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Nurse Educators' Consensus Opinion On Using An Academic Electronic Health Record: A Delphi Study

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NURSE EDUCATORS' CONSENSUS OPINION
ON USING AN ACADEMIC ELECTRONIC HEALTH RECORD: A DELPHI STUDY

by

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A Dissertation

Submitted to the Graduate Faculty

of the

University of North Dakota

In partial fulfillment of the requirements

for the degree of

Doctor of Philosophy

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August
2013

This dissertation, submitted by Darlene S. Hanson, in partial fulfillment of the requirements for the Degree of Doctor of Philosophy from the University of North Dakota, has been read by the Faculty Advisory Committee under whom the work has been done, and is hereby approved.

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This dissertation is being submitted by the appointed advisory committee as having met all of the requirements of the Graduate School at the University of North Dakota and is hereby approved.

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Dr. Wayne E. Swisher
Dean of the Graduate School

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Date

PERMISSION

Title   Nurse Educators' Consensus Opinion on Using an Academic Electronic
               Health Record: A Delphi Study

Department   Teaching and Learning

Degree   Doctor of Philosophy

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                              Darlene Hanson
                              June 25, 2013

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To Arvid Marshall Ekstrom

I dedicate this study to my father, who died over 30 years ago. He accomplished the totality of his education in seven years, graduating with an eighth grade diploma, as the only graduate of his class that year from a country school in northwestern North Dakota. He had an excellent knowledge of anatomy and taught it to me as a child, while working together in the meat processing plant that he had created. I remember asking him how he had learned about anatomy with his education. He looked at me and said, "You don't stop learning when you stop going to school." His insight about being a lifelong learner was inspirational. For that, and for his love of life and sense of humor, I thank him and promise to continue learning.

ABSTRACT

The purpose of this study was to determine the opinions of nurse educators in the state of North Dakota (ND) who were using the academic Electronic Health Record (EHR) known as SimChart. In this dissertation research study, factors that either hindered or facilitated the introduction of SimChart in nursing programs in ND were examined. Additionally, opinions were sought from nurse educators regarding whether or not SimChart contributed to student learning.

Seventy-five nurse educators from the state of ND participated in this mixed-methods study. E-mail addresses were obtained through website searches, and links to Qualtrics® surveys were e-mailed in three separate phases, using Delphi technique. The Phase 1 survey contained open-ended questions, encouraging nurse educators to express their views about factors that hindered or facilitated SimChart's implementation, and their views about whether SimChart facilitated or hindered student learning. The Phase 2 survey contained a Likert-type scale developed from instructors' responses in Phase 1. The Phase 3 survey asked nurse educators to respond to nurse educator ratings of hindrances and facilitators from Phase 2.

Qualitative data analysis was accomplished through NVivo software and an expert consultant review. Phase 2 and 3 data analysis was accomplished using SPSS® 20.

Data analyses confirmed that SimChart's adoption was facilitated by funding, educational efforts, opinions of colleagues throughout the state who agreed to purchase

the product, and nurse educator "champions." SimChart's adoption was hindered by the amount of nurse educator time involved and the product's lack of modifiability. SimChart facilitated student learning in regard to navigating an EHR, collecting and entering data in an EHR, and how an electronic health record is organized. Hindrances to learning, while few were expressed, included the time that students needed to search through the academic EHR to become familiar with the software and find patient information.

Knowledge about facilitators for academic EHR adoption may be useful when considering forthcoming innovations in nursing education. Recommendations include incorporating academic EHRs into nursing education, ensuring adequate nurse educator development time and teaching/learning strategies when incorporating academic EHRs. Nurse educator efforts for implementing newer technologies, including academic EHRs should be recognized and remunerated.

CHAPTER I

INTRODUCTION

Since the writings of Florence Nightingale, nurses have documented nursing care to substantiate evidence of their interactions with patients and patient progress toward meeting outcomes of care. Good documentation is necessary to avoid legal pitfalls and substantiate costs incurred, while assisting caregivers with learning what interventions are making a difference in patient care.

Historically, charting by nurses was accomplished through handwritten patient care notes and initialed checklists, which proved that cares were completed, medications were administered, and wounds and drainage were measured. While written documentation methods continue in health care agencies, there is a general shift in documentation to Electronic Health Records (EHRs) (Li & Korniewicz, 2013; Poon et al., 2010). The introduction of healthcare information technology is endorsed by several concerned organizations, including the Agency for Healthcare Research and Quality, the Institute of Medicine, and the Leapfrog Group (Zhang et al., 2013), for reasons of safe, quality care provision (Wang et al., 2003; Zhang et al., 2013).

Background of the Study

By the year 2014, all healthcare facilities in the United States are required by the Health Information Technology Act of 2009 to fully adopt electronic health records (Meyer, Sternberger, & Toscos, 2011). The Electronic Health Record Incentive Program

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of 2011, which was established by the Health Information for Clinical and Economic

Health Act in 2009, gives incentives to hospitals which implement EHRs (Conn, 2012;

Zhang et al., 2013).

The term "EHR" is considered to be basically interchangeable with electronic

medical records (EMRs). Adoption of EHRs has been endorsed by the two most recent

American Presidents and recommended by the Alliance for Nursing Informatics, who

state that nurses are "integral to achieving a vision…and enabling this digital

revolution"(Murphy, 2010, p. 286).

Accreditation Influences

The Commission on Collegiate Nursing Education (CCNE), which ensures the

quality of baccalaureate nursing programs through accreditation, places an impetus on

nursing programs to include technology in their curricula. In the latest CCNE Standards

for Accreditation (2013), the CCNE proposes that all baccalaureate nursing programs

incorporate The Essentials of Baccalaureate Education for Professional Nursing Practice

document that was developed by the American Association for Colleges of Nursing

(AACN, 2008). According to this document, baccalaureate graduates are expected to

have competence in "patient care technologies, information systems, and communication

devices that support safe nursing practice" (p. 18). Coursework and clinical experiences

should "expose graduates to a range of technologies...to support patient care" (p. 18). The

Essentials document declares that baccalaureate graduates are expected to be prepared "to

gather and document care data that serve as a foundation for decision making" (p. 18). It

is apparent from the above Essentials recommendations that electronic health record

documentation by nursing students must be incorporated into undergraduate nursing program curricula.

Educational Influences

Simulation education follows the current trend to move from an instructional paradigm to a learning paradigm. In a learning paradigm, a student discovers and creates knowledge (Barr & Tagg, 2004). College students, including nursing students expect and enjoy active instructional methods (Broussard, 2008; Cannon-Diehl, 2009; Todd, Manz, Hawkins, Parsons, & Hercinger, 2008). The advent of a greater emphasis on active learning strategies has resulted in the widespread use of simulation as one of the preferred teaching strategies in nursing education.

Simulation is useful when the interactive fidelity of the content cannot be easily provided in a lecture setting, thereby allowing student learning in a simulation setting "without fear of harming a patient or themselves" (Akhtar-Danesh, Baxter, Valaitis, Stanyon, & Sproul, 2009; Cioffi, 2001; Curl, Smith, Chisholm, Hamilton, & McGee, 2007; Issenberg, 2005; Jeffries, 2005; Jeffries, 2007; Rauen, 2004). Students who are engaged in their learning are more motivated and their learning is deepened (Chickering & Gamson, 1987). With simulation, a hospital-like atmosphere is promoted, and students interact with high-fidelity manikins that are capable of many human functions students will encounter in real patients who they care for later in their professional careers. SimChart, the academic EHR in this study, is part of that "hospital-like" atmosphere, as it simulates a real patient chart. SimChart will be defined later in this chapter.

Challenges in Nursing Education

Schools of nursing, which have readily adopted other simulation education activities, have been slow to incorporate electronic health records and informatics into their programs (Barnard, Nash, & O'Brien, 2005; Fetter, 2009; Jones & Donelle, 2011; McBride, 2005). Despite the fact that many healthcare facilities are already using electronic charting, and despite the widespread use of simulation technology applications for student learning, many nursing students are learning how to chart in a patient's record using traditional pen and paper methods.

A reluctance to introduce EHRs before research proves them to be effective may be part of the reason why colleges of nursing have not quickly endorsed their use. While EHRs are linked with higher quality care by some researchers (Pagliari, Detmer & Singleton, 2007), it remains an assumption that converting from paper to electronics will improve health outcomes for patients (Kelley, Brandon, & Docherty, 2011), or improve learning outcomes for students. Nurse educators understandably may be hesitant to incorporate EHRs into curricula when evidence for their use remains to be seen. However, a lack of familiarity with EHR use by graduates of nursing programs is thought to contribute to medication errors when students enter into practice in an agency which uses an EHR. Researchers indicate that it is imperative that nursing students receive education to enhance their awareness and comfort with EHRs (Kowitlawakul, Wang, & Chan, 2012) and that graduates of nursing programs know how to use EHRs to provide safe, quality care (National League for Nursing, 2008; IOM, 2010; Gloe, 2010).

Gloe (2010) reports that learning to document in an EHR is one of the most time consuming tasks of new graduates. Additionally, practicing nurses report that they need

more training in information and computer technology to perform their job requirements than what is provided in nursing education programs, with 25% of respondents in one study reporting that their lack of computer literacy had inhibited their career development (Eley, Fallon, Soar, Buikstra, & Hegney, 2008).

The aforementioned lack of education in information and technology at the undergraduate level may be partly due to an aging nurse educator population (Eley et al., 2008; Gardner & Jones, 2012). Nurse educators, many of whom are aging baby boomers, are striving to keep pace with technology (Skiba, Connors, & Jeffries, 2008). Technological applications can be overwhelming to a force of nursing educators who are primarily digital immigrants (Prensky, 2001), possibly lacking the computer skills exhibited by this latest generation of digital natives (Meyer et al., 2011; National League for Nursing, 2008; Prensky, 2001).

Researchers have identified nurse educators as "primary barriers" to integrating technology (Fetter, 2009) and academic EHRs into their curricula (Gardner & Jones, 2012). However, a study by Alquraini, Alhashem, Shah, and Chowdhury (2007) demonstrated that educational level and experience of nurse educators were both positively correlated with technology adoption. In the Alquraini et al. study, participants who had more experience, particularly computer-related experience, had a better understanding of the potential benefits of the technology and its relationship to patient care. Given this information, it may not be correct to assume that older nursing faculty, or more experienced faculty, would be less likely to adopt EHRs. Further evidence about EHR effectiveness is needed, so faculty of all ages and with a variety of computer skills will consider their use. With EHR use increasing dramatically in health care settings,

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nurse educators need to be prepared to advance the agenda of electronic health records, as this is "critical to advancing nursing science and the profession" (McNeil, Elfrink, Beyea, Pierce, & Bickford, 2006, p. 58).

Because pen and paper methods are soon to become historical artifacts (Byrne, 2013), and because it is essential to educate the new workforce of nurses in current methods, baccalaureate nursing administrators and nurse educators must lead the effort by learning how to add electronic record elements to their classrooms and learning activities. Instructional strategies used in nursing classes are "highly influential in determining critical thinking and clinical decision-making" (Durham & Alden, 2008, p. 1) as well as psychomotor skills of new graduates. By experiencing simulated electronic documentation while they are students, it is hoped that nursing graduates will be able to smoothly transition, or "seamlessly transfer what they have learned in a classroom into clinical practice" (Durham & Sherwood, 2008, p. 432) so that quality care is provided and safety outcomes are met.

Advent of New Technology

Some nursing education programs are facilitating instruction in student electronic documentation by purchasing academic EHRs. Johnson and Bushey (2011) defined an academic electronic health record as "an EHR used for teaching purposes [which] contains all the functionality required of an EHR" (p. 133). An academic or educational EHR, in addition to bearing a computerized patient record, has an educational component (Gloe, 2010) that enables nurse educators with the capability of assessing the student's documentation and providing feedback to the student through comments and grading in

electronic format. Academic EHRs allow students the opportunity to practice charting in a safe, simulated environment before they legally document in a real patient's record.

There are many vendors that supply academic electronic documentation systems. SimChart by Elsevier, Neehr Perfect®, and Cerner's Academic Education Solution (AES) are examples of educational EHRs. SimChart is an "electronic health record specifically developed as a teaching tool for nursing students" ("Elsevier: SimChart for Nursing," 2013). Nurse educators have a variety of products to choose from, but a lack of literature on EHR selection and information about whether or not these products result in student learning exists (Gloe, 2010). Additionally, academic EHRs can be very complex, and implementing them can be expensive for students and labor intensive for nurse educators.

