statistics allow researchers to describe, compare, and characterize a relationship. In addition, descriptive statistics can involve a single variable at a time or multiple variables simultaneously. The descriptive statistics for the study variables included the number of valid cases, mean, standard deviation, median, minimum, maximum, range, skew, and

kurtosis tables for each of the constructs. According to Polit (2010), the most common descriptive statistics that are analyzed to describe and summarize data are averages and percentages. The researcher organized and analyzed the data to answer the research questions presented in this study. Furthermore, the data collected were analyzed to identify and determine factors that predict intention to use e-learning systems. Finally, descriptive statistics are communicated in three ways: in a narrative fashion, in a graph, or in a table.

According to Doane and Seward (2010), nonparametric analyses may be used for ordinal data. Therefore, a multivariate analysis was conducted using structural equation modeling (SEM) to explain the impact of the independent variables on the dependent variables. SEM is a more powerful alternative to multiple regressions (Arminger, Clogg & Sobel, 1995). Doane and Seward described the advantages of nonparametric tests. The advantages of nonparametric tests include: (1) focus on the sign or rank of the data rather than the exact numerical value of the variable; (2) do not specify the shape of the parent population; (3) can often be used in smaller samples; and (4) avoid the restrictive assumption of normality.

In this study, using Mardia's multivariate test, evidence was found that indicated the data did not conform to the normality assumption. According to Hutchinson and Olmos (1998), it is common, when using ordinal scales, to have non-normal data. Therefore, a multivariate analysis was conducted using SEM and robust standard errors with the Satorra-Bentler adjustment (Satorra & Bentler, 1988). The statistical analysis was conducted using latent variable analysis (lavaan), implemented in the R 3.2.2 system (R Development Core Team, 2015).

Formats for Presenting Results

Tables and figures are used to present the data analyses. Graphs include the results of the pre-analysis data screening, reliability and validity tests, and the statistical tests. The results are presented in American Psychological Association (APA) style.

Resource Requirements

The two hospitals in South Florida selected as research sites provided assistance to the researcher regarding contacts and documentation indicating support of the study. Key individuals, including the Research Managers, forwarded the study invitation letter to the nursing leadership, who then emailed the information out to the nurses. The cost to complete the research was minimal due to the availability of existing instruments and easily obtained data collection tools. The items required to collect and analyze data for this study included a computer with an internet connection, SurveyMonkey® software, telephone, printer, paper, and transportation.

Summary

In this chapter, the methodology that was used to conduct this study was presented. Also, the researcher explained the specific research methods to be employed in determining factors influencing the nurses' use of e-learning for obtaining higher degrees in nursing. Additionally, reliability and validity were identified as two important criteria that assessed the quality of this research study.

Descriptions of the development and validation of the survey instrument, the sample of nurses, and the IRB process were provided in this chapter. Additionally, the data screening and analysis techniques that were used to answer the research questions were expounded. The chapter concluded with a description of the formats for presenting the results as well as resources used to complete the study.

Chapter 4

Results

The purpose of this quantitative study was to assess the impact of the perceived value (PV), attitude (ATT), and resistance to change (RC) on registered nurses (RNs) intentions to use e-learning systems (IU) for advancing their nursing education. The analyses and results of the statistical methods used to examine these relationships are presented and discussed in this chapter. Additionally, the procedures used in pre-analysis data screening to assess for validity and reliability are expounded in the sections below. Multivariate analysis was conducted to answer the research questions proposed in Chapter 1; the procedure is described and an illustration of the resulting structural model is provided. Finally, the chapter concludes with a summary of the results.

Data Collection

The web-based survey was sent to approximately 1,500 RNs at two hospitals in South Florida. The data collection took place over the course of one month, from February 5, 2016, to March 5, 2016, and at the conclusion of the process, a total of 323 (21.5%) participants completed the survey. Responses from approximately 175 RNs are considered satisfactory for statistical modeling using Structural Equation Modeling (SEM) (Bentley & Chow, 1987). Therefore, responses from 323 RNs in this study

guaranteed that the sample was representative of the population, and thereby increased the generalizability of the results.

Pre-Analysis Data Screening

As aforementioned, pre-analysis data screening was conducted before data analyses to ensuring data accuracy. Data entry and typing errors were not concerns in this study since the data were exported directly from the SurveyMonkey® software to R 3.2.2 software for statistical computing and graphics. Additionally, multiple responses were not included in the data because the SurveyMonkey® software was set to restrict participants to single responses. "Missing data" was not an issue since all questions must be answered before the survey could be submitted. Five cases of response set issues occurred, where every question had the same answer. Those response sets were eliminated from the data analysis.

As part of the survey, demographic information on age, race, gender, and education level were collected from each respondent. The purpose of the demographic information was to verify that the sample was representative of the population. Table 4 presents a summary of the demographic characteristics of the participants in this study. In this study, 68% of the responding sample of RNs was age 46 or older, 66.7% selected white as their race, 89% identified as women, and 51.9% of RNs had diplomas/associate's degrees.

A comparison of the study demographics of the RNs in South Florida indicated that respondents were representative of the population in terms of age, race, gender, and education level (FCN, 2013). In South Florida, over 40% of RNs were over age 50.

Also, over 60% of the RN population in South Florida selected white as their race.

Among the working nurses, 87% of RNs were women. South Florida had over 50% RNs

with diploma/associate's degrees.

Table 4

Descriptive Statistics for Demographics (N = 318)

Variable	Frequency	Percentage
Age		
≤25	8	2.5%
26–35	27	8.5%
36–45	55	17.3%
46–55	115	36.2%
56–65	101	31.8%
≥66	12	3.8%
Ethnicity		
White	212	66.7%
African American	45	14.2%
Hispanic/Latino	37	11.6%
Asian	14	4.4%
Other	7	2.2%
American Indian/Native American	3	0.9%
Gender		
Female	283	89.0%
Male	35	11.0%
Education		
Diploma	20	6.3%
Associate's	145	45.6%
Bachelor's	118	37.1%
Master's	32	10.1%
Doctorate	3	0.9%

Reliability and Validity

For this study, factor analysis was conducted on the following four constructs: PV, ATT, RC, and IU. Factor analysis was conducted to identify underlying variables to explain the pattern of correlations within a set of observed variables (Sekaran & Bougie, 2013). Table 5 demonstrates a summary of the loadings obtained on the variables for each component. Using Joliffe's eigenvalue cutoff of > .7 (as cited in Michel, 2013), all variables loaded consistently in this study indicating a good degree of generalizability. The results estimated high reliability for all variables.

Table 5

Exploratory Factor Analysis Measures for Subscales

Statistic	Value	Attitude	Resistance	Intention
Sum of squares loadings	15.26	2.14	1.18	0.97
Proportion variance	0.44	0.06	0.03	0.03
Cumulative variance	0.44	0.50	0.53	0.56
Proportion explained	0.78	0.11	0.06	0.05
Cumulative proportion	0.78	0.89	0.95	1.00

The reliability for each construct was calculated using Cronbach's alpha. According to Drost (2011), Cronbach's alpha scores should be .70 or higher in research on predictor tests of the construct to indicate internal consistency. The measures of reliability for the variables of interest in the current study were within an acceptable range (See Table 6).

Table 6

Reliabilities for Structural Equation Modeling (SEM) Subscales

Statistic	Value	Attitude	Resistance	Intention
Cronbach (factor reliability)	0.93	0.90	0.84	0.81
Average variance extracted	0.44	0.49	0.55	0.52

Construct validity was assessed using parallel analysis. Construct validity focused on how well the questions measure the constructs they were intended to measure (Kitchenham & Peeger, 2008). Parallel analysis is a Monte Carlo simulation process, whereby the expected eigenvalues are obtained by generating normal random samples that parallel the observed data, both in terms of sample size and number of variables (Ledesma & Valero-Mora, 2007).   In this study, parallel analysis was applied to a matrix with dimensions equal to those of the real data matrix for this study, but based on randomly generated uncorrelated normal variables (Ledesma & Valero-Mora, 2007). The parallel analysis revealed evidence for the four constructs. As can be seen in Figure 4, in the Scree Parallel, the observed eigenvalues are below the cutoff line estimated using the simulated data. Also, there are four factors with eigenvalues > 1.0 indicating that there are four constructs (Kaiser, 1960).