One State's Approach to EHR use

In the state of North Dakota, several nursing programs agreed to purchase the same academic EHR through a shared grant, yet to date, their opinions on the implementation of this EHR have not been sought. The purchased product, SimChart, is distributed by Reed Elsevier Corporation ("Elsevier Newsroom," 2013). To implement SimChart, some nurse educators in ND nursing programs received out-of-state training in the product's use, while others received in-state training from company representatives, ranging from four hours to 16 hours in length. Still other nurse educators were "trained by the trainers" who had been primary recipients of the training and were designated as super-users or SimChart "champions." To date, implementing the product has been very time consuming for the nurse educators. Further, no information is available that provides evidence that the product facilitates student learning in successful EHR usage.

Statement of the Problem

While there is burgeoning research in simulation education, studies related to academic EHRs are less apt to be found, due to the recent advent of this technology. While researchers have studied nurse, physician, and medical student adoption of EHRs (Jamoom et al., 2012), only a few studies (Baillie, Chadwick, Mann, & Brooke-Read, 2012; Jones & Donelle, 2011; Kowitlawakul et al., 2012) were found in the literature about academic EHRs in nursing education, and none reporting nurse educator opinions of EHRs.

Accreditors of nursing programs and employers of nursing graduates indicate that there is a need for increased technology in nursing programs to ease graduates' transition into nursing practice and contribute to patient safety (Durham & Sherwood, 2008). For nursing education programs, incorporation of technology in programs includes introducing students to some form of EHRs. Nurse educators are faced with many options of academic EHRs, yet lack information on which one to use, and how to implement the EHR in their teaching. To date, there are no located studies of nurse educator opinions about EHR use. In the state of North Dakota, one particular EHR was chosen for use in undergraduate nursing programs, yet opinions from nurse educators have not been sought about the product.

Further study is needed about academic EHRs, as any time an innovation is considered, there are pedagogical implications. Reiner (2011) writes that the use of "successful innovations should rely upon data-driven objective analysis." (p. 753). Scientifically validating nurse educators' opinions about SimChart's adoption will

provide objective analysis regarding whether or not nurse educators claim value for the use of this product in contributing to student learning.

As early as 1938, Dewey stated that we are at the mercy of every trend that comes our way, if we do not carefully reflect on how it will affect our students' learning (Parker & Myrick, 2010). It is important to address this lack of information about EHRs by gathering nurse educator opinions related to this issue. For the purposes of this study, the terms "undergraduate nurse educator," "nurse educator," and "faculty" are used interchangeably and refer to undergraduate nurse educators in the state of ND who are using SimChart.

Purpose of the Study

The purpose of this study was to determine the consensus opinion of undergraduate nurse educators throughout the state of North Dakota (ND) who are currently using the academic EHR known as SimChart. In this dissertation research study, factors that have either hindered or facilitated the introduction of SimChart in nursing programs across the state of ND were examined. Additionally, opinions were sought from undergraduate nurse educators regarding whether or not SimChart contributed to student learning.

Rationale for the Study

This dissertation research study complements research in the area of simulation education. Knowledge about factors which have influenced the adoption of this technology may be useful when considering forthcoming innovations in nursing.

Research Questions

The following research questions were designed to fulfill the purpose of this study:

1. What factors have helped facilitate the introduction of an academic EHR?

2. What factors have hindered the introduction of an Academic EHR?

3. Has SimChart helped students learn? If so, in what ways?

4. Has SimChart hindered student learning? If so, in what ways?

Theoretical Framework

The theoretical framework for this study is Cain and Mittman's (2002) Diffusion of Innovation in Health Care, which is based on the work of Rogers' Diffusion of Innovation Theory (2003). This theory was used to guide the literature review and data analysis, and will be further explicated in Chapter II.

Assumptions

1. It is assumed that participants would ethically, honestly, and completely answer questions related to the use of SimChart.

2. Despite the best efforts at analyzing qualitative data in Phase 1 in an unbiased manner, researcher assumptions may have influenced research outcomes and phrasing of items for Phase 2 and 3 data analysis.

3. In many Delphi studies, the participants are the same for each phase of the study. For this study, because of small numbers anticipated, it was assumed that instructors who did not participate in Phase 1 of the study would be able to complete Phase 2 and 3 of the study. Findings may have varied if all participants had taken part in all phases.

4. Level of expertise about SimChart is assumed to vary between users of this product.

Delimitations

1. The study was limited to undergraduate nurse educators in the state of North Dakota whose programs were utilizing SimChart. Nurse educators who were listed as graduate nurse educators on websites of colleges in the state were not included in the study as they were less likely to be engaged in using SimChart.

2. Undergraduate nurse educators whose e-mail addresses could not be found by website survey or directory for the college were not included.

3. The research was limited to one state where an agreement had been made to purchase SimChart for all colleges in the education consortium.

4. The survey was administered using Qualtrics®, a Web based survey provider.

Summary

This study is organized into five chapters. Provided in the first chapter was an introduction, background information, statement of the problem, statement of purpose, research questions, definitions, assumptions, and delimitations. A review of the literature regarding academic EHRs and a description of the theoretical framework for this study is presented in Chapter II. Chapter III follows with methodology. In Chapter IV, the findings of the study are presented through data analysis. A discussion of findings, limitations and recommendations for further study can be found in Chapter V.

CHAPTER II

LITERATURE REVIEW

The purpose of this study was to determine the consensus opinion of undergraduate nurse educators throughout the state of North Dakota (ND) who were using the academic EHR known as SimChart at the time of this research. In this dissertation research study, factors that have either hindered or facilitated the introduction of SimChart in nursing programs across the state of ND were examined. Additionally, opinions were sought from undergraduate nurse educators regarding whether or not SimChart contributed to student learning.

In this chapter, Rogers' (2003) Diffusion of Innovation Theory (DoI) is explored, followed by the critical dynamics of DoI that Cain and Mittman (2002) identified in relation to health care innovation adoption. The remainder of the literature review includes studies related to EHR adoption in health care settings, studies specific to academic EHR adoption, and specific information about SimChart, the EHR studied in this dissertation research.

Diffusion of Innovation

An innovation is "an idea, practice or project that is perceived as new by an individual or other unit of adoption" (Rogers, 2003, p. 12). Diffusion is the process by which innovations are communicated or spread over time in a social system

(Rogers, 2003). Adoption is "a decision of full use of an innovation as the best course of action available" (Rogers, p. 177).

Characteristics of an Innovation

According to the DoI, characteristics of an innovation that are important are: a) relative advantage over what it supersedes, b) compatibility, c) complexity, d) trialability, and e) observability, or how visible the results are. Adoption of an innovation is partly based on whether the innovation possesses these characteristics, and to what degree the characteristics are possessed (Rogers, 2003).

Rate of Adoption

An innovation that is trialable, which means that it can be learned by doing, will be adopted more quickly than innovations that do not possess that characteristic. The more trialable, compatible or easy to use, the more rapid will be the rate of adoption (Rogers, 2003). However, if an innovation is so complex that it is difficult to understand, adoption is slower (Rogers, 2003). SimChart is an example of an innovation that may not be trialable, might not be compatible with the values of SimChart users, or may be too complex.

Characteristics of individuals are important when considering rates of innovation adoption. An early adopter takes hold of the innovation at a faster rate than an early or late majority or a "laggard" who is more skeptical of the innovation (Rogers, 2003). Early adopters are "active information seekers" and are usually in leadership roles in the social system (Sahin, 2006), with laggards having a more traditional viewpoint. Previous studies have implicated nurse educators as barriers to technology implementation (Gardner & Jones, 2012), while others report that experienced nurse educators readily adopt new

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technology. Whether or not a nurse educator possesses certain characteristics may have an influence on whether or not they adopt technology readily, or linger until others do so.

The Innovation-Decision Process

There are five stages in Rogers' adoption of a technological innovation (Starkweather & Kardong-Edgren, 2008). The steps or stages in the innovation-decision process include: a) knowledge, b) persuasion, c) decision, d) implementation, and e) confirmation.

Knowledge Stage. In the knowledge stage, an individual finds information about the innovation. If there is a lack of knowledge of how to use the innovation correctly, the technology will not be used as effectively (Wetzel, 1993), and it will influence their discontinuance of the product (Sahin, 2006).

Persuasion Stage. In the persuasion stage, opinions of others may influence an individual's adoption of an innovation (Rogers, 2003). This social reinforcement, or lack thereof, may influence whether or not an innovation is adopted.

Decision Stage. In this stage, the individual participates in activities that lead to a judgment about the innovation. Ultimately, the individual adopts or rejects the innovation in this stage, before implementing the innovation.

Implementation Stage. The implementation stage, which seems self-explanatory, involves putting the innovation to work. Within this phase, the user works with the innovation and will occasionally reinvent the innovation.

Confirmation Stage. In the confirmation stage, the individual seeks support from others for his decision about the innovation. If conflicting messages are received, he may reverse earlier decisions (Rogers, 2003).

Critical Dynamics of Innovation Diffusion in Health Care

Cain and Mittman (2002) further expound on the Diffusion of Innovation (DoI) by listing ten critical dynamics of innovation diffusion in health care, in a report given to the California Health Foundation (2002). The ten critical dynamics include: "relative advantage; trialability; observability; communications channels; homophilous groups; pace of innovation/reinvention; norms, roles, and social networks; opinion leaders; compatibility; and infrastructure" (p. 5).

In this report, Cain and Mittman (2002) specifically list an EMR as an example of an innovation that is not trialable, stating that health care workers are reluctant to try out an EMR, because it has to "fit in with so many other systems" (Cain & Mittman, 2002, p. 10).

Cain and Mittman (2002) recommend that health care workers can adopt innovations more easily by first learning about barriers that are associated with the potential to impede adoption. Grol (1997) also writes that "obstacles to change should be identified" (p. 418), and indicates that changing behaviors, in part, depends on the barriers and facilitators that are identified. Literature in the remaining sections is thus sub-divided into barriers and facilitators, paralleling a study by Fountain (2011), who studied nurse educators' consensus opinions of high fidelity patient simulation in the state of Texas.

Previous Studies of EHR Adoption in Health Care

Many articles exist that relate to EHR adoption in health care, but few are found that are specific to nurse educator or nursing student adoption of EHRs. However, studies exist regarding nurse adoption, medical student, and medical educator adoption of

EHRs that have relevance for the study. These studies are reported, followed by studies of nursing education. Studies of physician and medical student adoption are considered pertinent to the topic, as the content of the EHRs are the same whether used by medical or nursing students. The exception to that would be academic EHRs which are specifically designed for nursing education. The studies that have been found are presented in terms of barriers and facilitators, using Cain and Mittman's critical dynamics when appropriate for the subheadings of sections.

Barriers to Implementing EHRs

Several common themes emerge when reviewing literature about barriers to the implementation of EHRs. Barriers are associated with EMR use in clinics, hospitals (Boonstra & Broekhuis, 2010) and home care settings (DeVliegher, Paquay, Vernieuwe, & Gansbeke, 2010) as reported by physicians, nurses, and nursing students. Lack of time, lack of funding, lack of relative advantage over previous methods of documentation, negative characteristics of EHRs, nurse educator characteristics, and adverse effects on teaching have all been reported as barriers to EHR implementation.

Lack of time. Yarbrough and Smith (2007) studied barriers that keep physicians from embracing new technologies. Time was reported as a strong barrier to technology adoption, as lost time affects physicians' time spent with patients, and affects income. Vedel (2012) also reported that the adoption of a clinical information system was hindered by its perceived negative impact on the patient-physician relationship, related to time issues. Time is identified as a barrier to technology adoption in nursing studies as well. Time spent away from patients, while documenting, can potentially lead to poorer outcomes for patients (Blair & Smith, 2012; Bjorvell, Wredling & Thorell-Ekstrand,

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2003). When systems are not user friendly, increased time is needed for training, and when systems are down, valuable time is lost to interact with patients (Sheikh et al., 2011).

Other researchers reported time constraints as an important factor in preventing the adoption of electronic documentation (Chang, 1997; Faria & Wellington, 2004; Lean, Moizer, Towler & Abbey, 2006). In a study of 46 nurses, Kossman and Scheidenhelm (2008) found that 50% of nurses' overall shift time was spent in electronic documentation activities.

Bjorvell et al. (2003) studied 20 nurses in Sweden who were learning electronic documentation methods and found that nurses were spending time documenting more extensively in the patient's record than they had with written documentation. Although records may have been more comprehensive, the increased time to document was considered a drawback. Blair and Smith (2012) also listed time constraints as a barrier to safe documentation.

A Belgium study of 51 home care nurses who were implementing EHRs also found that using an EHR increased nurses' time and workload (DeVliegher et al., 2010). Additionally, nurses in the study reported concerns that their attention was divided between the EHR and the patient in the home. Workload concerns were also described by two other authors (Blair & Smith, 2012; deVeer & Francke , 2010).

Lack of Infrastructure or Funding. Many studies pointed to a lack of funding as a barrier for implementing EHRs. A large meta-analysis of EMRs and EHRs (Boonstra & Broekhuis, 2010) provides a list of barriers to EMR adoption from the physician's perspective. Barriers were categorized as financial, technical, time, psychological (e.g., a

lack of belief in EMRs,) social, legal, organizational, and change process. Boonstra &

Broekhuis (2010) concluded that removing technical, financial, and legal barriers may

not be all that is needed to increase the use of EMRs, suggesting that a change process is

needed instead. From Yarbrough and Smith's (2007) systematic review of the literature,

the barriers associated with physician technology acceptance included time,

organizational issues, and system issues (Yarbrough & Smith, 2007).

Blair and Smith (2012) reported that poorly written institutional documentation

policies and a lack of clear guidelines for charting are barriers to good documentation

when using either written or electronic methods. Poorly functioning computers are also

reported as barriers for electronic record implementation (Blair & Smith, 2012).

Lack of Relative Advantage Over Previous Methods. EMR use may have

unintended consequences and may not be safer than previous documentation methods.

Recently, a task force developed by the American Medical Information Association

(AMIA), responded to concerns that EMR systems may have unintended consequences,

(e.g., an increasing number of errors or increased patient harm). Recommendations from

this task force include that agencies adopt "useful and usable" EHR systems. These

recommendations have an impact on nursing programs which adopt EHRs too readily,

before they have safe, useful and usable EHR systems in clinical agencies.

While there exists an assumption that health outcomes will be improved with the

use of EHRs, there is lack of evidence in that regard (Kelley et al., 2011; Li &

Korniewicz, 2013). Two studies reported that documentation may not improve with the

use of electronic methods. In a recent study of pressure ulcer documentation, Li and

Korniewicz pointed to the need for standardization of electronic health records. The study

compared EHR documentation with written documentation about pressure ulcers by nurses, and researchers discovered errors in documentation in both methods. The study recommended further identification of "factors and barriers faced by nurses during the use of an EHR" (p. 24) and standardization of EHR documentation. In a retrospective study of nursing home documentation, Wang, Yu, and Hailey (2013) also compared written documentation with electronic methods. They found that completeness and timeliness of documentation were not improved when nurses used electronic documentation methods. Other studies indicated the opposite, reporting that safety was improved with legible documentation provided by electronic means (Blair & Smith, 2012).

Complexity. Darbyshire (2004) reported computer slowness as a barrier to implementation. Greenhalg (2010) reported that EHRs are complex, expensive, and threatening to patient confidentiality. Stevenson (2010) reported that EHRs are not practical or user friendly. In a study by Mahon, Nickitas, and Nokes (2010), nurse educators who were using either paper-based methods or EHRs for undergraduate instruction were queried, and researchers found that nurse educators faced many obstacles with EHRs, including language challenges for diverse students.

Lack of access. Two studies were located that discussed access as an issue with EHR implementation **(**Darbyshire, 2004; Mahon et al., 2010). One of the studies (Darbyshire, 2004) reported that finding a computer when it was needed and forgetting a password for access were issues. In another study, Mahon et al. (2010) reported that when students tried to use computers in the clinical setting, students did not have enough computer access.

Incompatibility. Byrne (2013) listed incompatibility across many electronic environments as a possible reason that paper methods are preferred to EHRs. Other explanations mentioned were mistrust of EHRs and lack of functionality of some EHRs that are in an early stage of development.

Only one study was found where researchers studied nurse educator perceptions of teaching undergraduates nursing documentation using electronic health records (Mahon et al., 2010). Using qualitative methods, this study found that nurse educators had to overcome several barriers while teaching students how to document, including "time expenditures and constraints, language challenges for a diverse student population, lack of access to secure patient documentation systems and insufficient number of computer terminals" (p. 619).

Characteristics of EHR Users. In a National Center for Health Statistics brief, Jamoom et al. (2011) observed differences in physician non-adopters and adopters of EHR systems. In this study of physicians with office-based practices, physicians under age 50 were more likely to adopt EHRs than those who were 50 and older (Jamoom et al., 2011).

Yarbrough and Smith (2007) also mentioned personal characteristics in their list of barriers of physicians' use of EHRs. Previous studies about physician attitudes have reported that physicians with less computer experience or typing skills have a more difficult time adjusting to an EMR, with some choosing retirement over choosing to work with an EMR (Boonstra & Broekhuis, 2010; Hauser & Johnston,2008; Yan, Gardner & Baier, 2012).

Attitudes. From previous studies that were reported in a meta-analysis by Kelley et al. (2011), attitudes of nurses towards technology, and electronic documentation in particular, have been studied extensively in the last 20 years, and often attitudes are listed as barriers to technology adoption. In the studies reported by Kelley et al. (2011) authors indicated that attitudes may be affected by age. Kelley indicated that younger nurses had more favorable attitudes than older nurses; yet, what is confusing is that others reported that nurses with 20 years of experience had more favorable attitudes toward electronic documentation than younger, less experienced nurses. Prior use with computers is the only characteristic that seems to positively influence attitudes toward electronic documentation in the studies reported by Kelley et al. (2011).

A lack of knowledge, a lack of awareness, understanding, and involvement are also listed as barriers to the profession's use of technology-based information (Procter & Woodburn, 2012; Lee, 2007). Other attitudes that reportedly contribute to slower adoption of EMRs are faculty lack of confidence about implementing technology into the curriculum and discomfort with technology (Gardner & Jones, 2012)

Facilitators of EHR Implementation

Influences of Opinion Leaders. As the use of EHRs grows in health care settings, health professionals need to have improved competence in the use of informatics (Institute of Medicine Report, 2003; Gloe, 2010), and the influence of opinion leaders drives the force forward. Three major leaders in the field of health care advocate the importance of integrating technology into teaching, including the National League for Nursing, Institute of Medicine, and American Association of Colleges of Nursing. As mentioned in Chapter I, the current American Association of Colleges of Nursing

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Baccalaureate Essentials (2008) recommend that nursing programs include components on information management and application of patient care technologies in their curricula, and more specifically, electronic health records.

Infrastructure and Funding. Infrastructure, leadership, relative advantage, and compatibility were found to be facilitators for the implementation of Human Patient Simulation (HPS) in a previously mentioned study by Fountain (2011). Fountain studied Texas nursing educators who had implemented this technology in their curricula (Fountain, 2011).

Assumption that EHRs Contribute to Patient Safety. While the evidence is not always clear, using EHRs has been shown to improve patient safety, quality of care, and reduce health care costs (Bates, 2010; Cherry, Ford, & Peterson, 2011). In a long-term care study by Cherry et al. (2011), researchers reported that an EHR was cost-effective, improved care quality, and resulted in operational improvements.

Higher quality of care and greater patient safety, better informed care, and fewer medical errors are listed as advantages of EHRs by Baillie et al. (2012). EHRs enable rapid transfer of information, increase accuracy, and improve safety and quality (NAO, 2011). Errors are reduced through EHR prescribing methods (Abramson et al., 2011), and legibility of records through EHR use improves safety (Sheikh et al., 2011). In a study of 1,884 licensed physicians in the state of Massachusetts, availability and use of EHRs was associated with higher performance on quality/safety measures. In a study that took place in Germany, Mahler et al. (2007) randomly selected 240 nursing documentation entries through a qualitative audit. They found that a computerized nursing documentation system significantly improved documentation quantity and quality on four wards of a

university medical center over an 18-month time period. When Wang, Yu, and Hailey (2013) compared written documentation with electronic methods in a long-term care setting, they found that electronic records were signed and dated correctly, more so than written records.

Attitudes. Nurses' attitudes about EHRs have been studied, as mentioned, as barriers. Positive attitudes can also be facilitators to EHR adoption. Swedish nurses viewed EHRs as a very positive change, after they had worked with them for four years (McBride, 2012). A study of nurses' attitudes toward EHRs in the Netherlands, which included 685 respondents also found that most nurses associated EHRs with producing positive effects on quality and safety (deVeer & Francke, 2010).

Ease of Use and Colleague Support. In a qualitative study of 31 healthcare professionals' adoption and use of a clinical information system in Canada, Vedel et al. (2012) found that factors related to adoption of the clinical information system included user skills, ease of use, comfort in using the system while being observed by patients, colleague support, and perceived positive impacts of the clinical information system. Blair and Smith (2012), in a meta-analysis of nursing literature related to documentation, list "point of care" (p. 163) documentation as an advantage of electronic documentation that saves nurses' time to be with patients.

Less Cognitive Effort. Electronic health records are reported as beneficial for documentation when a nurse cannot recall what needs to be charted. Drop-down menus helped nurses in one study remember what to chart, making it easy for them to not "think" about the nursing process (Kossman & Scheidenhelm, 2008; Lee, 2007). Whether this is a facilitator or barrier remains to be seen, as some authors reported that less

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thinking on the part of the practitioner, by letting the computer do the processing, is not necessarily advantageous (Peled, Sagher, Morrow, & Dobbie, 2009).

Reported Studies of EHR Use in Educational Settings

Using Cain and Mittman's Diffusion of Innovation in Health Care theory, Fountain (2011) explored the opinions of Texas nursing educators regarding the implementation of human patient simulation (HPS), but not EHRs in nursing curricula. Fountain identified resources, nurse educators, administration, student, and laboratory needs as barriers to HPS implementation. The study is relevant in that academic EHRs are considered simulated hospital records and the study is similar in design to the present study.

Barriers of Academic EHR Implementation

Lack of time. Lack of time is a common theme with technology in general and is reported as a barrier in technology adoption studies in academia. Three primary factors were identified as barriers in nurse educator adoption of technology in a large study conducted at Illinois State University (Butler & Sellbom, 2002), and one of them was lack of time to learn new technologies. Other factors included "lack of institutional support and lack of financial support" (Butler & Sellbom, 2002, p. 23). Students who used EHRs have reported that they took more time than completing paper records (Sheikh et al., 2011).

Product Characteristics. Barriers associated with timing, complexity, accessibility, and functionality of academic EHRs were reported (Kowitlawakul et al., 2012) in a qualitative study with nursing students in Singapore who used an Electronic Health Record for Nursing Education (EHRNE). Nursing educators also reported that

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confidentiality of patient records was a concern when 13 students used EHRs in a Canadian study, as students left their computer screens on for other students to see (Jones & Donelle, 2011).

Faculty Characteristics. Gardner and Jones (2012) stated that nursing schools and nurse educators must be committed to integrating technology into the nursing curriculum, yet identified nurse educators as one of the major barriers for integrating academic EHRs into the curriculum (Gardner & Jones, 2010). Reasons as to why nurse educators are not implementing technology included age, technological expertise, attitudes, and effects of the technology on teaching (Gardner & Jones, 2010).

With nurse educators' average age being 51.5 years (Curl et al., 2007), it is not unexpected that there may be a technology gap between them and their students, who are primarily in their late teens and early twenties. However, access to affordable computers and ready access to computers in health care settings could have already had an influence on the reported lack of technological skills among college nurse educators (Butler & Sellbom, 2002). While it is yet to be determined, there may be a proficiency gap between the technological skills of educators and the millennial group of students who have used computers from an early age (Prensky, 2001) but more research is needed.

Researchers report a lack of nurse educator knowledge, lack of awareness, understanding, and involvement as well (Jones & Donelle, 2011; Lee, 2007; Procter & Woodburn, 2012). While one might think that age may be a factor in nurse educators' adoption and use of EHRs, research findings have been inconclusive. However, some studies authors' reported that the higher the nurse's educational level, the more favorable their attitudes were towards technology adoption. In a study of nurses in Kuwaiti, nurses

who were primarily clinical educators had more favorable attitudes toward electronic documentation than those with less experience (Alquraini et al., 2007).

Student Characteristics. Using academic EHRs requires some technological skills on the part of the student. Older-than-average or less tech-savvy students may be intimidated by the complexity brought to their learning experience by the computer and electronic record, as it requires the student to know how to click, point, and find information within the computer, rather than in a paper record. Language issues were mentioned as an obstacle that some nursing students had to overcome when working with EHRs in a study by Mahon et al. (2010).