Parallel Analysis Scree Plots

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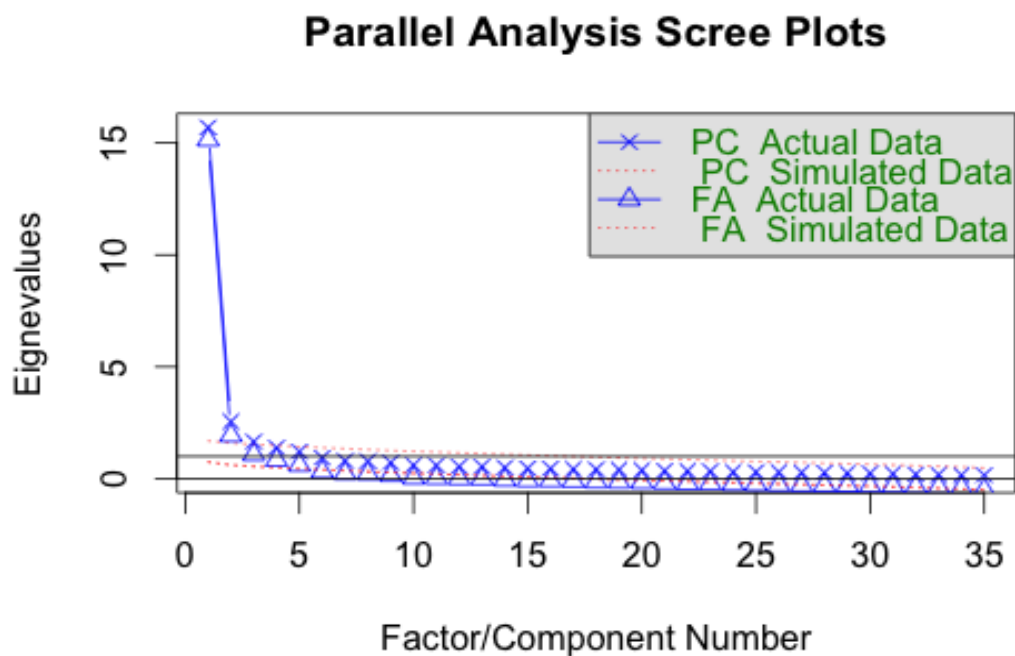
Figure 4. Parallel analysis scree plots

Data Analysis

In this study, the analysis approach used the structural equation modeling (SEM) to answer this study's three research questions. SEM, a second-generation data analysis technique, was used in this study as it is considered to be a more powerful alternative to multiple regression (Arminger, et al., 1995; Hoyle, 2012). SEM allows questions to be answered that involve multiple regression analyses of factors. As compared to multiple regression, advantages of SEM include flexible assumptions that allow interpretation even in the case of multicollinearity, use of multiple indicators per latent variable, the opportunity to test models overall rather than coefficients individually, and the ability to test models with multiple dependent variables (Bollen, 1989). SEM involves the

combination of exploratory factor analysis (EFA) with multiple regression analyses, allowing the researcher to posit a relationship between a single, measured variable.

Khine (2013)'s steps involved in testing SEM models were completed in this study, to answer the research questions. These steps are discussed below:

1. Specification of the model is achieved by identifying the hypothesized relationships among the observed and latent variables that exist or do not exist in the model.

2. When using SEM, the researcher's goal is to find the most parsimonious summary of the interrelationships among variables that accurately reflects the associations observed in the data.

3. Model estimation involves determining the value of the unknown parameters and the error associated with the estimated value. Both unstandardized and standardized parameter values and coefficients are estimated.

4. Once estimated, the model's fit to the data must be evaluated. If the associations among measured and latent variables in the researcher's estimated model reflect the observed associations in the data, the result is a final structured model.

The statistical analysis was conducted using lavaan, a package for structural equation modeling implemented in the R 3.2.2 system for statistical computing (R Development Core Team, 2015). Lavaan is an interface with a design-based complex survey analysis (Oberski, 2014). According to Rosseel (2012), R is a software for statistical computing and graphics. In addition, the R package lavaan is reliable and robust. When comparing lavaan to other software packages such as LISREL, Jöreskog

(2006) and Rosseel added that all SEM's software packages produce the same results with only minor differences in the output.

SEM is based on covariances that are less stable with small sample sizes. Based on the work of Bentley and Chow (1987), the ratio of five observations to one free parameter is needed for the statistical modeling using SEM. In this model there were 35 free parameters which indicated a sample size of 175 respondents. A total of 318 RNs completed surveys were included in the data, which provided enough power for the statistical modeling using SEM.

Multivariate normality was tested using Mardia's coefficient. Evidence was found that indicated the data did not conform to the normality assumption, chi-square ($\chi2$) = 11,711 and $p < 0.001$. As previously discussed in Chapter 3, it is common when using ordinal scales to have non-normal data (Hutchinson & Olmos, 1998). In this study, the data were ordinal since Likert scales are considered to be an ordinal scale of measurement (Rovai et al., 2013). Therefore, a multivariate analysis was conducted using SEM and robust standard errors with the Satorra-Bentler adjustment (Satorra & Bentler, 1988) in our statistical model. According to Rahman (2015), simulation studies have revealed that this correction is effective with non-normal data, even in small-to-moderate samples, and applying the correction often results in a better model fit.

Of additional concern were outliers that have extreme residual values, as they can also affect study results (Randolph & Myers, 2013). According to Sheskin (2010), an outlier is an observation in a set of data that is inconsistent with the majority of the data. Outliers can affect the results in two ways. First, outliers can bias the results because they affect the value of the estimated coefficients. Additionally, outliers can be a concern

in data collection since they may change the values of both the mean and variance of a distribution (Sheskin, 2010). Based on the results of the multivariate test, no significant outliers were observed (Appendix J).

SEM is used to formulate a measurement component and a structural component (Rahman, 2015). The measurement component estimates the relationship between the latent variables and their measures. The structural component determines the relationship between the latent variables.

Ullman (2006) identified and defined the parts of the measurement model. These identification and definitions are presented below:

1. The measured (observed) variables are the responses on the questionnaire.

2. The latent (unobserved) variables are factors or constructs created by factor analytic methods.

3. Exogenous constructs are those that are independent of the effects from inside the model.

4. Endogenous constructs are dependent on other constructs.

5. Lines with arrows in one direction show a direct relationship between the variables.

In this study, the measurement model revealed important findings about relationships between the variables where PV (red circle), ATT (green circle), and RC (aqua circle) were the latent exogenous constructs, while IU (purple circle) was the latent endogenous construct. PV had a direct relationship with 17 measured variables (red – squares) (Q1 through Q17); ATT had a direct relationship with ten measured variables (green – squares) (Q18 through Q27); RC had a direct relationship with four measured

variables (aqua – squares) (Q28 through Q31); and IU had a direct relationship with four

measured variables (purple squares) (Q32 through Q35). The measurement model with

results is shown in Figure 5.
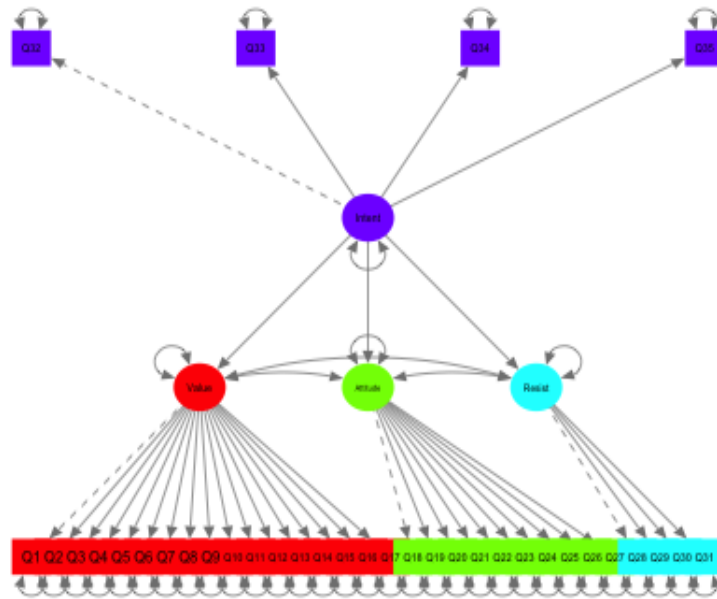
Figure 5. Measurement model

Once the data were screened, reliability and validity of the model structure were

estimated, and related factors identified, the next step was model fit and interpretation.

The objective was to determine whether the associations among measured and latent

variables in the researcher's estimated model adequately reflect the associations observed

in the data (Khine, 2013). According to Kline (2011), a good-enough fit between the

model and the data must reflect appropriate factors such as sample size, the ratio of

indicators to factors, and the overall intricacy of the model.

Considering all indices combined, the final structural equation model was statistically significant and all tests indicate an acceptable model: (1) chi-square fit ($\chi 2$) (554) = 779, p = 0.000; (2) Comparative Fit Index (CFI) = 0.776; (3) the Tucker-Lewis index (TLI) = 0.772; and (4) Root Mean Square Error of Approximation (RMSEA) = 0.079 {95% CI:0.077 to 0.083]. According to Hooper, Coughlan, and Mullen (2008), CFI and TLI values range between 0 -1 with higher values indicating better model fit; and RMSEA below 0.08 shows a good fit (MacCallum, Browne, & Sugawara, 1996).

The R^2 coefficient of determination value for each predictor was as follows: perceived value = 0.562, attitude toward e-learning systems = 0.561, and resistance to change = 0.664. The R^2 coefficient of determination, ranging from 0 – 1, measures how well the regression line is similar to the real data points (Nagelkerke, 1991). The R^2 showed the predicted probability of having an occurrence due to a change in the independent variables (Ferdousi, 2009). The results for perceived value, attitude, and resistance to change significantly predicted intention to use ($p = 0.000$).

According to Hooper et al. (2008), although fit indices are useful guides, a structural model should also be observed with respect to applicable theory. The standardized coefficients for the structured model signified the influences of the independent variables – value, attitude, and resistance – on the dependent variable – intention. Results are displayed in Table 7 and Figure 6.