Lack of Perceived Advantage. A reported barrier to EHR implementation includes the effect that these devices may have on teaching. In an Oregon study (Spencer, Choi, English & Girard, 2012) of medical educators, sixty-five percent reported that EHR use distracted from teaching and listed few advantages of EHR implementation. Almost half of the medical educators in the study reported less enthusiasm for teaching after they had implemented EHRs. The study recommended further learning about how to train medical instructors and modify the EHR to support teaching practices.

While electronic health records may improve the fidelity of a simulation, by appearing "state of the art" and "high tech," it can also create some additional concerns within the room. Teteris, Fraser, Wright, and McLaughlin (2012) purport that increased cognitive load decreases learning. When Zendejas, Cook, and Farley (2010) explored timing within simulations with fourth-year medical students, the researchers found that increased cognitive load had a negative impact on cognitive scores in simulation education**.**

One report of medical students' use of EHRs indicated that electronic charting is a distractor to their educational objectives. Medical educators expressed concern that the EHR replaces students' synthesis of clinical information (Peled et al., 2009) as the computer does the work for the student.

Facilitators Associated With Academic EHR Implementation

Positive Learning Outcomes. Positive results associated with use of an EHR were noted by Kennedy, Pallikkathayil, and Warren (2009) in a study of eight nursing students who used a modified electronic health record. Researchers found that students learned about the nursing process as they used the electronic record, rather than learning about the electronic record itself.

In a qualitative study, Jones and Donelle (2011) studied documentation skills of 13 undergraduate students who were assigned a case study for EHR data recording. Researchers found that the case study method resulted in positive learning outcomes for the students.

In the previously mentioned study by Kowitlawakul et al. (2012), researchers identified advantages of the academic EHR, including "simplicity, accessibility, time efficiency," (p. 7) and content specificity for each course.

Advantages and disadvantages of EHRs were sought in a study of 10 medical students who were using a student-centered EHR in Australia. Investigators found that students' ability to review a patient record was of benefit (Elliott, Judd, & McColl, 2011). The authors recommended that the introduction to EHRs should begin early in a student's curriculum, and that learning activities within an EHR should be closely

integrated within the curriculum so that learning can be linked to curricular objectives (Elliott et al., 2011).

While EHRs are recommended for student use, (Fetter, 2009; Mahon et al., 2010; Meyer et al., 2011) and it is apparent that many nursing education programs may be using them (Jones & Donelle, 2011), few studies were found about barriers and facilitators encountered when adopting them for use in nursing education. Further study about academic EHRs in nursing education is needed.

Summary

In Chapter II, DoI and the ten critical dynamics that are associated with it were presented. The terminology used in the DoI was appropriate for organizing and framing the literature review in this study, which concerned an innovation in health care (i.e., SimChart). Facilitators and barriers to EHR implementation were identified from previous studies in health care, as recommended by Cain and Mittman (2002) as one of the first steps in the process of understanding innovation adoption. EHR-associated barriers in health care settings that were reported included lack of time, funding/administrative support, and perceived lack of relative advantage in regard to patient safety. Product characteristics, such as EHR complexity and slowness, and user characteristics, including age and computer proficiency were reported. A lack of computer access or support was apparent in some agencies. In academia, only a few studies could be located; however, when EHRs were used, they were usually associated with learning outcomes that were content-related and course-specific. Barriers to EHR implementation in academic settings included time, learner characteristics, product characteristics, time needed, confidentiality of patient information and perceived lack of

relative advantage about student learning outcomes. The chapter concluded with a description of SimChart, the academic EHR used in this study.

In Chapter III, quantitative and qualitative methodology for the study will be described. Delphi methodology is explored and tools, population and sampling methods for this dissertation study's three phases are described.

CHAPTER III

METHODOLOGY

While there are numerous studies related to EHR adoption in health care, there exists a significant gap in the literature in regard to studies related to academic EHR adoption, particularly in nursing education. An academic EHR has been introduced in several programs of nursing in the state of North Dakota; yet, no information has been obtained as to its effect on student learning. To address this lack of information, the current research study was conducted using Delphi Technique, which consisted of a three-phase, mixed-methods survey design. In this chapter, the purpose, participants, research methodology, procedures, survey instruments, data collection, and data analysis are presented.

Purpose

The purpose of this study was to determine the consensus opinion of undergraduate nurse educators throughout the state of North Dakota (ND) who were using the academic EHR known as SimChart at the time of this study. In this three-phased, mixed methods dissertation research study, factors that have either facilitated or hindered the introduction of SimChart in nursing programs across the state of ND were examined. Additionally, opinions were sought from undergraduate nurse educators regarding whether or not SimChart contributed to student learning.

Participants

The participants in this study included undergraduate nurse educators in the state of North Dakota. A convenience sample was used. Of the overall population of 133 nurse educators whose e-mail addresses could be found from a website search, 75 of 133 (56.4%) undergraduate nurse educators in the convenience sample participated in one, two, or three of the phases of the study. Seventy-three of 75 respondents were female (97.3%), and most were in the age range of 45 to 54 years. Chapter IV provides specific demographics for all three phases of the study.

The Population

The population that is pertinent to this study consists of all undergraduate nurse educators in the state of North Dakota, since all programs are represented in the ND Nursing Education Consortium. The Nursing Education consortium was established by the legislature in 2007 for the purpose of advising schools of nursing about common concerns, and had endorsed the use of SimChart as the academic electronic health record for the state programs.

The total number of ND undergraduate nurse educators is difficult to discern. In the latest published report ("ND Board of Nursing Education Annual Report", 2011-2012) 120 registered nurses and 30 licensed practical nurses have the designated title of "nursing faculty". Over 300 others are listed as nurse educators, which is somewhat confusing, but explained by the fact that many nurses are nurse educators in clinical settings providing patient instruction, but not instruction in programs of nursing. To triangulate this source and confirm the number of undergraduate nurse educators, an additional report from the ND Center for Rural Health was used, which identified 199

nurse educators in the state of ND in 2008, and provided demographics for 122 of them for that year(Lang & Moulton, 2008). In 2008, the nurse educators were predominantly Caucasian (96%), female (97%), and 63% were between 45 and 60 years of age (Lang & Moulton, 2008).

The Sample

A convenience sample was obtained by searching all ND undergraduate nursing program websites for names and e-mail addresses for undergraduate nurse educators, and 133 were identified as providing instruction at the undergraduate level. Part-time and full-time nurse educators were included. These 133 undergraduate nurse educators are considered the convenience sample for the current study, and all were given opportunity to participate.

In Phase 1 of the study, forty-three nurse educators logged into the Qualtrics® link in Phase 1 of the study. Thirty-seven of the 43 completed the survey, for a response rate in Phase 1 of 27.8% (37 of 133). In Phase 2 of the study, 127 nurse educators received the invitation to the survey link, purposefully excluding three nurse educators who asked to be excluded and inadvertently excluding 3 of the original 133. Thirty-nine of 127 (30.7%) nurse educators completed the survey. In Phase 3 of the study, 130 were e-mailed the survey link, again purposefully excluding the three who had asked to be excluded. Twenty-seven of 130 (20.8%) completed the survey. In all, 75 of the 133 (56.4%) invited nurse educators participated in one, two or all three phases of the study. Demographics for all participants is reported in Chapter IV.

The Electronic Health Record Used in This Study

A description of the study's academic EHR was obtained from a website for the product. SimChart is a web-based educational EHR specifically developed for nursing students" ("Elsevier: SimChart for Nursing," 2013). Elsevier's simulated EHR known as SimChart "allows students to practice documenting, monitoring and analyzing patient care in an interactive, safe learning environment." ("Elsevier's SimChart," 2013). Within SimChart, the features of the product allow nurse educators to assess and grade student documentation. It is listed as being "fully web-based and HIPAA compliant" and is designed for a variety of settings, including classrooms, simulation, lab and clinical settings. The SimChart software is modeled after actual EHRs which are used in practice ("Elsevier's SimChart," 2013). There are four main areas for nurse educators to use. The four areas are:

1. Model EHRs

2. My Clinicals, or "Pre-clinical manager" section

3. Simulations

4. Pre-built clinical documentation cases

Model EHR Section of SimChart. Nurse educators can build their case studies or simulations using this section of SimChart, and re-use the model patient they have created for later simulations or different topics of care.

My Clinicals Section of SimChart. In this section of SimChart, students enter patient information into the computer, as preparation for their clinical experience, in an effort to create care plans and prepare for their clinical experiences. Students are expected to follow HIPAA-compliant rules, using no patient identifiers, when documenting.

Simulation Section of SimChart. In this section of SimChart, nurse educators make a simulated patient record for students' use during simulations. The section is timed, so that medications, lab results, and changes in the patient's condition appear as time passes.

Pre-built Clinical Documentation Cases. These cases of patients are pre-loaded into SimChart to challenge a student to respond to charting according to a story that unfolds in the patient chart ("Elsevier: SimChart for Nursing," 2013).

Research Methodology

The Delphi technique, which is particularly applicable for nursing research studies (Keeney, Hasson, & McKenna, 2006), was used for this study. The terms "Delphi method," "Delphi technique" and "The Delphi methodology" appear to be used interchangeably in meta-analysis studies (Boulkedid, Abdoul, Loustau, Sibony, & Alberti, 2011). Delphi technique is appropriate for use when a researcher aims to reach a consensus on important issues (Clibbens, Walters, & Baird, 2012; Linstone & Turoff, 1975), particularly when there is "limited evidence or where evidence is contradictory." (Vernon, 2009, p. 69). Delphi technique is widely used in research and particularly in nursing research (Keeney et al., 2006; West, 2011). Delphi technique is likened to a hybrid survey or a mixed-methods approach, as it usually has qualitative and quantitative components. It is accomplished in a series of rounds, usually two or three (Boulkedid et al., 2011). The first round is usually qualitative (Keeney et al., 2006) and helps establish expert opinions on a topic (Clibbens et al., 2012), followed by a round which uses descriptive statistics to further elucidate the opinions. One of the values of mixed methods research is that of "creating a dialogue" (Maxwell, 2010) to determine different

ways of knowing what is occurring in a situation. Using Delphi method in the way it was used in this study encouraged dialogue from nurse educators about the academic EHR in question.

When Delphi technique is used, it is considered imperative to define the characteristics of the respondents, since one of the drawbacks to the technique is that a differing panel of experts may come to a different consensus. Respondent characteristics were established through demographics.

Delphi technique may be accomplished through e-mail or through a face-to-face expert panel (Vernon, 2009), and when a face-to-face meeting with participants is held, it is considered a modified Delphi technique. In this study, it was more convenient to access the nurse educators through electronic means. Therefore, surveys were sent through an e-mailed link (See Appendix A).

With Delphi studies, it is recommended to complete the three phases in a close time frame (West, 2011), to keep participants' interest. This was done, with each phase not extending longer than three weeks. It is also important to be certain that participants in the study are aware that each round or phase is made up of participant responses from the last round. Encouraging ownership of the study helps obtain active participation in the study (Keeney et al., 2006).

Procedures

Prior to proceeding with the study, endorsement for the study was sought from the North Dakota Nursing Education Consortium (See Appendix A). IRB approval was obtained (See Appendix B). A full consent was used for each phase of the study (See Appendix C), and IRB protocol changes were submitted and approved for Phases 2 and 3

as well, as updates to questionnaires were generated from participants' responses in Phases 1 and 2 (See Appendix C), as planned in a study that uses Delphi Technique.

Sampling Method

Study participants were selected using purposeful, homogenous sampling methods, in order to yield rich data about SimChart from nurse educators within the state of ND's nursing educational programs who were familiar with the product. Homogenous sampling methods are chosen when one seeks to "describe some subgroup in depth" (Glesne, 2011, p. 45).

In Delphi studies, it is recommended that a heterogenous group is used so that a diverse set of opinions can be obtained for analysis (Boulkedid et al., 2011). In this case, nursing educators were considered heterogenous only with respect to the four sections of the electronic EHR they have experienced (My Clinicals, Model EHRs, Simulations, Pre-built clinical cases) which was expected to vary between programs.

Because SimChart's use varies from program to program, course by course within programs, and also by instructor, some nurse educators may have been SimChart "champions" and others may have been less familiar with SimChart, so the group was heterogenous in that respect as well. In the adoption of an innovation, SimChart champions who may have a keen interest in the matter, may have a positive bias (Keeney et al., 2006) toward the innovation. In order to obtain a range of nurse educators whose familiarity with the product varied, it was deemed most advisable to survey as many undergraduate nurse educators as possible who may have used SimChart, not just the SimChart champions.