Table 7

Unstandardized, Standardized, and Significance Levels for Structural Model

I. V.	D. V.	Estimate	Std. Error	*Z-value*	*p-value*	Std. L. V.	Std. All
Intent	Value	0.80	0.09	8.76	0.00	0.75	0.75
Intent	Attitude	0.77	0.08	9.32	0.00	0.75	0.75
Intent	Resistance	0.81	0.09	9.43	0.00	0.82	0.82

Note. I. V. = independent variables, D. V. = dependent variables, L. V. = latent variables, and All = latent and observed variables.
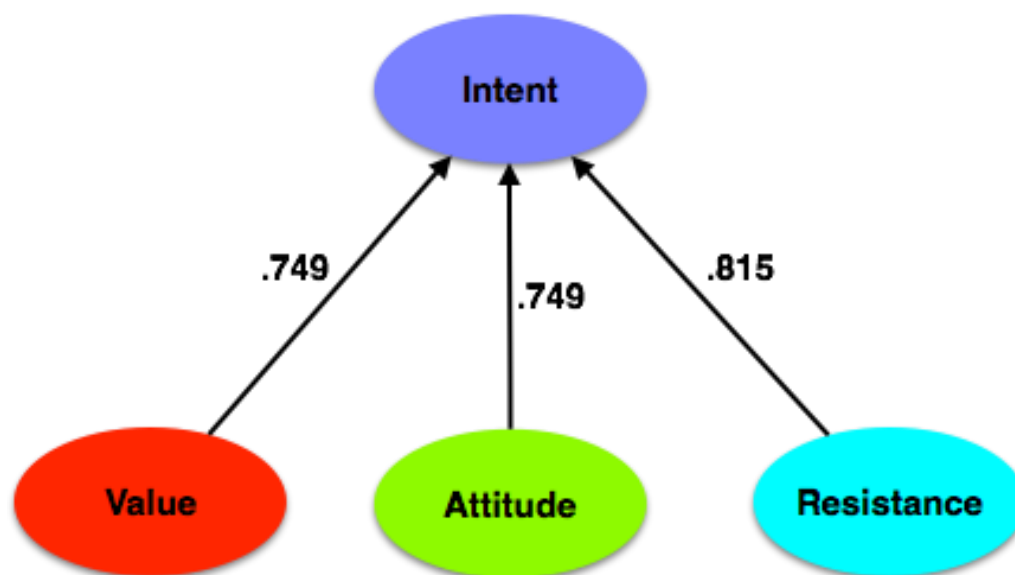
Figure 6. Structural model – standardized coefficients

Descriptive Statistics for Study Variables

Descriptive statistics for study variables include: (1) measures of central tendency (mean and median), (2) measures of dispersion (range, standard deviation, minimum, and maximum), and (3) measures of shape (skewness and kurtosis) (Aaker, Kumar, & Day, 2007). The descriptive statistics for study variables related to perceived value of e-

learning systems are displayed in rows Q1 through Q17 in Table 8. The descriptive statistics for study variables related to attitude of e-learning systems by the respondents are displayed in rows Q18 through Q27 in Table 9. The descriptive statistics for study variables related to resistance to change by the respondents are displayed in rows Q28 through Q31 in Table 10. The descriptive statistics for study variables related to intention to use systems by the respondents are displayed in rows Q32 through Q35 in Table 11.

Perceived Value Statistics

Questions Q1, Q2, Q3, Q4, Q5, Q6, Q7, Q8, Q9, Q10, Q11, Q12, Q13, Q14, Q15, Q16, and Q17 addressed the respondents' PV relating to their use of e-learning systems. The highest average for PV was Q5, Q9, and Q17 (Mean = 3.85), using e-learning systems to make my learning easier is important, using e-learning systems to meet learning objective without difficulty is important, and using e-learning systems is important; and Q14 (Standard deviation [SD] = 1.14), using e-learning systems to have a sense of fun and enjoyment. Based on the data gathered from the survey questions, the respondents revealed how much importance they placed on using e-learning systems. Table 8 summarizes the descriptive statistics for the respondents' responses to PV of e-learning systems.

Table 8

Descriptive Statistics for Perceived Value (N = 318)

Question	Mean	SD	Skew	Kurtosis
Q1	3.63	1.00	-0.43	-0.46
Q2	3.60	0.98	-0.44	-0.29
Q3	3.55	1.01	-0.41	-0.22
Q4	3.58	1.03	-0.46	-0.26
Q5	3.85	0.92	-0.61	0.03
Q6	3.66	0.93	-0.37	-0.08
Q7	3.72	0.95	-0.48	-0.20
Q8	3.60	0.98	-0.57	0.01
Q9	3.85	0.95	-0.63	-0.08
Q10	3.81	0.95	-0.48	-0.16
Q11	3.71	0.99	-0.48	-0.23
Q12	3.60	1.01	-0.47	-0.24
Q13	3.28	1.10	-0.42	-0.43
Q14	3.21	1.14	-0.24	-0.71
Q15	3.53	1.09	-0.42	-0.54
Q16	3.64	1.01	-0.50	-0.32
Q17	3.85	0.96	-0.70	0.32

Note. For all question items, median = 4, minimum = 1, maximum = 5, and range = 4.

Attitude Statistics

Questions Q18, Q19, Q20, Q21, Q22, Q23, Q24, Q25, Q26, and Q27 revealed the respondents' ATT toward e-learning systems. Table 9 shows the descriptive statistics for the respondents' ATT toward e-learning systems. The highest average for ATT was Q22

(Mean = 3.91), using e-learning systems is convenient; and Q27 (SD = 0.99), using e-learning systems is exciting.

Table 9

Descriptive Statistics for Attitude (N = 318)

Question	Mean	SD	Skew	Kurtosis
Q18	3.84	0.85	-0.65	0.39
Q19	3.86	0.91	-0.67	0.07
Q20	3.74	0.92	-0.69	0.29
Q21	3.81	0.93	-0.51	-0.36
Q22	3.91	0.93	-0.66	0.15
Q23	3.51	0.96	-0.31	-0.30
Q24	3.73	0.97	-0.50	-0.10
Q25	3.49	0.94	-0.22	-0.40
Q26	3.45	0.94	-0.35	-0.12
Q27	3.46	0.99	-0.28	-0.41

Note. For all question items, median = 4, minimum = 1, maximum = 5, and range = 4.

Resistance to Change Statistics

Questions Q28, Q29, Q30, and Q31 were related to RNs' RC and e-learning. The respondents' RC were measured when responding to the questions. Table 10 shows the descriptive statistics for the respondents' RC. The highest average for RC was Q28 (Mean = 3.65), I would be enthusiastic about using e-learning systems; and Q31 (SD = 1.02), I would encourage other nurses to use e-learning systems.

Table 10

Descriptive Statistics for Resistance to Change (N = 318)

Question	Mean	SD	Skew	Kurtosis
Q28	3.65	0.86	-0.62	0.24
Q29	3.52	1.01	-0.31	-0.48
Q30	3.53	0.95	-0.37	-0.25
Q31	3.54	1.02	-0.30	-0.55

Note. For all question items, median = 4, minimum = 1, maximum = 5, and range = 4.

Intention to Use Statistics

Questions Q28, Q29, Q30, and Q31, addressed the respondents' IU e-learning systems. Table 11 shows the descriptive statistics for the respondents' IU e-learning systems. The highest average for IU was Q33 (Mean = 3.81), I expect to use e-learning systems in near future; and Q32 (SD = 0.99), I intend to use e-learning systems the next semester.

Table 11

Descriptive Statistics for Intention to Use (N = 318)

Question	Mean	SD	Skew	Kurtosis
Q32	3.59	0.99	-0.70	0.14
Q33	3.81	0.92	-0.69	0.24
Q34	3.67	0.97	-0.63	0.12
Q35	3.61	0.97	-0.32	-0.47

Note. For all question items, median = 4, minimum = 1, maximum = 5, and range = 4.

Summary of Results

This chapter described the data collection and statistical analysis for this study. Data were collected using a web-based survey. The survey instrument was evaluated and proved to have acceptable levels of validity and reliability. A pre-analysis data screening procedure, including validity and reliability, were estimated on PV, ATT, RC, and IU constructs, to address the issues of data accuracy.

Multivariate analysis was conducted using SEM and robust standard errors with the Satorra-Bentler adjustment (Satorra & Bentler, 1988) to answer the research questions in this study. Overall, the predictive power and significance of the measures of SEM appeared valid. Results from SEM indicated that all three independent variables PV, ATT, and RC had a significant effect on dependent variable IU.

Chapter 5

Conclusions, Implications, Recommendations, and Summary

This chapter provides an overview and synthesis of the report's findings, implications, and future directions. The chapter initially presents conclusions derived from an analysis of the results in this study. Next, the strengths, weaknesses, and limitations of the study are explained. The effects of the study, as well as its impacts on the knowledge and professional practice of RNs, are discussed. The chapter concludes with recommendations, proposals for changes in future research, and a summary of the overall study.

Conclusions

The goal of this study was to investigate factors that influence RNs' intentions to use e-learning systems for completing higher degrees in nursing. The population for this study was approximately 1,500 nurses at two public hospitals in South Florida. Three hundred and twenty-three nurses responded, and the sample was judged to be representative of the population. The research questions that guided the study – and the accompanying conclusions for each question – are provided below.

1. To what extent does perceived value affect RNs' intentions to use e-learning systems in completing higher degrees in nursing?

A significant association was found between perceived value and intentions to use e-learning systems ($p < 0.05$)—Table 7 and Figure 6. If a nurse's perceived value score were increased by one standard deviation, a related intention to use an e-learning system in completing higher degrees in nursing would increase by 0.75. This suggests an impactful association between perceived values and intention to use.

This result was consistent with findings from a study completed by Kim, Kim, and Wachter (2013), which revealed that users' perceived value influenced their continued engagement intention more significantly than users' current satisfaction or motivation. Kim et al. (2013) inferred that smartphone companies should provide employees with more information or educational sessions on the value of smartphones. Similarly, hospitals need to provide RNs with education on the value of e-learning education.