Data Collection

Surveys were distributed using Qualtrics® online survey software, which is web-based and password protected. Qualtrics uses Transport Layer Security (TLS) encryption and multiple data redundancies to protect identities. A link to the Qualtrics® survey was emailed to the identified nursing educators. After distributing the surveys, checks of the Qualtrics® website were made to ensure that e-mail was distributed without error messages in e-mail addresses.

Timeline

Participants were allowed 3 weeks for participation in Phase 1, and 2 weeks each for participation in Phases 2 and 3. Due to the qualitative nature of items in Phase 1, more time was allowed in case respondents wanted to return to the survey to complete it when they had time to do so. In between phases 1 and 2 and again between phases 2 and 3, data were analyzed, and new questions were formatted based on responses and sent to IRB for changes in protocol approval. Some items from Phase 1 required qualitative data analysis which required additional time, so there was a longer time lapse between Phases 1 and 2 than Phases 2 and 3.

Survey Reminders

With each phase of the study, participants were sent e-mail reminders if they failed to complete the survey within 10 days of the survey being posted. The surveys were dated, closed to multiple re-takes, and monitored frequently for completeness. Surveys were closed to participation after three weeks for Phase 1, and after two weeks for Phase 2 and for Phase 3.

Informed Consent

The informed consent was posted to Qualtrics® and preceded each survey. After the informed consent was presented to participants, they were asked to read and acknowledge the informed consent form prior to responding to survey items (See Appendix B). The informed consent assured the participants that their identities would not be revealed, and all data will be reported in aggregate form, and that they could discontinue participation at any time.

Incentives for Participation

Compensation was not provided to participants. As an incentive for completing the survey, participants were given the opportunity to enter their name and e-mail address into a drawing for a $50 VISA® gift card at the end of the surveys. The drawing was optional and winning participants' names were not given to other participants. The drawing was not connected to survey responses in any way. Three respondents were chosen through three separate random drawings from names of all who had consented to the drawing, and gift cards were provided to those whose names were drawn.

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Survey Instruments

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The following research questions guided the construction of the surveys in this study:

1. What factors have helped facilitate the introduction of an academic EHR?

2. What factors have hindered the introduction of an academic EHR?

3. Has SimChart helped students learn? If so, in what ways?

4. Has SimChart hindered student learning? If so, in what ways?

The survey instrument used in this study contained identical demographic items for each phase of the study, and SimChart-related items which were different for each phase of the study.

Demographic Items

Demographic items were included in each survey to elicit information pertaining to the nurse educators' gender, age, years of teaching experience, self-perceived proficiency with computers, professional productivity with computers, and use, satisfaction and recommendation ratings of SimChart. The purpose of including SimChart-related demographic items was necessary in this case, because in a Delphi study, the participants are an expert panel and content validity is based on the qualifications and responses of the panel.

Content Validity. It was important to establish nurse educators' ability to answer the questions about the product. Demographics are used in Delphi studies to establish content validity and thus are reported here.

First, the study sought nurse educators who were actually utilizing the product; therefore, the first two questions on each survey asked if the participants were nurse educators in the state of ND and if the program they were associated with used SimChart for instruction. If nurse educators answered no to either question, a "display logic" type of question was used to end the survey (See Appendix C). One hundred percent of nurse educators who completed the surveys, thus, had answered that they were using SimChart in their programs.

Secondly, age and experience were sought. Nurse educators were primarily in the 45 to 54 years of age category, coinciding with the average age of US nurse educators as

51.5 years of age (Curl et al., 2007). Most participants were Master's prepared, had several years of teaching experience, and the majority reported at least seven months of experience with SimChart (See Tables 1, 3, and 4 in Chapter IV).

Comfort and Proficiency With Technology. Nurse educators' comfort and proficiency with technology were relevant to content validity so those are further described in chapter IV but summarized here to address content validity as well. In each phase of the study, 100% of the survey participants reported being comfortable or very comfortable with technology.

By self-report, nurse educators report a high proficiency level when asked about technology use. On a 1 to 5 scale where "1" is "not proficient, worse than most nurse educators," and "5" is "highly proficient, exceeding what most other nursing faculty do," nurse educators rated their proficiency as highest in word processing (M=3.89, SD=0.81) and lowest in SimChart (M=3.18, SD=.83). Means and standard deviations for each of the proficiencies will be reported in Chapter IV. As mentioned in the literature review, higher levels of proficiency with technology can lead to more positive views of new technology and faster adoption rates, possibly suggesting that this group may have a positive bias. However, the item may also reflect the nurse educators' integrity in reporting their proficiency skills, as they reported they were less proficient in SimChart than other technologies that have been used for some time.

Use and Satisfaction With SimChart. It was important to establish that nurse educators had in fact used the various sections of SimChart and were able to give credible responses regarding the survey items. As established by a question item on the demographics, not all nurse educators were familiar with all the various parts of

SimChart. Those who reported satisfaction ratings were least satisfied with the simulation section of SimChart and most satisfied with the case studies section of SimChart. This information may be helpful when interpreting instructor responses to the main question asked in the study.

Facilitating and Hindering Factors

Phase 1. In addition to demographics, Phase 1 survey questions simply asked participants to identify factors that had facilitated and hindered SimChart implementation, and whether or not SimChart facilitated or hindered the learning experience of students, and if so, in what ways. (See Appendix C)

Phase 2. For Phase 2, a Likert-type scale was developed using instructor responses from Phase 1. Wording from the participants was used as much as possible, as recommended for Delphi studies (Hasson, Keeney & McKenna, 2000). The Likert-type six-point scale ranged from Strongly Disagree to Strongly Agree with no neutral rating. The Likert-type scale verified instructor responses to Phase 1 statements by asking participants to rate their agreement or disagreement with the opinion statements that were formulated from the initial survey. (See Appendix C).

Phase 3. In the survey in Phase 3, nurse educators were given de-identified aggregate data results from other nurse educators in Phase 2 within the survey, and were asked to indicate their level of agreement or disagreement with other nurse educators' mean ratings for each item, to obtain their level of agreement. (See Appendix C).

Data Analysis

Qualitative Procedures

For Phase 1, data from open-ended items related to facilitators and barriers was downloaded into a Word document and then uploaded into an NVivo application for coding. Data analysis for the qualitative items followed recommendations from Anfara, Brown, and Mangione (2002), including use of an external audit from an expert in qualitative research methods and coding responses using NVivo software, which aided in categorizing findings and identifying themes. The researcher maintained privacy of the participants' responses by de-identifying the information that was given to the expert reviewer.

Quantitative Analysis

After participants in Phase 1 were allowed time to participate in the survey, the demographic data were downloaded from Qualtrics® into a Microsoft® Excel file. Next, the Statistical Package for the Social Sciences (SPSS®) 20 predictive analytics software was used for analysis. Descriptive statistics were employed for the analysis of demographic items in this phase.

After subjects had completed the surveys for Phase 2 and 3, all data were downloaded from Qualtrics® into a Microsoft® Excel file, and then SPSS® 20 predictive analytics software was used for analysis. Descriptive statistics were employed for all items.

For Delphi methodology, evidence as to how to define and analyze agreement is contradictory. Agreement can be determined by voting, by consensus, or through mathematical averaging (Keeney et al., 2006). Keeney et al. (2006) suggest that if

percentages are used, 75% agreement is a reasonable minimal level of agreement. In a Delphi study, agreement does not necessarily mean that the researchers have found the correct answer, but only that participants agree with each other. While confidence levels are used in some studies rather than a percentage, Keeney et al. (2006) support the use of a percentage, and also instruct that when participants receive data from phases in a Delphi study to agree upon, it should be explained in simple terms as some may not understand means, median, and standard deviations. For this reason, the questionnaire for Phase 3 provided an explanation to participants regarding the definition of percent of agreement for this study, and included means and standard deviations for their reference. For this study, when agreement was reported, it was measured using 75% as a standard.

For studies which use standard deviation, the reported cut-off measure is less certain in determining what constitutes agreement. A recommendation in Delphi studies is that cut-off scores should be established before the study ensues. Fountain (2011) used 1 standard deviation in analyzing data for agreement. West (2011) used a 1.5 standard deviation of less than 1.5 for greatest consensus and more than 3.0 when determining contention. For this study, it was decided to use a cut-off standard deviation score of 1.00, allowing for 68% dispersion from the mean.

Summary

This chapter delineated the methodology that was used in this study of nurse educators throughout the state of North Dakota (ND) who are currently using the academic EHR known as SimChart. Delphi technique, sampling procedures, data collection tools and methods of qualitative and quantitative analysis were addressed in this chapter. Chapter IV follows with results from data analysis.

CHAPTER IV

RESULTS

The purpose of this study was to determine the consensus opinion of undergraduate nurse educators throughout the state of North Dakota (ND) who were using the academic EHR known as SimChart at the time of this study. Factors that have either facilitated or hindered the introduction of SimChart in nursing programs across the state of ND were examined. Additionally, opinions were sought from undergraduate nurse educators regarding whether or not SimChart contributed to student learning. The research questions were:

1. What factors have helped facilitate the introduction of an academic EHR?

2. What factors have hindered the introduction of an Academic EHR?

3. Has SimChart helped students learn? If so, in what ways?

4. Has SimChart hindered student learning? If so, in what ways?

The research results are reported in this chapter. Demographic information is given for each phase of the study, followed by data analysis for each of the four research questions, for each phase of the study.

Demographics

Phase 1

Forty-three nurse educators (32.3%) responded to the initial e-mail invitation by clicking on the Qualtrics survey, and 37 of the 43 (29.3%) completed the survey.

Demographics for the current study participants are given in Table 1. Demographic information for Phase 2 was analyzed using descriptive measures in SPSS® 20.

Gender. Thirty-six of 37 (97.3%) were female, with only one male (2.7%) participating in the initial phase of the study (See Table 1 for demographic characteristics for Phase 1).

Age. Thirteen of the participants (36%) in Phase 1 reported that they were 45 to 54 years of age, and 22 percent were in the 35 to 44 age category. Three nurse educators (8%) reported that they were 65 years of age or older (See Table 1).

Educational Background. Twenty-nine of 37 (78%) had an M.S.N. or M.S. degree, 4 (11%) were prepared at the doctoral level, and three of 37 reported a Bachelor's degree.

Type of Program. Twenty-seven of 37 participants (73%, 1 missing) in Phase 1 were nurse educators in baccalaureate degree programs, and nine of 37 (24.3%, 1 missing) were nurse educators in an associate degree program (See Table 1).

Years as a Nurse Educator. Most educators who responded to this phase of the study had been teaching from 1 to 5 years (42%), and 19% of educators had 21 years or more of experience as a nurse educator (See Table 1).

Length of SimChart Use, In Phase 1, twelve of 37 (32%) had used SimChart for 0 to 6 months. Twenty-one of 37 (57%) nurse educators had been using SimChart for 7 to 12 months, and 4 of 37 (11%) reported that they had used SimChart for 13 to 24 months (See Table 1).

Table 1. Demographic Information for Phase 1.

	Overall Sample N=37	%
1. Gender		
Male	1	2.7
Female	36	97.3
Total	37	100.0
2. Age		
20-24	0	0
25-34	5	13.5
35-44	8	21.6
45-54	13	35.1
55-64	7	18.9
65 or over	3	8.1
Missing	1	2.7
Total	37	99.9
3. Educational Background		
Bachelor's Degree	3	8.1
MSN, MS	29	78.3
PhD, EdD, DNP	4	10.8
Other	1	2.7
Total	37	99.9
4. Type of Program		
Associate Degree	9	24.3
Baccalaureate Degree	27	73.0
Missing	1	2.7
Total	37	100.0
5. Years as a Nurse Educator		
1-5	15	40.5
6-10	8	21.6
11-15	2	5.4
16-20	4	10.8
21 or more	7	18.9
Missing	1	2.7
Total	37	99.9
6. Length of Use of the Study EHR		
0-6 months	12	32.4
7-12 months	21	56.8
13-24 months	4	10.8
Total	37	100.0

Comfort With Technology. In Phase 1 of the study, when asked about comfort levels with technology, 37 of 37 nurse educators (100%) reported being comfortable or very comfortable with technology.

Technology Proficiency. Nurse educators rated themselves on their proficiency with technology. On a 1 to 5 scale, where "1" is "not proficient, worse than most nurse educators," and "5" is "highly proficient, exceeding what most other nursing faculty do," instructor ratings are reported for this phase. Nurse educators rated their highest levels of proficiency in Word Processing (M=3.89, SD=.81) and lowest levels of proficiency in SimChart use (M=3.30, SD=.81) and Blackboard (M=3.57, SD=.97) (See Table 2).

Table 2. Nurse Educators' Self-Report of Proficiency With Technology.

	Phase 1		Phase 2		Phase 3	
	M	SD	M	SD	M	SD
E-Mail	3.84	0.73	3.91	.73	3.92	.83
Blackboard	3.46	1.02	3.57	.95	3.76	.71
Word Processing	3.89	0.81	3.87	.95	3.96	.76
SimChart	3.30	0.81	3.57	.79	3.18	.83
Presentation Software	3.81	0.88	3.74	.81	3.81	.74

Phase 2

Three nurse educators who were e-mailed the link to the survey in Phase 1 requested to be removed from the mailing list for Phase 2 because they stated they were not using SimChart. Thirty-nine nurse educators of 130 (30%) responded to the Phase 2

invitation e-mail and completed the Phase 2 survey. Nineteen were returning participants who had completed Phase 1. Twenty additional participants completed the Phase 2 survey, for a total of 39 participants in this phase (See Table 3).

Gender. Twenty-one of 22 (95.5%, 17 missing) participants who reported demographics in Phase 2 were female, with one male participating (See Table 3).

Age. Nine of 22 participants (39.2%, 17 missing) reported that they were 45 to 54 years of age, and 6 of 22 (26.1%, 17 missing) were in the 35 to 44 age category.

Educational Background. Twenty of 23 (87.0%, 16 missing) had an M.S.N. or M.S. degree, one of 23 (4.3%, 16 missing) was prepared at the doctoral level, and one of 23 (4.3%, 16 missing) reported having a Bachelor's degree (See Table 3).

Program Type. Twenty of 23 participants (87.0%, 16 missing) in Phase2 were nurse educators in baccalaureate degree programs, and three of 23 (13.0%, 16 missing) were nurse educators in associate degree programs (See Table 3).

Nurse Educator Experience. Nine of 23 (39.1%, 16 missing) participants in this phase reported that they had been teaching from 1 to 5 years (39%, 16 missing), and 7 of 23 (30.4%, 16 missing) participants had 21 years or more of experience as a nurse educator. Four of 23 (17.4%, 16 missing) participants reported 21 or more years of experience (See Table 3).

Length of SimChart Use, In Phase 2, six of 22 (27.3%, 17 missing) participants had been using SimChart less than 6 months, 13 of 22 (59.2%, 17 missing) had been using SimChart for 7 to 12 months, and 3 of 22 (13.6%, 17 missing) reported SimChart use for 13 to 24 months (See Table 3).

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Table 3. Demographic Information for Phase 2.

	Overall Sample N=39	Percent	Valid Percent
1. Gender			
Male	1	2.6	95.5
Female	21	53.8	4.5
Missing	17	43.6	
Total	39	100	100
2. Age			
20-24	0	0	0
25-34	3	7.7	13.0
35-44	6	15.4	26.1
45-54	9	23.0	39.1
55-64	4	10.3	17.4
65 or over	1	2.6	4.3
Missing	16	41.0	
Total	39	100.0	99.9
3. Educational Background			
Bachelor's Degree	1	2.6	4.3
MSN, MS	20	51.2	87.0
PhD, EdD, DNP	1	2.6	4.3
Other	1	2.6	4.3
Missing	16	41.0	
Total	39	100.0	99.9
4. Type of Program			
Associate Degree	3	7.7	13.0
Baccalaureate Degree	20	51.3	87.0
Missing	16	41.0	
Total	39	100.0	100.0
5. Years as a Nurse Educator			
1-5	9	23.1	39.1
6-10	7	17.9	30.4
11-15	0	0	0
16-20	3	7.7	13.0
21 or more	4	10.3	17.4
Missing	16	41.0	
Total	39	100.0	99.9
6. Length of Use of the Study HER			
0-6 months	6	15.4	27.3
7-12 months	13	33.3	59.1
13-24 months	3	7.7	13.6
Missing	17	43.6	43.6
Total	39	100.0	100.0

Comfort With Technology. In Phase 2, 23 of 23 (100%, 16 missing) nurse educators rated themselves as being comfortable or very comfortable with technology.

Proficiency With Technology. Nurse educators rated themselves on their proficiency with technology. On a 1 to 5 scale, where "1" is "not proficient, worse than most nurse educators," and "5" is "highly proficient, exceeding what most other nurse educators do," nurse educators' ratings are reported for this phase. Nurse educators rated their highest levels of proficiency in Word Processing (M=3.91, SD=.73) and lowest level of proficiency in SimChart use (M=3.57, SD=.79) . See Table 2.

Phase 3

Thirty-one of 130 nurse educators (23.8%) responded to the final survey, and analyzable data from completed surveys was obtained for 27 of these respondents (See Table 3). Thirteen of the 27 Phase 3 participants (48%) had also completed Phase 1 of the survey; 6 of the 27 participants (22%) who completed the Phase 3 survey had also completed Phase 2 of the survey (See Table 4).

Gender. Twenty-seven of 27 (100.0%) participants who reported demographics in Phase 3 were female (See Table 4).

Age. Thirteen of 27 participants (48.1%) reported that they were 45 to 54 years of age, 5 of 27 (3.7%) were in the 35 to 44 (18.5%)age category, and 5 of 27 (18.5%) were in the 55 to 64 age category (See Table 4).

Educational Background. Twenty-six of 27 (96.3%) had an M.S.N. or M.S. degree, and 1 of 27 (3.73%) reported a Bachelor's degree (See Table 4).

Program Type. Twenty-two of 27 participants (81.5%) in Phase 3 were nurse educators in baccalaureate degree programs, four of 27 (14.8%) were nurse educators in

associate degree programs, and one (3.7%) was an instructor in a certificate for practical

nursing program (See Table 4).

Table 4. Demographic Information for Phase 3.

	Overall Sample N=27	%
1. Gender		
Male	0.0	0.0
Female	27.0	100.0
Total	27.0	100.0
2. Age		
20-24	0.0	
25-34	2.0	7.4
35-44	5.0	18.5
45-54	13.0	48.1
55-64	5.0	18.5
65 or over	2.0	7.4
Total	27.0	99.9
3. Educational Background		
Bachelor's Degree	1.0	3.7
MSN, MS	26.0	96.3
PhD, EdD, DNP	0.0	0.0
Other	0.0	0.0
Total	27.0	100.0
4. Type of Program		
Associate Degree	4.0	14.8
Baccalaureate Degree	22.0	81.5
Certificate for Practical Nursing	1.0	3.7
Total	27.0	100.0
5. Years as a Nurse Educator		
1-5	6.0	22.2
6-10	12.0	44.4
11-15	1.0	3.7
16-20	3.0	11.1
21 or more	5.0	18.5
Total	27.0	99.9
6. Length of Use of the Study HER		
0-6 months	2	7.4
7-12 months	21	77.8
13-24 months	4	14.8
Total	27	100.0

Nurse Educator Experience. Six of 27 (22.2%) participants had been teaching from 1 to 5 years as a nurse educator, 12 of 27 (44.4%) participants in this phase reported they had been teaching from 6 to 10 years, and 5 of 27 (18.5%) had been teaching 21 years of more (See Table 4).

Length of SimChart Use, In Phase 3, two of 27 (7.4%) participants reported SimChart use as less than 6 months, 21 of 27 (77.8%) had been using SimChart for 7 to 12 months, and 4 of 27 (14.8%) reported SimChart use for 13 to 24 months (See Table 4).

Comfort with Technology. In Phase 3, 26 of 27 (100%, 1 missing) nurse educators reported being comfortable or very comfortable with technology (See Table 4).

Technology Proficiency. Nurse educators rated themselves on their proficiency with technology. On a 1 to 5 scale, where "1" is "not proficient, worse than most nurse educators," and "5" is "highly proficient, exceeding what most other nursing faculty do," nurse educators' ratings are reported for this phase. Nurse educators rated their highest levels of proficiency in Word Processing (M=3.96, SD=.76) and lowest level of proficiency in SimChart use (M=3.18, SD=.83). See Table 2.

Summary of Demographics

Demographics are reported for all three phases and included gender, age, educational background, type of educational program, years as a nurse educator, length of experience with the study EHR, and self-ratings of comfort and proficiency with technology. A different set of demographics is reported for each phase, as all 133 identified nurse educators were invited to participate in each phase of the study. Seventy-five participants from the overall pool of 133 nurse educators who were invited

participated in one, two or all phases of the study. Missing demographics are apparent in

Phase 2, and will be discussed in the Chapter V discussion area.

Research Questions

Question 1: What Factors Have Facilitated the Introduction of an Academic EHR?

Phase 1 Results. In Phase 1, nurse educators were asked to respond to the

question "what factors have helped facilitate the introduction of SimChart?" A prompt to

"be as descriptive as possible with this answer" was added to this item to encourage

qualitative feedback. In analyzing the results from this question, qualitative research

methods were employed.

NVivo application was used for frequency counts and theme development in

analyzing the numerous instructor responses to this question, as described in Chapter III.

Fifty-four main statements were given by nurse educators in regard to factors that

facilitated the implementation of SimChart.

An example of one respondent's comments is given below:

"We decided to dive in and use it! You just need to read the tutorials and try it out. It's not complicated."

Another respondent wrote:

"*The help of faculty and staff. I am a learner who needs to have a hand held numerous times as I am learning something new-especially with the computer. The helpfulness that I received from faculty and staff made me confident that "I could do it" and I could help the students to learn it also."*

When redundancy was eliminated, the following themes were identified as

facilitators for the implementation of SimChart: Funding, administrative support,

collaboration with other nurse educators, local peer support, nurse educator development,

teaching-learning strategies, and characteristics of the electronic health record (See Table

5). Themes in the qualitative data were confirmed by an expert in qualitative research

analysis, who reviewed respondent's answers to the question without viewing identifiers.

Items are ranked in Table 5 according to order of frequencies of word counts from N-

vivo data analysis.

Phase 2 Results. The statements generated by nurse educators were formulated

into statements suitable for use in a Likert-type scale for phase 2 of the study, using

"word for word" statements when possible as recommended in Delphi technique (See

Table 6). Participants were queried as to their agreement or disagreement on these items

using a 1 to 6 item Likert-type scale, in Phase 2. Results from Phase 2 analysis of the

results are included in Table 6, including means and standard deviations for each item.

Table 5. Phase 1 Themes: Factors That Facilitated an Academic EHR's Implementation.

Facilitating Factors

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1. Funding/Administrative support
2. Collaboration with other educators
3. Local peer support
4. Education
5. Teaching/Learning strategies
6. Product Characteristics

Phase 3 Results. Statements of factors that facilitated the implementation of

SimChart were ranked in order of percentage of agreement on the Likert-type scale for

Phase 3. The researcher added three statements to the original list, obtained from the

Phase 2 list of facilitators of student learning. While the researcher determined that these

three items were associated with implementing SimChart and not associated with

facilitating student learning (See Table 7), it is recognized that other researchers may

have categorized the statements differently. For Phase 3, nurse educators were asked to

rate their level of agreement with other instructors' ratings for Phase 2.

Table 6. Phase 2 Data: Percentage of Agreement with Factors That Facilitated an
Academic EHR's Implementation.

Statement	% of some form of agreement	M	SD
Funding/Administrative Support			
1.The funding was attractive, to allow us to obtain the product.	97.0	5.20	.80
2. Students did not have to pay for SimChart themselves and that helped get SimChart initiated.	94.3	5.19	1.09
3. The fact that there was administrative support helped facilitate our use of SimChart.	82.9	4.89	1.14
Local Peer Support/Leadership			
4. Our "faculty champions" who learned about SimChart first were instrumental in helping us learn about SimChart.	88.6	5.00	1.24
5. Having one designated individual to train faculty (a "super-user") helped the most in learning about SimChart.	67.6	4.51	1.46
Collaborating with other educators in the state			
6. The fact that other faculty in the state thought it was a good product facilitated our use of the product.	88.6	4.42	1.16
7. Collaborating with other faculty in the state helped us get SimChart initiated.	50.0	3.57	1.46
Formal and ongoing education/faculty development			
8. The orientation provided by the SimChart company was very helpful in getting SimChart started.	68.6	4.08	1.44
9. We had ongoing training sessions which were beneficial to get SimChart initiated.	50.0	3.42	1.70
Experimental strategies/Trialability			
10. The way we introduced it to the beginning students helped. We scaffolded the information for students, by starting with simple assignments and progressing to more complex assignments	77.8	4.42	1.48
11. We just went ahead and tried it and it worked well for us.	57.1	3.71	1.53
12. Because SimChart is so easy to use, it was easy to get students using it.	55.6	3.50	1.24

The results of data analysis for Phase 3 are given in Table 7. The items are ranked in order of percentage of agreement. Percent of agreement, means, and standard deviations are given for each factor that was listed as facilitating the implementation of SimChart.