2. To what extent does attitude toward e-learning systems affect RNs' intentions to use e-learning systems to complete higher degrees in nursing?

A significant association was found between attitude toward e-learning systems and intentions to use e-learning systems ($p < 0.05$)—Table 7 and Figure 6. If a nurse's attitude toward e-learning systems score were increased by one standard deviation, a related intention to use an e-learning system in completing higher degrees in nursing would increase by 0.75. This suggests an impactful association between attitude toward e-learning systems and intention to use.

In this study, attitude toward the use of e-learning systems refers to nurses' positive or negative feelings or thoughts about using e-learning systems. The findings of

this study showed that registered nurses have a positive attitude towards using e-learning overall. However, the results of this study were inconsistent with the findings of previous studies. Specifically, Alrehaili's (2013) findings revealed that the students' attitudes toward online education were neutral. Also, after completing a study with health professionals using EHRs, Styron's (2013) findings revealed that the nurses have a negative attitude when learning how to use the EHR system. Styron concluded that health professionals' negative experiences with technology might alter their attitudes toward adopting and utilizing other technologies. Furthermore, already overworked nurses may view using technology as additional responsibilities inserted into their current workload (Styron, 2013).

3. To what extent does resistance to change affect RNs' intentions to use e-learning systems in completing higher degrees in nursing?

A significant association was found between resistance to change and intentions to use e-learning systems ($p < 0.05$) in Table 7 and Figure 6. If a nurse's resistance to change score were decreased by one standard deviation, a related intention to use an e-learning system in completing higher degrees in nursing would increase by 0.82. This suggests an impactful association between resistance to change and intention to use.

In line with previous work, such as that of Huang (2015), this study finding suggests that there is a relationship between resistance to change and behavioral intention. Consistent with prior research, resistance to change was found to be a strong predictor of behavioral intention (Dominguez, Galán-González, & Barroso, 2015). Research completed in the retail field by Dominguez et al. (2015) examined employees'

resistance to change and the effect on sales. According to Dominguez et al. (2015), sales increased because of the expectations created by the change, but this improvement must be sustained.

Strengths

This study makes several contributions to the literature on technology acceptance and the professional practice of nursing. These contributions include:

1. Empirically estimating the validity of a theoretical model for predicting e-learning acceptance in nursing education.

2. Identifying aspects of PV, ATT, and RC as factors influencing e-learning acceptance.

3. Supplementing previous investigations of education in the nursing profession by exploring recommendations in prior research.

4. Facilitating a deeper understanding of nurses' e-learning acceptance.

5. Enhancing nurses' exposure to the concept of e-learning.

6. Educating nurses on the ongoing research taking place in e-learning within nursing education.

7. Suggesting directions for future research on other factors that may affect nurses' intentions to use e-learning.

8. Informing nursing institutional leaders about factors affecting nursing education.

Results from this study revealed that PV, ATT, and RC may have effects on nurses' intentions to use e-learning. In addition, RNs had a positive outlook regarding the use of e-learning systems.

Weaknesses

Based on the shortage of nurses, the participants should have been given a longer time to complete the survey. In the interest of time, this could not be done. It was assumed that at least 50% of the RNs would answer the survey questions because they were informed that their anonymity and confidentiality would be preserved. Furthermore, the researcher assumed that the RNs would be very interested in completing the survey as a contribution to the education of nurses. The RNs' responses were lower than expected. Nevertheless, the data were sufficient to complete the analysis.

Limitations

There were two limitations in this study. First, the present study was conducted at two hospitals in South Florida. As aforementioned, the initial generalizability of this study may be limited to the two hospitals. However, research suggestions were discussed that allowed for extrapolating from this sample to other RN populations in terms of studying variables that may affect RNs intention to use e-learning in other organizations.

A second limitation was the method used to distribute the survey instrument. A link to the survey was sent to the emails of the RNs by their supervisors asking them to take part in this study. Any RN who believed that the results would be shared with the administration may not have responded or may have responded with a positive bias, thereby skewing the results. However, it was indicated in the survey participation letter that the participants' responses would be confidential and would not affect their employment.

Implications

This study investigated the effects of perceived value, attitude, and resistance to change on RNs' intentions to use e-learning systems in completing higher degrees in nursing. One of the major contributions of this study is to present the findings and how they can influence positive changes in nursing education. Overall, this study revealed both positive and negative responses related to the perceived value, attitude, and resistance to change of RNs' intention to use e-learning systems.

The nurses surveyed in the current study identified the importance of using e-learning systems in completing higher degrees in nursing. After the data preparation, each question or item in the questionnaire was analyzed by tabulating the data. Aaker et al. (2007) described the use of frequency tables and tabulation. Tabulation consists of counting the number of cases that fall into the various categories. Tabulation involves determining the frequency distribution of the variable in question and calculating the descriptive statistics, mainly the mean or percentages. A frequency distribution identifies the number of responses for each question, to determine the distribution of each variable. The frequency organizes data into groups of values to demonstrate the number of observations from the data set that falls into each group. Appendix K illustrates the frequency distribution for the questions from this study, the number of RNs in each response category, and the percentage breakdown of the various categories. Overall, the appendix illustrates the reaction of RNs in this study to the use of e-learning systems. The following sections identified the response frequency for the study variables.

1. Questions Q1 through Q17 show the number of occurrences of each response chosen by the respondents to the questions relating to perceived value of e-learning systems.

2. Questions Q18 through Q27 show the number of occurrences of each response chosen by the respondents to the questions relating to attitude toward e-learning systems by the respondents.

3. Questions Q28 through Q31 show the number of occurrences of each response chosen by the respondents relating to the questions on resistance to change by the respondents.

4. Questions Q32 through Q35 show the number of occurrences of each response chosen by the respondents relating to the questions on intention to use by the respondents.

The response options for the survey items assessing RNs' perceived value of e-learning systems were each assigned a numerical value: any selection of "Very Important" was given a score of 5, any selection of "Slightly Important" was given and score of 4, any selection of "Important" was given a score of 3, any selection of "Not So Important" was given a score of 2, and any selection of "Not Important" was given a score of 1. Overall, 43.7% (n = 139) of respondents chose option "Important" in using e-learning systems to make their learning easier. PV items means ranged from 3.21 to 3.85. The scale frequency distributions for perceived value are presented in Table 12.

Table 12

Response Frequency for Perceived Value (N = 318)

Question	Very Important (5)	Important (4)	Slightly Important (3)	Not So Important (2)	Not Important (1)
Q1	63 (19.8%)	127 (39.9%)	81 (25.5%)	41 (12.9%)	6 (1.9%)
Q2	56 (17.6%)	130 (40.9%)	88 (27.7%)	37 (11.6%)	7 (2.2%)
Q3	57 (17.9%)	115 (36.2%)	103 (32.4%)	32 (10.1%)	11 (3.5%)
Q4	62 (19.5%)	117 (36.8%)	95 (29.9%)	33 (10.4%)	11 (3.5%)
Q5	80 (25.2%)	139 (43.7%)	73 (23.0%)	22 (6.9%)	4 (1.3%)
Q6	60 (18.9%)	123 (38.7%)	107 (33.6%)	22 (6.9%)	6 (1.9%)
Q7	68 (21.4%)	131 (41.2%)	86 (27.0%)	28 (8.8%)	5 (1.6%)
Q8	53 (16.7%)	137 (43.1%)	87 (27.4%)	31 (9.7%)	10 (3.1%)
Q9	84 (26.4%)	136 (42.8%)	68 (21.4%)	26 (8.2%)	4 (1.3%)
Q10	83 (26.1%)	120 (37.7%)	91 (28.6%)	19 (6.0%)	5 (1.6%)
Q11	74 (23.3%)	119 (37.4%)	91 (28.6%)	27 (8.5%)	7 (2.2%)
Q12	62 (19.5%)	121 (38.1%)	92 (28.9%)	33 (10.4%)	10 (3.1%)
Q13	38 (11.9%)	109 (34.3%)	103 (32.4%)	41 (12.9%)	27 (8.5%)
Q14	41 (12.9%)	96 (30.2%)	97 (30.5%)	57 (17.9%)	27 (8.5%)
Q15	64 (20.1%)	111 (34.9%)	85 (26.7%)	44 (13.8%)	14 (4.4%)
Q16	65 (20.4%)	127 (39.9%)	81 (25.5%)	37 (11.6%)	8 (2.5%)
Q17	86 (27.0%)	128 (40.3%)	81 (25.5%)	15 (4.7%)	8 (2.5%)

The response options for the survey items assessing RNs attitude toward e-learning systems were each assigned a numerical value: any selection of "Strongly Agree" was given a score of 5, any selection of "Agree" was given and score of 4, any selection of "Neither Disagree Nor Agree Disagree" was given a score of 3, any selection of "Disagree" was given a score of 2, and any selection of "Strongly Disagree" was given

a score of 1 (See Table 13). Overall, 50.9% (n = 162) of respondents chose options of "Agree" indicating that many RNs had a positive attitude toward using e-learning systems. ATT items means ranged from 3.45 to 3.91.