Question 2: What Factors Have Hindered the Introduction of Simchart?

Phase 1 Results. In Phase 1, nurse educators were asked to respond to the question "What factors have hindered the introduction of SimChart" and prompted to "be as descriptive as possible with this answer." Again, this information was downloaded to NVivo and the researcher searched for themes in the data using the NVivo product. The 93 statements that were given by respondents were reviewed by an expert in qualitative analysis who confirmed the emerging trends and themes in the large volume of qualitative responses that were generated by this item.

An example of one of the respondent's statements about hindrances is given here:

"We don't want to just add Simchart but rather implement it in a way that is beneficial to the students and faculty-using it to its full potential. Inability to use it in the clinical setting as students do not have internet access readily available in all clinical areas. Students would rather navigate a real EHR in the clinical setting rather than an academic one."

Another respondent wrote:

"I think that we were so overwhelmed with it at first that a second inservice to follow up a couple weeks later would have been helpful. Maybe a tier or instructional sections where the instructors were given assignments over one semester to practice, then implement it the following semester. I don't even feel like I know all of what simchart can do and how to use it in my courses."

Table 7. Phase 3 Data: Factors That Facilitated an Academic EHR's Implementation.

	% of Some Form of Agreement	M	SD
1. Students did not have to pay for SimChart and that helped to get SimChart initiated.(**M= 5.19**, SD=1.09)	100	5.36	.70
2. The funding for SimChart was attractive, to allow us to obtain the product (**M=5.20,** SD=.80).	100	5.50	.59
3. The fact that other faculty in the state thought it was a good product facilitated our use of the product (**M=4.42;**, SD=1.16).	96	4.8	1.04
4. Administrative support helped facilitate our use of SimChart **(M=4.89**, SD=1.14).	92.0	4.60	1.16
5. Our faculty champions who learned about SimChart first were instrumental in helping us learn about SimChart (**M=5.00,** SD=1.24)	88.5	5.04	1.08
6. Having a designated individual to train faculty (A super user) helped the most in learning about SimChart (**M=4.51**, SD=1.46).	88.5	4.92	1.09
7. The way we introduced it to students helped. We scaffolded the information for students by starting with simple assignments and progressing toward more complex assignments. (**M=4.42,** SD=1.48).	84.6	4.58	1.42
8. The orientation provided by the SimChart company was very helpful in getting SimChart started. (**M=4.08**, SD=1.44).	84.6	4.27	1.12
9. Ongoing training sessions were beneficial to get SimChart initiated (**M=3.42**, SD=1.70).	80.8	4.65	1.26
10. Our students liked SimChart in that it seemed like a real chart (**M=4.02**, SD=1.42).	76.9	4.19	1.42
11. SimChart seemed like the charts that students will see in clinical (**M=4.08**, SD=1.46; 69.4% agreement	73.1	4.12	1.42
12. Experimenting with SimChart by "going ahead and trying it" worked well for us. (**M=3.71**, SD=1.53)	65.4	3.92	1.35
13. Our students felt like a real RN when using SimChart. (**M=3.78**, SD=1.41).	61.5	3.58	1.33
14. Because SimChart is so easy to use, it was easy to get students using it. (**M=3.5,** SD=1.52)	56.0	3.56	1.45
15. Collaborating with other faculty in the state helped us get SimChart initiated (**M=3.57**, SD=1.46).	53.8	3.58	1.30

Table 8. Phase 1 Themes: Early Identification of Hindrances to the Implementation of an EHR.

Hindering Factors

Incompatibility with affiliating agencies
Nurse educator reluctance
Lack of nurse educator time to learn and implement the product
Flaws/bugs or fixes that were needed in the product
Complexity of the product
Faculty technology skills.

Statements such as those given by the above respondents were reviewed for the presence of themes, and the following themes were generated related to hindrances in the implementation of an EHR : 1) Incompatibility with affiliating agencies; 2) Nurse educator reluctance; 3) Lack of nurse educator time to learn and implement the product; 4) Flaws/bugs or fixes that were needed in the product; 5) Complexity of the product; and 6) Nurse educator technology skills (See Table 8). These were verified by an expert in qualitative analysis methods. Difficulty with categorization between time and faculty reluctance was noted on the researchers' part. For example "faculty did not want to take the time to learn about this" could be construed as either time or reluctance.

Phase 2 Results

To determine level of nurse educator agreement with these items, statements were placed into a Likert-type scale format, where 1 is "strongly disagree" and 6 is "strongly agree" for the Phase 2 Qualtrics® survey.

Results of the Phase 2 survey analysis for the statements about what hindered SimChart's introduction are given in Table 9. Percent of instructor agreement, means and

Table 9. Phase 2 Data: Percentage of Agreement with Factors that Hindered An

Academic EHR's Implementation.

Nurse Educator Statements	% of Some Form of Agreement	M	SD
Incompatibility with affiliating agencies			
1. Our affiliating agencies did not want us to use SimChart, so that inhibited getting it started	32.4	2.86	1.72
2. SimChart is not compatible with our computer resources at our clinical agencies, so we could not use it effectively.	39.4	3.00	1.91
3. SimChart is not compatible with the simulations that we use.	32.4	2.83	1.52
Faculty reluctance or lack of skills			
4. Our faculty were not technologically skilled enough to use SimChart.	32.4	2.57	1.52
5. Faculty did not want to take the time to learn about this product.	42.9	3.25	1.44
6. We did not want to add another piece of technology to an already overflowing workload.	47.2	3.11	1.72
Faculty desire for more information before implementing			
7. Faculty wanted to learn to use SimChart to its full potential but felt they only had time to learn the basics about it.	85.7	4.67	1.10
8. As a faculty member, I wish I had time to understand the advantages of SimChart more before incorporating it into simulations or courses**.**	79.4	4.43	1.42
Time: Student issues			
9. SimChart just took too much time to learn and implement.	45.7	3.36	1.64
10.Students resented having to learn about SimChart because of the time involved.	35.3	3.29	1.58
Product characteristics			
11. It is really hard to modify or change the simulations in SimChart once they are in there. This needs to be fixed.	88.2	4.69	1.25
12. There are some things about SimChart that need to be fixed before implementing it successfully, like barcoding issues	70.6	4.29	1.56
13. The "timing" in SimChart is a problem. Students get timed out before they can make entries.	70.6	4.40	1.50
Complexity			
14. SimChart is very complex to learn and use, but the complexity is outweighed by the benefits to student learning.	52.9	3.46	1.27
15. SimChart is too complicated for faculty to use, as the setup seems to be problematic, as well as the phases.	47.1	3.23	1.57
16. SimChart is just too complicated. Our students get lost in it.	31.4	2.97	1.61

Table 10. Phase 3 Data: Factors That Hindered An Academic EHR's Implementation.

	% of Some Form of Agreement	M	SD
1. It is really hard to modify or change the simulations in SimChart once they are in there. This needs to be fixed (M= 4.68, SD=1.25).	96.3	4.85	.95
2. As a faculty member, I wish I had more time to understand the advantages of SimChart before incorporating it into simulations or courses (M=4.42, SD=1.42)	88.9	4.96	1.06
3. Faculty wanted to learn how to use SimChart to its full potential but felt they only had time to learn the basics about it (M = 4.67, SD= 1.10)	85.2	4.89	1.19
4. Some things in SimChart need to be fixed before implementing it successfully, like barcoding issues (M=4.28, SD=1.56)	81.5	4.52	1.28
5. The "timing" of SimChart is a problem. Students get timed out before they can make entries (M=4.4, SD=1.50).	77.8	4.48	1.31
6. SimChart took too much faculty time to learn and implement (M=3.36, SD=1.64).	63.0	3.93	1.27
7. The set-up and phases in SimChart are very complicated (M=3.23, SD=1.57).	55.6	3.67	1.36
8. We didn't want to add another piece of technology to an already overflowing workload(M=3.11, SD=1.72).	50.0	3.54	1.68
9. The timing of when we received the training was one of the factors that hindered the introduction of SimChart-(New statement, no means reported)	46.2	3.46	1.45
10. SimChart is very complex to learn and use(M=3.46, SD=1.27).	44.4	3.41	1.55
11. Students resented the amount of time involved in learning about SimChart (M=3.29, SD= 1.58).	44.4	3.37	1.47
12. SimChart is complicated. Our students get lost in it (M=2.97, SD=1.61).	37.0	3.19	1.55

standard deviation for each item are reported as found in Phase 2. Nurse educators had

the highest percentage of agreement on items related to nurse educator desire to learn

more about the product, and a high level of agreement on two items related to product

characteristics, including modification of simulations in SimChart and timing issues

related to SimChart use in simulation rooms.

Phase 3 Results

For Phase 3, four items related to hindrances were removed due to a lack of agreement on the items on the Phase 2 survey, as suggested by Delphi technique. Nurse educators were asked to rate their level of agreement with the rating that other nurse educators had given for factors that hindered the implementation of Simchart in Phase 2. The results of data analysis for Phase 3 are given in Table 10. Percent of agreement, means and standard deviations are given for each factor that was listed as hindering the implementation of SimChart. The items are ranked in order of nurse educators' percentage of agreement.

**Question 3: Has SimChart Helped Students
Learn? If so, in What Ways?**

Phase 1 Results. In Phase 1, when asked if SimChart has helped students learn, 92 percent of respondents (34 of 37) responded "yes" to this question. When asked "in what ways," nurse educators provided qualitative feedback that was analyzed and formulated into statements for the Likert-type scales for confirmation in Phase 2 of the study. Thirty statements were received from respondents in this phase, related to how SimChart helped students learn. Examples of one respondent's statements are given below:

> *"We are still learning and working out the bugs, but the students find it a positive experience as they feel like they are a real RN and responsible for documenting all aspects of care and developing and evaluating that care. I feel it really helps pull it all together and enhances clinical reasoning. I can't wait to use it again next year, now that I have finally taken the time to figure out how to use it."*

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A second respondent wrote: *"It is really easy to use, so that all of their brain power does not go into logistics. Also it is consistent with all instructors, so there is no learning curve with each rotation."*

A third respondent answered: *"Simchart helped them with writing care plans, finding medication information and becoming familiar with electronic records."* Themes that emerged included electronic record content, navigation of an EHR, and data collection and entry. Nurse educators reported that SimChart resembled the charts that students see in clinical and "felt like a real RN when using SimChart."

Phase 2 Results. To determine level of nurse educators agreement with these items, statements were placed into a Likert-type scale format, where 1 is "strongly disagree" and 6 is "strongly agree" for the Phase 2 Qualtrics® survey. Results of the Phase 2 survey analysis for the statements about what hindered SimChart's introduction are given in Table 11.

Phase 3 Results. Again, items about student learning that had low levels of nurse educator agreement in Phase 2 (in this case, less than 55%) were eliminated before the Phase 3 survey, as suggested by Delphi technique. Nurse educators were asked to rate their level of agreement with the rating that other nurse educators had given about student learning in Phase 2, as generated by Phase 2 data analysis. See Table 12 for Phase 3 results for this question about student learning with SimChart. Percent of agreement, means and standard deviations are given for each factor that was listed about what students learned when using SimChart. Items are ranked according to percentage of agreement.

Table 11. Phase 2 Data: What Students Learned With an Academic EHR.

	% of Some Form of Agreement	M	SD
1. Using SimChart, our students learned how information is organized in an electronic record.	80.0	4.44	1.32
2. Using SimChart, our students learned how to navigate an EHR.	82.4	4.37	1.37
4. Using SimChart, our students learned about data collection and entry.	82.4	4.46	1.31
5. SimChart is very complex to learn and use, but the complexity is outweighed by the benefits to student learning.	52.9	3.46	1.27
8. Our students liked SimChart as it seemed like a real chart.	74.3	4.03	1.42
9. Our students feel like they are a real RN when using SimChart.	60.0	3.78	1.42
10. SimChart is very realistic, in that it resembles the charts that students will see in clinical.	68.6	4.08	1.46

Question 4: Has SimChart Hindered Student Learning? If so, in What Ways?