Table 13

Response Frequency for Attitude (N = 318)

Question	Strongly Agree (5)	Agree (4)	Neither Agree nor Disagree (3)	Disagree (2)	Strongly Disagree (1)
Q18	65 (20.4%)	162 (50.9%)	68 (21.4%)	20 (6.3%)	3 (0.9%)
Q19	77 (24.2%)	151 (47.5%)	60 (18.9%)	27 (8.5%)	3 (0.9%)
Q20	59 (18.6%)	156 (49.1%)	70 (22.0%)	27 (8.5%)	6 (1.9%)
Q21	78 (24.5%)	137 (43.1%)	71 (22.3%)	30 (9.4%)	2 (0.6%)
Q22	94 (29.6%)	128 (40.3%)	75 (23.6%)	16 (5.0%)	5 (1.6%)
Q23	46 (14.5%)	121 (38.1%)	106 (33.3%)	38 (11.9%)	7 (2.2%)
Q24	74 (23.3%)	122 (38.4%)	92 (28.9%)	23 (7.2%)	7 (2.2%)
Q25	44 (13.8%)	119 (37.4%)	110 (34.6%)	40 (12.6%)	5 (1.6%)
Q26	38 (11.9%)	122 (38.4%)	113 (35.5%)	36 (11.3%)	9 (2.8%)
Q27	47 (14.8%)	113 (35.5%)	106 (33.3%)	43 (13.5%)	9 (2.8%)

The response options for the survey items assessing RNs' resistance to change, were each assigned a numerical value: any selection of "Very Likely" was given a score of 5, any selection of "Likely" was given and score of 4, any selection of "Neither Unlikely Nor Likely" was given a score of 3, any selection of "Unlikely" was given a score of 2, and any selection of "Very Unlikely" was given a score of 1 (See Table 14). Several respondents were enthusiastic about using e-learning systems (*n* = 166) (52.2%). RC items means ranged from 3.52 to 3.65.

Table 14

Response Frequency for Resistance to Change (N = 318)

Question	Very Likely (5)	Likely (4)	Neither Likely nor Unlikely (3)	Unlikely (2)	Very Unlikely (1)
Q28	39 (12.3%)	166 (52.2%)	79 (24.8%)	30 (9.4%)	4 (1.3%)
Q29	54 (17.0%)	115 (36.2%)	98 (30.8%)	43 (13.5%)	8 (2.5%)
Q30	46 (14.5%)	127 (39.9%)	101 (31.8%)	37 (11.6%)	7 (2.2%)
Q31	60 (18.9%)	110 (34.6%)	97 (30.5%)	43 (13.5%)	8 (2.5%)

The response options for the survey items assessing RNs' intention to use e-learning systems, were each assigned a numerical value: any selection of "Very Likely" was given a score of 5, any selection of "Likely" was given and score of 4, any selection of "Neither Unlikely Nor Likely" was given a score of 3, any selection of "Unlikely" was given a score of 2, and any selection of "Very Unlikely" was given a score of 1 (See Table 15). Overall, 151 (47.5%) respondents chose options of "Likely" indicating that many RNs are likely to use e-learning systems. IU items means ranged from 3.59 to 3.61.

Table 15

Response Frequency for Intention to Use (N = 318)

Question	Very Likely (5)	Likely (4)	Neither Likely nor Unlikely (3)	Unlikely (2)	Very Unlikely (1)
Q32	47 (14.8%)	150 (47.2%)	76 (23.9%)	33 (10.4%)	12 (3.8%)
Q33	70 (22.0%)	151 (47.5%)	67 (21.1%)	25 (7.9%)	5 (1.6%)
Q34	59 (18.6%)	141 (44.3%)	81 (25.5%)	28 (8.8%)	9 (2.8%)
Q35	61 (19.2%)	119 (37.4%)	97 (30.5%)	36 (11.3%)	5 (1.6%)

RNs' responses to the perceived value revealed that overall e-learning systems made learning easier, enabled them to learn quickly, and gave them a sense of accomplishment and independence. RNs' highest response to perceived value identified e-learning systems as being important in making their learning easier (43.7%). However, pursuing fun and enjoyment were not important reasons to RNs to use e-learning systems (30.2%).

One-half of all participants indicated that e-learning was a good idea (50.9%), but only one-third thought it was exciting (35.5%). According to Luskin (2010), the "e" in e-learning means "exciting, energetic, engaging, extended" learning. It is important that e-learning is exciting to nurses, since it is the excitement of the "e" that drives changes and stimulates behavior (Luskin, 2010). To improve the excitement in e-learning, theories of motivation, success, intelligence, mastery, psycho-visualization, believability, color, sound, cognition, repetition and attention, personality, semantics, persuasion, and control should be included in the development e-learning systems (Luskin, 2010). Schlag (2001) discussed using e-learning as an exciting way to prepare for changes in organizations. The author identified some stimulating ways to deploy e-learning to support organizations preparing for changes. These ways include the following:

- Allowing the quick publishing and re-purposing of existing content forms, including Word and PowerPoint.

- Supporting the next-generation, web-development, and publishing tools, including Flash, Director, Shockwave.

- Permitting employees to share and publish their knowledge and skills for the advancement of the entire team.

The responses to the resistance to change revealed that one-half of all participants were enthusiastic about using e-learning systems (52.2%). Likewise, responses to intention to use revealed that nearly one-half (47.5%) of all participants expect to use e-learning in the near future. Approximately one-third of all participants revealed that they were likely to try to convince other nurses of the advantage of using e-learning systems (36.2%) and encourage them to use e-learning systems (34.6%). Enterprise Training Solutions (2016) identified methods to convince and encourage nurses to use e-learning. These methods include:

- Developing short messages designed to inform and remind others about e-learning availability.
- Creating an advertisement on e-learning that appears to be a news story.
- Creating quick presentations to deliver at business meetings or conferences.
- Using opportunities such as organizational conferences, functions, and parties to promote e-learning.
- Promoting e-learning to individual groups such as workshops and Internet groups.

Administrators, educators, and designers of e-learning systems should explore RNs concerns in more detail, to increase their use of e-learning systems in the future. In addition, the strategies learned from increasing nurses' use of e-learning systems could assist nurse educators in designing and implementing appropriate tools to assist RNs in using other educational technologies.

Recommendations

This research focused on nurses and their intentions to use e-learning systems in completing higher degrees in nursing. Thus, future research should explore e-learning acceptance at other levels of education. Additionally, this study concentrated on resistance to change affecting e-learning acceptance in nursing education. However, there is also a need for greater understanding of changes in nurses' educational, professional, and organizational practice, procedures, and behavior due to information technology.

Future studies should include variations in the research approach. Specifically, the current study used a cross-sectional research design, whereas a longitudinal study would have provided information over a period. Also, a longitudinal study would provide a more thorough understanding of the factors affecting the actual use of e-learning.

The significance of the study could also be strengthened by increasing the number of participants. Although the sample size is within the minimum range for SEM, increasing the sample size would provide more credibility to the conclusions. As a result, administrators may use this study as a model for understanding what affects RNs' intentions to use e-learning.

Enabling nurses to use information technology seamlessly to provide safer, higher-quality patient care (IOM, 2011) "will require action on the part of many stakeholders, including professional organizations, academic institutions, government and policy makers, vendors, healthcare delivery organizations, health information management professionals, and librarians" (TIGER, 2007, p. 10). The following are

specific action plans for nursing organizations in adopting technology in nursing education (TIGER, 2007). These plans include:

- Sharing the vision and action plan with their stakeholders and integrating the goals into their organizational strategic plans.

- Establishing relationships, such as resource groups of experts and creating networks and special-interest groups.

- Creating educational resources and affordable programs for IT innovation and adoption.

- Developing programs for nurse administrators and educators that stress the value of information technology and empower them to use IT skillfully.

- Highlighting IT capabilities at national conferences and workshops.

- Promoting and presenting case studies and best practices in health journals, publications, newsletters, websites, and national and local meetings.

- Developing strategies and guidelines for nurses making the transition to evidence-based protocols for decision making in practice.

- Exploring the possibility of adding IT skills and knowledge to the organization's nursing certification.

This study focused on e-learning, but there is also a need for studies focusing on alternative technologies being used in education. Specifically, studies should focus on information technology strategies within nursing education. Leaders initiating changes in nursing education can apply similar techniques in implementing new technology in their institutions.

Summary

This study is intended to provide a research-based approach to address the need for the nursing workforce to become more educated as a means of improving the safety and efficiency of patient care (FNCA, 2014; HRSA, 2014b; NLN, 2013). Prior studies acknowledged that the shortage of baccalaureate and graduate-prepared RNs in the U.S. is an impediment to advancing the nursing profession, as well as improving the delivery of patient care (AACN, 2014; IOM, 2011; Robert Wood Johnson Foundation, 2013).

Several nursing organizations have suggested that e-learning may play an important role in nursing education (Fang et al., 2013; NACNEP, 2013; Romero, 2012), but there are factors that affect nurses' acceptance of e-learning systems. The technology acceptance model (TAM) theory – developed by Davis in 1989 – is frequently used to investigate IT acceptance. Further studies, including the present work, extended the original TAM to investigate the impact of other constructs and developed research models to determine users' acceptance of various technological offerings (Hashim, 2011; Šumak et al., 2011).

Some of the factors that affect nurses' acceptance of IT include students' perceived value of e-learning (Allen & Seaman, 2013; Chang, 2013), attitude toward e-learning systems (Lina et al., 2011; Yoo & Han, 2013), and resistance to change (Naccarato, 2013). Consequently, a Conceptual Research Diagram: Perceived Value (PV), Attitude toward E-Learning Systems (ATT), Resistance to Change (RC), was designed to analyze the effect on Intentions to Use E-Learning Systems (IU) in completing higher degrees in nursing. Therefore, there were three independent variables in this study namely, PV, ATT, and RC, and the independent variable was IU.

The main goal of the current study was to assess the effect of registered nurses' perceived value, attitude, and resistance to change on their intention to use e-learning systems for continuing formal education. To that end, the study addressed the following three research questions:

1. To what extent does perceived value affect nurses' intention to use e-learning systems in completing higher degrees in nursing?

2. To what extent does attitude toward e-learning systems affect nurses' intention to use e-learning systems in completing higher degrees in nursing?

3. To what extent does resistance to change affect nurses' intention to use e-learning systems in completing higher degrees in nursing?

A 35-item survey was distributed to nurses in two hospitals in South Florida. To answer the research questions, the items included 17 questions on RNs' perceived value, 10 on attitude, four on resistance to change, and four on intention to use. Demographics included questions on RNs' age, gender, race, and educational level. A comparison of the study demographics of the RNs in South Florida indicated that respondents were representative of the population.

Before testing the relationships in the structural model, levels of reliability and validity for the measurement model were estimated. Specifically, in this study, the context and internal consistency reliability of the instrument were each estimated (Marrs, 2013; Rahman, 2015). To ensure content validity, a previously validated instrument was utilized in this study. The instrument was evaluated by experts in nursing, education, and technology. A pilot study competed by RN volunteers at the research site indicated no functionality issues. The results revealed that the survey did not require any

modifications. Comparisons between study demographics and those from South Florida

established external validity. Construct validity was estimated using exploratory

paralleled factor analysis. The PV, ATT, RC, and IU scales were estimated to have

attained Cronbach's α reliability.

A total of 323 nurses in the two hospitals in South Florida completed the survey

and problems with the data were addressed. Descriptive statistics were calculated for

each study dimension. Multivariate normality was examined using the study dataset.

Testing of multivariate assumptions was performed using Mardia's coefficient and

revealed non-normal multivariate data. Therefore, the structural equation was modeled

using robust standard errors with the Satorra-Bentler adjustment (Satorra & Bentler,

1988).

SEM was used in the analysis approach, since it is a more powerful alternative to

multiple regressions. SEM includes both a measurement and structural model. Results in

SEM analysis demonstrated the effect of the three aforementioned independent variables

PV, ATT, and RC, on the dependent variable IU. Additionally, results showed overall

that each of the independent variables was a significant predictor of nurses' intention to

use e-learning systems.

Conclusions were drawn and related the study findings to positive changes in

nursing education. Implications for nursing education using technology were then

discussed. Finally, recommendations were made for future research focusing on other

factors that may affect registered nurses' intention to use e-learning systems and other

technologies to improve their education.

Appendix A

Permission to Use Figures

From Anoweck, Kimberly kimberly.anoweck@informs.orghide details
To pgl2885 pgl2885@aol.com

Dear Pauline,

Permission is granted to use the following material in your dissertation at no charge:

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Appendix B

Letter of Support - #1 Hospital

<u>Department Letter of Support for Research Purposes</u>

Name of Principal Investigator Pauline Little PhD candidate

Name of BH employee authorized to support this project Robyn Farrington CNO

Name of department where research will be conducted Nursing - surveymonkey survey

Research Title An Investigation of Factors that Influence Registered Nurses' Intentions to Use E-Learning Systems in Completing Higher Degrees in Nursing

RE: Letter of Support

___

I have reviewed and support the above referenced research project. I understand that the researcher will be conducting activities that may involve using resources from this department to conduct research.

I will assist the researcher in his/her oversight of activities by ensuring this research is carried out following ethical principles. If participants are being recruited they will be made aware that involvement in this research study is strictly voluntary and provides a mechanism to ensure confidentiality of research data, as described in the protocol.

Therefore, as a representative of Broward Health, I agree that this research project may be conducted at the above referenced department.

Name removed

Appendix C

Letter of Support - #2 Hospital

Department Letter of Support for Research Purposes

Name of Principal Investigator Pauline Little PhD candidate

Name of Principal Investigator Pauline Little, R.N., M.A., Ed.S.

Name of ▓▓ employee authorized to support this project ▓▓▓▓▓▓▓▓▓

CNO

Name of department where research will be conducted Nursing - surveymonkey survey

Research Title An Investigation of Factors that Influence Registered Nurses' Intentions to Use E-Learning Systems in Completing Higher Degrees in Nursing

RE: Letter of Support

I have reviewed and support the above referenced research project. I understand that the researcher will be conducting activities that may involve using resources from this department to conduct research.

I will assist the researcher in his/her oversight of activities by ensuring this research is carried out following ethical principles. If participants are being recruited they will be made aware that involvement in this research study is strictly voluntary and provides a mechanism to ensure confidentiality of research data, as described in the protocol.

Therefore, as a representative of ▓▓▓▓▓▓▓▓▓, I agree that this research project may be conducted at the above referenced department.

Print name of ▓▓ authorized employee   date

Signature of ▓▓ authorized employee

11-12-15

Appendix D

Nova Southeastern University IRB Approval

MEMORANDUM

To: Pauline Little

From: Ling Wang, Ph.D.
Institutional Review Board

**NOVA SOUTHEASTERN
UNIVERSITY**
Office of Grants and Contracts
Institutional Review Board _____**Date:**Oct.
14, 2015

Re:*An Investigation of Factors that Influence Registered Nurses' Intentions to Use E-Learning Systems in Completing Higher Degrees in Nursing*

IRB Approval Number: wang10151501

I have reviewed the above-referenced research protocol at the center level. Based on the information provided, I have determined that this study is exempt from further IRB review. You may proceed with your study as described to the IRB. As principal investigator, you must adhere to the following requirements:

1) CONSENT: If recruitment procedures include consent forms these must be obtained in such a manner that they are clearly understood by the subjects and the process affords subjects the opportunity to ask questions, obtain detailed answers from those directly involved in the research, and have sufficient time to consider their participation after they have been provided this information. The subjects must be given a copy of the signed consent document, and a copy must be placed in a secure file separate from de-identified participant information. Record of informed consent must be retained for a minimum of three years from the conclusion of the study.

2) ADVERSE REACTIONS: The principal investigator is required to notify the IRB chair and me (954-262-5369 and 954-262-2020 respectively) of any adverse reactions or unanticipated events that may develop as a result of this study. Reactions or events may include, but are not limited to, injury, depression as a result of participation in the study, life-threatening situation, death, or loss of

confidentiality/anonymity of subject. Approval may be withdrawn if the problem is serious.

3)	AMENDMENTS: Any changes in the study (e.g., procedures, number or types of subjects, consent forms, investigators, etc.) must be approved by the IRB prior to implementation. Please be advised that changes in a study may require further review depending on the nature of the change. Please contact me with any questions regarding amendments or changes to your study.

The NSU IRB is in compliance with the requirements for the protection of human subjects prescribed in Part 46 of Title 45 of the Code of Federal Regulations (45 CFR 46) revised June 18, 1991.

Cc:Protocol File

3301 College Avenue • Fort Lauderdale, FL 33314-7796 • (954) 262-5369
Fax: (954) 262-3977 • Email: inga@nsu.nova.edu • Web site: www.nova.edu/cwis/ogc

Appendix E

IRB Approval - #1 Hospital

January 14, 2016

Pauline G. Little
10550 NW 29th court
Coral springs FL 33065

Re: Follow Meeting Date: 12/9/2015

RECORD NUMBER 2015-52 **DOCUMENT NUMBER** 6114

**Protocol Title: An Investigation of Factors that Influence Registered Nurses'
Intentions to Use e-Learning Systems in Completing Higher Degrees in Nursing.
Dated 03/13. Protocol Type:** SBR

Approved 12/9/2015 **Expires** 12/8/2016

Dear Ms. Pauline Little:

This letter is to advise you that the above referenced study has been presented to
Institutional Review Board for initial review. Modifications
were approved as requested by the board. The following action(s) taken are
subject to the conditions and explanation provided below.

Sponsor: Nova Southeastern University**Research Site**
Reason 1: Follow-Up to Initial Review
Description: *NSU IRB approval letter dated 10/14/15
             * letters of support
             *Initial review application
             *Informed consent waiver request dated 11/16/15
             ***Revised protocol dated 11/16/15**
             ***Service authorization (approved for Only)**
             ***Announcement letter**
             ***Participation letter**
**IRB
ACTION: Approved - Modifications approved as requested by the board**

       Max number of subjects allowed 1500 **Current Enrollment:** 0 **Status:**
       Open enrollment

*PLEASE NOTE: Approved to conduct research at ████████████ Only.

Risk Assessment: The IRB has determined this research satisfies the requirement of (45 CFR 46.404 and 50 CFR 51). The IRB find and document this research involves no more than minimal risk to subjects, and waiver or alteration will not adversely affect the rights and welfare of the subjects, and the research could not practicably be carried out without the waiver or alteration informed consent (46.102(h)(i). Risks to subjects are reasonable in relation to the anticipated benefits and selection of subjects is equitable. This project includes written assurance that Protected Health Information will not be re-used or disclosed to any other entity outside ████████████ Institution for any purpose other than approved by the IRB as required by law. Informed consent and PHI waiver is granted for this project.

All research activities including data collection is prohibited after study expiration 12/8/2016 unless continued renewal is granted by the IRB.

It is the responsibility of the principal investigator to communicate protocol progress, closures, and/or terminations in accordance with the Code of Federal Regulations. The information contained herein is true and correct as reflected in the records of ████████████ Institutional Review Board (IRB). This institutional review board operates in accordance with the Office of Human Research Protections and Good Clinical Practices (GCP) under the U.S. Food and Drug Administration (FDA) regulations.

Sincerely,

████████████, MBA, CIM, CIP
Institutional Review Board Manager ████████████

Appendix F

IRB Approval - #2 Hospital

January 19, 2016

Pauline G. Little
10550 NW 29th court
Coral springs FL 33065

Meeting Date: 2/10/2016

RECORD NUMBER: 2015-52 **DOCUMENT NUMBER:** 6192

Protocol Title: An Investigation of Factors that Influence Registered Nurses' Intentions to Use e-Learning Systems in Completing Higher Degrees in Nursing. Dated 03/13.

Protocol Type: SBR

Study Status: Open enrollment **Study Expiration:** 12/8/2016

Dear Ms. Little:

This letter is to advise you that the above referenced study has been presented to Broward Health's Institutional Review Board and the following action taken subject to the conditions and explanations provided below.

Sponsor: Nova Southeastern University **Research Site(s):** BHN / BH North

On Agenda For: Expedited

Reason 1: Request Site Addition

Description: *Add research site BH North

IRB ACTION: Approved

      Risk Assessment: The IRB has determined this research satisfies the requirement of (45 CFR 46.404 and 50 CFR 51). The IRB find and document this research involves no more than minimal risk to subjects, and waiver or alteration will not adversely affect the rights and welfare of the subjects, and the research could not practically be carried out without the waiver or alteration informed consent (46.102(h)(i). Risks to subjects are reasonable in relation to the

anticipated benefits and selection of subjects is equitable. This project includes written assurance that Protected Health Information will not be re-used or disclosed to any other entity outside Broward Health's Institution for any purpose other than approved by the IRB as required by law. Informed consent and PHI waiver is granted for this project.

All research activities including data collection is prohibited after study expiration 12/8/2016 unless continued renewal is granted by the IRB.

It is the responsibility of the principal investigator to communicate protocol progress, closures, and/or terminations in accordance with the Code of Federal Regulations. The information contained herein is true and correct as reflected in the records of Broward Health Institutional Review Board (IRB). This institutional review board operates in accordance with the Office of Human Research Protections and Good Clinical Practices (GCP) under the U.S. Food and Drug Administration (FDA) regulations.

Sincerely,

Robin M. Smith, MBA, CIM, CIP
Institutional Review Board Manager FWA00001243

Appendix G

Permission to Use Survey Instrument

From: Eli Cohen Inform@Sonic.net
To: Pauline Little;
Wed 10/21/2015 12:48 PM
Inbox

Pauline,
Yes, of course you may use the instrument, so long as you properly cite its
source. The journal is meant to help science flourish, not to make profit
from the research of others.

-eli
Prof. dr Eli COHEN
Executive Director, Informing Science Institute

From: Pauline Little
To: Publisher@InformingScience.org;
Wed 10/21/2015 4:23 AM
Hello Publisher,

I am a student at Nova Southeastern University engaged in research for the purpose of
satisfying a requirement for a Doctor of Philosophy in Computing Technology in
Education. The purpose of my study is to assess perceived value, attitude, and resistance
to change on RNs' intentions to use e-learning systems in completing higher degrees in
nursing.

I would like permission to use the Survey Instrument - presented by Bilquis Ferdousi and
Yair Levy in the Development and Validation of a Model to Investigate the Impact of
Individual Factors on Instructors' Intention to Use E-learning Systems (Interdisciplinary
Journal of E-Learning and Learning Objects, Volume 6, 2010 -
 http://www.ijello.org/Volume6/IJELLOv6p001-021Ferdousi680.pdf) – with minor
modification relating to nursing.

Thank you.
Pauline Little

Appendix H

Questionnaire

Registered Nurses and Intention to Use E-learning Systems

1.

Please click the "DONE" button when finished!

1. The following is a list of statements related to your intended use of e-learning systems in completing higher degrees in nursing and/or completing continuing education courses in nursing. Please read each item and rate the level of importance you attribute to each statement from: (1) 'Not Important' to (5) 'Very Important'.

	Not Important	Not So Important	Slightly Important	Important	Very Important
Using e-learning systems to enable me to learn quickly is...	○	○	○	○	○
Using e-learning systems to improve my performance is...	○	○	○	○	○
Using e-learning systems to increase my productivity is...	○	○	○	○	○
Using e-learning systems to enhance my effectiveness is...	○	○	○	○	○
Using e-learning systems to make my learning easier is...	○	○	○	○	○
Using e-learning systems to improve my quality is...	○	○	○	○	○
Using e-learning systems to perform my task efficiently is...	○	○	○	○	○
Using e-learning systems to be advantageous to my learning is...	○	○	○	○	○

Using e-learning systems to meet learning objective without difficulty is...	○	○	○	○	○
Using e-learning systems to have greater control over my learning is...	○	○	○	○	○
Using e-learning systems to have a sense of accomplishment is...	○	○	○	○	○
Using e-learning systems to have a sense of self-fulfillment is...	○	○	○	○	○
Using e-learning systems to have a sense of following the trend is...	○	○	○	○	○
Using e-learning systems to have a sense of fun and enjoyment is...	○	○	○	○	○
Using e-learning systems to have a sense of intelligence is...	○	○	○	○	○
Using e-learning systems to have a sense of independence is...	○	○	○	○	○
Overall, using e-learning systems is...	○	○	○	○	○

2. The following is a list of statements related to your intended use of e-learning systems in completing higher degrees in nursing and/or completing continuing education courses in nursing. Please read each item and rate the level of agreement you attribute to each statement from: (1) 'Strongly Disagree' to (5) 'Strongly Agree'.

	Strongly Disagree	Disagree	Neither Disagree Nor Agree	Agree	Strongly Agree
Using e-learning systems is a good idea.	○	○	○	○	○

Using e-learning systems is beneficial.	○	○	○	○	○
Using e-learning systems is advantageous.	○	○	○	○	○
Using e-learning systems is a positive step toward learning.	○	○	○	○	○
Using e-learning systems is convenient.	○	○	○	○	○
Using e-learning systems is pleasant.	○	○	○	○	○
I like to use e-learning systems.	○	○	○	○	○
E-learning systems provide an attractive learning environment.	○	○	○	○	○
Using e-learning systems is enjoyable.	○	○	○	○	○
Using e-learning systems is exciting.	○	○	○	○	○

3. The following is a list of statements related to your intended use of e-learning systems in completing higher degrees in nursing and/or completing continuing education courses in nursing. Please read each item and rate the level of likelihood you attribute to each statement from: (1) 'Very Unlikely' to (5) 'Very Likely'.

	Very Unlikely	Unlikely	Neither Unlikely Nor Likely	Likely	Very Likely
I would be enthusiastic about using e-learning systems.	○	○	○	○	○
I would try to convince other nurses of the advantage of using e-learning systems.	○	○	○	○	○

I would do much more of what is required for me to help my co-workers to use e-learning systems.	○	○	○	○	○
I would encourage other nurses to use e-learning systems.	○	○	○	○	○

4. The following is a list of statements related to your intended use of e-learning systems in completing higher degrees in nursing and/or completing continuing education courses in nursing. Please read each item and rate the level of likelihood you attribute to each statement from: (1) 'Very Unlikely' to (5) 'Very Likely'.

	Very Unlikely	Unlikely	Neither Unlikely Nor Likely	Likely	Very Likely
I intend to use e-learning systems the next semester.	○	○	○	○	○
I expect to use e-learning systems in near future.	○	○	○	○	○
I intend to use e-learning systems frequently.	○	○	○	○	○
I intend to use e-learning systems whenever the systems are available.	○	○	○	○	○

5. Age

25 or younger	26-35	36-45	46-55	56-65	66 or older
○	○	○	○	○	○

6. Gender

Male	Female
○	○

7. Race

White	Hispanic/Latino	Black/African American	Asian	American Indian/Alaska Native	Other
○	○	○	○	○	○

8. Educational Level

	Diploma	Associate's	Bachelor's	Master's	Doctoral
What is you highest degree?	○	○	○	○	○

9. Technology Proficiency

	Very Proficient	Somewhat	Limited
In terms of your computer skills, you consider yourself to be...	☐	☐	☐

DONE

Powered by
SurveyMonkey
See how easy it is to create a survey.

Appendix I

Participation Letter to Study Site

PARTICIPATION LETTER

Title of Study: An Investigation of Factors that Influence Registered Nurses' Intentions to Use E-Learning Systems in Completing Higher Degrees in Nursing

Pauline Little
Principal investigator
Candidate Doctor of Philosophy
in Computing Technology in Education
10550 NW 29th Ct., Coral Springs,
FL 33065
(954) 383-7088

Co-investigator
Thomas MacFarland, Ed.D.
c/o School of Engineering and Computing
Education Nova Southeastern University
3301 College Avenue, Fort Lauderdale,
Florida 33314-7796 | 800-541-6682

Institutional Review Board
Nova Southeastern University
Office of Grants and Contracts
(954) 262-5369/Toll Free: 866-499-0790
IRB@nsu.nova.edu

Institutional Review Board
Broward Health
1600 S. Andrews Avenue, Ft Lauderdale,
FL 33316
(954) 355-494

Description of Study: I am Pauline Little and I am a student at Nova Southeastern University engaged in research for the purpose of satisfying a requirement for a Doctor of Philosophy in Computing Technology in Education. Completing higher degrees in nursing will support today's evolving and emerging roles of RNs and will pave the way for the next century of nursing care. The purpose of this study is to assess perceived value, attitude, and resistance to change on RNs' intentions to use e-learning systems for completing higher degrees in nursing and/or completing continuing education courses in nursing.

If you agree to participate, you will be asked to complete the anonymous Web-based survey. This questionnaire will help the administrators in higher educational institutions of nursing to make decisions on ways to address the challenges that may be affecting e-learning acceptance by registered nurses. The questionnaire will take approximately fifteen minutes to complete.

Risks/Benefits to the Participant: There may be minimal risk involved in participating in this study. There are no direct benefits to you for agreeing to be in this study. If you have any questions regarding your rights as a research subject, contact the IRB at one of the offices listed above.

Cost and Payments to the Participant: There is no cost for participation in this study. Participation is completely voluntary and no payment will be provided.

Confidentiality: Information obtained in this study is strictly confidential unless disclosure is required by law. Your name will not be used in the reporting of information in publications or conference presentations.

Participant's Right to Withdraw from the Study: You have the right to refuse to participate in this study and the right to withdraw from the study at any time without penalty.

Voluntary Participation: Taking part is this study is your choice. No matter what your decision, there will be no penalty to you, and you will not lose any of your rights as an employee.

I have read this letter and I fully understand the contents of this document and voluntarily consent to participate. All of my questions concerning this research have been answered. If I have any questions in the future about this study they will be answered by the investigator listed above or his/her staff. I understand that the completion of this questionnaire implies my consent to participate in this study.

Please click on the following link to begin the survey:

Thank you for your support!

Sincerely,
Pauline Little

College of Engineering and Computing
Carl DeSantis Building, Fourth Floor
3301 College Avenue · Fort Lauderdale, Florida 33314 -7796
(954) 262-2000 · Fax: (954) 262-3915 · Website: *www.cec.nova.edu*

Appendix J

Descriptive Statistics for Study Variables

	N	Mean	SD	Median	Min	Max	Range	Skew	Kurtosis
Q1	318	3.63	1.00	4	1	5	4	-0.43	-0.46
Q2	318	3.60	0.98	4	1	5	4	-0.44	-0.29
Q3	318	3.55	1.01	4	1	5	4	-0.41	-0.22
Q4	318	3.58	1.03	4	1	5	4	-0.46	-0.26
Q5	318	3.85	0.92	4	1	5	4	-0.61	0.03
Q6	318	3.66	0.93	4	1	5	4	-0.37	-0.08
Q7	318	3.72	0.95	4	1	5	4	-0.48	-0.20
Q8	318	3.60	0.98	4	1	5	4	-0.57	0.01
Q9	318	3.85	0.95	4	1	5	4	-0.63	-0.08
Q10	318	3.81	0.95	4	1	5	4	-0.48	-0.16
Q11	318	3.71	0.99	4	1	5	4	-0.48	-0.23
Q12	318	3.60	1.01	4	1	5	4	-0.47	-0.24
Q13	318	3.28	1.10	3	1	5	4	-0.42	-0.43
Q14	318	3.21	1.14	3	1	5	4	-0.24	-0.71
Q15	318	3.53	1.09	4	1	5	4	-0.42	-0.54
Q16	318	3.64	1.01	4	1	5	4	-0.50	-0.32
Q17	318	3.85	0.96	4	1	5	4	-0.70	0.32
Q18	318	3.84	0.85	4	1	5	4	-0.65	0.39
Q19	318	3.86	0.91	4	1	5	4	-0.67	0.07
Q20	318	3.74	0.92	4	1	5	4	-0.69	0.29
Q21	318	3.81	0.93	4	1	5	4	-0.51	-0.36
Q22	318	3.91	0.93	4	1	5	4	-0.66	0.15
Q23	318	3.51	0.96	4	1	5	4	-0.31	-0.30
Q24	318	3.73	0.97	4	1	5	4	-0.50	-0.10
Q25	318	3.49	0.94	4	1	5	4	-0.22	-0.40
Q26	318	3.45	0.94	4	1	5	4	-0.35	-0.12
Q27	318	3.46	0.99	4	1	5	4	-0.28	-0.41
Q28	318	3.65	0.86	4	1	5	4	-0.62	0.24
Q29	318	3.52	1.01	4	1	5	4	-0.31	-0.48
Q30	318	3.53	0.95	4	1	5	4	-0.37	-0.25
Q31	318	3.54	1.02	4	1	5	4	-0.30	-0.55
Q32	318	3.59	0.99	4	1	5	4	-0.70	0.14
Q33	318	3.81	0.92	4	1	5	4	-0.69	0.24
Q34	318	3.67	0.97	4	1	5	4	-0.63	0.12
Q35	318	3.61	0.97	4	1	5	4	-0.32	-0.47

Note. N = 318.

Appendix K

Response Frequency for Study Variables

	Very Important	Important	Slightly Important	Not So Important	Not Important
Q1	63 (19.8%)	127 (39.9%)	81 (25.5%)	41 (12.9%)	6 (1.9%)
Q2	56 (17.6%)	130 (40.9%)	88 (27.7%)	37 (11.6%)	7 (2.2%)
Q3	57 (17.9%)	115 (36.2%)	103 (32.4%)	32 (10.1%)	11 (3.5%)
Q4	62 (19.5%)	117 (36.8%)	95 (29.9%)	33 (10.4%)	11 (3.5%)
Q5	80 (25.2%)	139 (43.7%)	73 (23.0%)	22 (6.9%)	4 (1.3%)
Q6	60 (18.9%)	123 (38.7%)	107 (33.6%)	22 (6.9%)	6 (1.9%)
Q7	68 (21.4%)	131 (41.2%)	86 (27.0%)	28 (8.8%)	5 (1.6%)
Q8	53 (16.7%)	137 (43.1%)	87 (27.4%)	31 (9.7%)	10 (3.1%)
Q9	84 (26.4%)	136 (42.8%)	68 (21.4%)	26 (8.2%)	4 (1.3%)
Q10	83 (26.1%)	120 (37.7%)	91 (28.6%)	19 (6.0%)	5 (1.6%)
Q11	74 (23.3%)	119 (37.4%)	91 (28.6%)	27 (8.5%)	7 (2.2%)
Q12	62 (19.5%)	121 (38.1%)	92 (28.9%)	33 (10.4%)	10 (3.1%)
Q13	38 (11.9%)	109 (34.3%)	103 (32.4%)	41 (12.9%)	27 (8.5%)
Q14	41 (12.9%)	96 (30.2%)	97 (30.5%)	57 (17.9%)	27 (8.5%)
Q15	64 (20.1%)	111 (34.9%)	85 (26.7%)	44 (13.8%)	14 (4.4%)
Q16	65 (20.4%)	127 (39.9%)	81 (25.5%)	37 (11.6%)	8 (2.5%)
Q17	86 (27.0%)	128 (40.3%)	81 (25.5%)	15 (4.7%)	8 (2.5%)
	Strongly Agree	Agree	Neither Disagree Nor Agree	Disagree	Strongly Disagree
Q18	65 (20.4%)	162 (50.9%)	68 (21.4%)	20 (6.3%)	3 (0.9%)
Q19	77 (24.2%)	151 (47.5%)	60 (18.9%)	27 (8.5%)	3 (0.9%)
Q20	59 (18.6%)	156 (49.1%)	70 (22.0%)	27 (8.5%)	6 (1.9%)
Q21	78 (24.5%)	137 (43.1%)	71 (22.3%)	30 (9.4%)	2 (0.6%)
Q22	94 (29.6%)	128 (40.3%)	75 (23.6%)	16 (5.0%)	5 (1.6%)
Q23	46 (14.5%)	121 (38.1%)	106 (33.3%)	38 (11.9%)	7 (2.2%)
Q24	74 (23.3%)	122 (38.4%)	92 (28.9%)	23 (7.2%)	7 (2.2%)
Q25	44 (13.8%)	119 (37.4%)	110 (34.6%)	40 (12.6%)	5 (1.6%)
Q26	38 (11.9%)	122 (38.4%)	113 (35.5%)	36 (11.3%)	9 (2.8%)
Q27	47 (14.8%)	113 (35.5%)	106 (33.3%)	43 (13.5%)	9 (2.8%)
	Very Likely	Likely	Neither Unlikely Nor Likely	Unlikely	Very Unlikely
Q28	39 (12.3%)	166 (52.2%)	79 (24.8%)	30 (9.4%)	4 (1.3%)
Q29	54 (17.0%)	115 (36.2%)	98 (30.8%)	43 (13.5%)	8 (2.5%)
Q30	46 (14.5%)	127 (39.9%)	101 (31.8%)	37 (11.6%)	7 (2.2%)
Q31	60 (18.9%)	110 (34.6%)	97 (30.5%)	43 (13.5%)	8 (2.5%)
	Very Likely	Likely	Neither Unlikely Nor Likely	Unlikely	Very Unlikely
Q32	47 (14.8%)	150 (47.2%)	76 (23.9%)	33 (10.4%)	12 (3.8%)
Q33	70 (22.0%)	151 (47.5%)	67 (21.1%)	25 (7.9%)	5 (1.6%)
Q34	59 (18.6%)	141 (44.3%)	81 (25.5%)	28 (8.8%)	9 (2.8%)
Q35	61 (19.2%)	119 (37.4%)	97 (30.5%)	36 (11.3%)	5 (1.6%)

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