Phase 1 Results. In Phase 1, when asked if SimChart hindered student learning, and in what ways, 38% of respondents believed that SimChart had hindered student learning. When asked in what ways, respondents provided only 11 statements that were analyzed through qualitative analysis. NVivo software was used to confirm themes, which were also confirmed through an expert in qualitative research.

Table 12. Phase 3 Data: Percentage of Agreement with What Students Learned With an Academic EHR

	% of Some Form of Agreement	M	SD
1. Using SimChart, our students learned how information is organized in an electronic record (**M = 4.44**, SD = 1.32).	88.9	4.48	1.18
2. Using SimChart, our students learned how to navigate an EHR (M = 4.37, SD 1.37).	88.9	4.44	1.22
3. Using Simchart, our students learned about data collection and entry (M = 4.46, SD 1.31).	84.6	4.46	1.39
4. SimChart slowed down our simulations too much, and that hindered student learning (M = 3.40, SD = 1.54).	65.4	4.00	1.33
5. Students had to re-enter documentation and spend a lot of time looking for things in SimChart, which hindered their learning (M = 3.85, SD= 1.27, 66.7%)	59.3	3.81	1.36
6. SimChart took the focus off the patient and put the focus of the learning on the computer (M = 3.53, SD = 1.46).	55.6	3.85	1.29

Examples of hindrances to learning are given in participant statements below:

"It does not facilitate critical thinking. Too many things are choices from drop down menus, no thinking involved."

Another respondent wrote, *"At times students have to re-enter documentation because of a server error."*

A third respondent had the following comments: *"It slowed down our sims…they were more focused on finding the orders/labs than focusing on the patient."*

Three resultant themes about factors that hindered student learning were identified, which included 1) slowing down simulations; 2) shifting the focus of learning

to the computer; and 3) time and re-entry of data. These statements were formulated into

statements for the Qualtrics® Likert-type scale for the survey in Phase 2 (See Table 13).

Table 13. Phase 2 Data: Hindrances to Student Learning When Using an Academic EHR

	Percent of Agreement	M	SD
1. SimChart slowed down our simulations too much, and that hindered student learning	47.1	3.40	1.54
2. In the sim room, SimChart took the focus off the patient and put the focus of the learning on the computer.	48.6	3.53	1.46
3. Students had to re-enter documentation and spend a lot of time looking for things in SimChart, which hindered their learning.	65.7	3.86	1.27

Phase 2 Results. To determine level of faculty agreement with these items,

statements were placed into a Likert-type scale format, where 1 is "strongly disagree" and

6 is "strongly agree." Results from Phase 2 data analysis is given in Table 13.

From instructor responses, the hindrance that came closest to reaching consensus

levels (75%) was related to how much time students needed to look for things in the

electronic record, which almost reached consensus with an agreement level of 66%.

Phase 3 Results. Nurse educators were asked to rate their level of agreement with

the rating that other nurse educators had given about hindrances to student learning in

Phase 2, as generated by Phase 2 data analysis. See Table 14 for Phase 3 results for this

question. Percentage of agreement, means, and standard deviations are given for each

factor that was listed as a hindrance to student learning. Items are ranked according to

percentage of agreement.

Table 14. Phase 3 Data: Percentage of Agreement with Factors That Hindered
Student Learning

	Percent of Agreement	M	SD
1. SimChart slowed down our simulations too much, and that hindered student learning (M=3.40, SD=1.54)	65.4	4.0	1.33
2. Students had to re-enter documentation and spend a lot of time looking for things in SimChart, which hindered their learning.(M=3.86, SD=1.27)	59.3	3.81	1.36
3. In the sim room, SimChart took the focus off the patient and put the focus of the learning on the computer. (M=3.53, SD=1.46)	55.6	3.85	1.29

Summary

In Chapter IV, research findings were presented, including demographics and data

analysis results for all three phases of the study to answer the four research questions that

were asked in this study, followed by a discussion of the findings. Chapter V concludes

the dissertation by presenting conclusions, recommendations and reflections.

CHAPTER V

DISCUSSION

The purpose of this study was to determine the opinions of nurse educators

throughout the state of North Dakota (ND) who are currently using the academic

Electronic Health Care Record (EHR) known as SimChart. In this dissertation research

study, factors that have either hindered or facilitated the introduction of SimChart in

nursing programs across the state of ND were examined. Additionally, opinions were

sought from nurse educators regarding whether or not SimChart contributed to student

learning. In this chapter, the reader will find: a summary of findings with respect to the

literature; broad based conclusions drawn; recommendations to educators and future

researchers; limitations of the study; and reflections by the researcher.

Study Findings

This section was guided by the four research questions in the study. For each

question, results from each phase are given, supported by findings in the literature.

**Question 1: What Factors Have Facilitated the
Introduction of an Academic EHR?**

Funding, administrative support, opinions of other nurse educators in the state,

local peer support in the form of nurse educator champions, teaching strategies that were

used by nurse educators (scaffolding information), initial orientation sessions, ongoing

training, and the product characteristic of fidelity (it seemed like a real chart) were

initially listed as facilitating factors by nurse educators and confirmed by nurse educators by high levels of agreement (greater than 75%) in Phase 2 and in Phase 3.

When stricter measures were used (1 standard deviation as a cut-off determinant), funding for SimChart was isolated as the only factor that was determined to be a facilitator of SimChart implementation in Phase 2 and 3.

Administrative support and funding were also listed as facilitating factors in several other studies related to EHR adoption (Bjorvell et al., 2003; Boonstra & Broekhuis, 2010; Fountain, 2011). Peer support was listed as a facilitator for EHR adoption in one other study (Vedel et al., 2012).

Question 2: What Factors Have Hindered The Introduction of an Academic EHR?

Incompatibility with affiliating agencies, nurse educator reluctance to use the product, lack of nurse educators time to learn about and implement the EHR, complexity of the product, flaws in the EHR such as lack of modifiability, and nurse educators' technology skills were hindrances listed initially by nurse educators in the study.

The product's lack of modifiability and the nurse educators' desire to learn more about the product, but limited time to do so, were verified as hindrances in phases 2 and 3 with a high level of agreement (80% or greater). When stricter statistical measures were applied (a standard deviation of 1.0 was used), the lack of modifiability of SimChart was identified as a sole hindrance (M=4.85, SD=.95) in SimChart's adoption. If considered to be "complexity," this is a characteristic that supports Rogers' (2003) theory about slower adoption for innovations that are complex. There are no other reported studies that discuss a lack of modifiability of an EHR as a disadvantage of the product.

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Time has been listed as a barrier to written documentation and EHR use in many studies (Blair & Smith, 2012), and this study supports the notion that time was a factor in the adoption of an academic EHR. Complexity of EHRs was reported as a hindrance to implementing electronic documentation in another study of nursing students (Kowitlawakul et al., 2012), and confirmed in this study as well, if "lack of modifiability" means the same as complexity.

The DoI theory indicates that complexity is an important factor in the ultimate adoption, or more specifically, non-adoption of an innovation. Nonetheless, researchers who have studied adoption of innovations indicate that complex innovations will be adopted by those who perceive benefits associated with the innovation (Vedel et al., 2012).

Question 3. Has SimChart Helped Students Learn? If so, in What Ways?

Content-specific themes emerged in Phase 1 when nurse educators were asked if SimChart helped students learn. Nurse educators reported that students learned about electronic record content, how to navigate an EHR, and how to collect and enter data using SimChart.

Overall, through Phase 1 and Phase 2 data analysis, participants verified that students learned content about EHRs using SimChart. Nurse educators again demonstrated a high level of agreement. However, when standard deviation of 1.0 was used, for both phases 2 and 3, the statements were not supported statistically. The rationale for dispersion on this item is difficult to interpret without further information about how the nurse educators were using SimChart in their courses. Differences in how

they are using the software could possibly explain why there was a lack of agreement on these items. For example, if they had only used it for a health assessment course, their answer about what students learned would be different than if they were using SimChart in a simulation room or clinical setting. Further study is warranted with more detail about how SimChart is actually being employed.

The current study's findings support those of other researchers who saw positive benefits through the use of an academic EHR (Kowitlawakul et al., 2012). This study does not as readily concur with the findings of Kennedy et al. (2009) who found that students did not learn about the EHR itself, but used the EHR to learn the nursing process.

Findings in this study raise the question as to whether or not student learning outcomes, when using an EHR for documentation, should be focused on learning about the content of the EHR, as occurred in this study, or on using the content in the EHR to learn other things. It appears that the academic EHR may be beneficial for both, which makes it imperative that nurse educators need clearly delineate what is expected from students who use the EHR in their courses. The learning outcomes for the course and curriculum should direct the use of the EHR as well.

Question 4. Has SimChart Hindered Student Learning? If so, in What Ways?

Hindrances to student learning were reported through qualitative methods in Phase 1, reflecting that SimChart slowed down simulations, shifted the focus during a simulation from the patient to the computer, and required students to spend a substantial amount of time looking through SimChart to enter data. None of these were verified

through quantitative measures in Phase 3, when using a 75% percentage of agreement or 1.0 standard deviation from the mean as a cut-off level. Further study is needed.

The fact that electronic records may consume more time than written documentation is not new. Bjorvell et al. (2003) also found that electronic documentation was more time consuming, limiting the time that nurses could spend with their patients. Shifting the focus from the patient to the computer has been reported as a drawback to EHRs in other studies of nurses in healthcare settings (DeVliegher et al., 2010), so this finding is not unusual, but does deserve further study. In this study, some nurse educators reported that students spent a large amount of time involved in the chart to find what they needed. Whether this is a positive or negative aspect remains to be seen; in this study, nurse educators identified it as a hindrance to learning in Phase 1, but this was not affirmed by other nurse educators in subsequent phases.

Regarding the shift in focus from the patient to the computer, standard deviations were at 1.27 and above for these items, indicating that there was dispersion on opinions about this item. The topic is an interesting one that deserves further study. While students use EHRs to locate information that may be important to a patient's care, it may take the focus away from a patient's current needs. Further study about whether students focus too much attention on the computer in simulation rooms or in real patient care settings would be beneficial.

Conclusions

In this dissertation research study, factors that have either hindered or facilitated the introduction of SimChart in nursing programs across the state of ND were examined.

Additionally, opinions were sought from nurse educators regarding whether or not SimChart contributes to student learning.

Factors that clearly facilitated the implementation of SimChart included funding, administrative support, nurse educator development, opinions of other nurse educators in the state of ND, product characteristics, and teaching strategies that were employed by nurse educators when SimChart was used. Factors that were identified as hindrances to SimChart's adoption included lack of modifiability of SimChart, and lack of nurse educator time to implement the EHR to its fullest potential. Students learned how an EHR was organized, learned how to navigate an EHR, and learned how to collect and input data into an EHR. While hindrances to learning were initially listed in Phase 1, fewer hindrances (11) than facilitators (30) were reported, and no hindrances were confirmed through strict analytical means (Phase 3).

Nurse educators reported comfort with technology, and proficiency in many technologies, less so for SimChart than for other methods they were familiar with. Funding, administrative support, and educational efforts to introduce the product were clearly delineated as being important factors in the adoption of this EHR. Nurse educators did not agree that the product was too complex for themselves or their students, but did agree that the product's lack of modifiability was a factor that hindered SimChart's implementation in this state. Qualitative items yielded rich data that was confirmed in subsequent phases through percentages of agreement, yet not for all items when strict cut-off scores were used for data interpretation.

In regard to support or non-support of the DoI theory, compatibility is identified by Rogers (2003) as a characteristic that influences innovation adoption. Nurse

educators' qualitative comments about SimChart included that the product "resembled what students see in real clinical settings." This statement inferred that SimChart possessed the characteristic of compatibility; in this case, compatibility with current clinical practice. The characteristic of observability (Rogers, 2003) was affirmed by respondents who stated that opinions of other nurse educators in the state were important in their selection and use of SimChart. Trialability of an innovation has a positive influence on adoption. In this study, respondents stated "we just experimented with it and it helped," and that was reported as facilitating the implementation of SimChart.

Complexity is a characteristic of an innovation that may impede its adoption (Rogers, 2003). Complexity of the product was denied by participants when statistical measures were applied, but may be implied by their report of "lack of modifiability" of SimChart which added time to their adoption of the product. It is recommended that efforts at improving this product might focus on simplifying the process by which instructors enter data into SimChart, as simplicity is recognized by Rogers (2003) as being associated with faster adoption rates. This is the same recommendation that Vedel et al. (2013) makes from a meta-analysis of EHR literature, where they conclude that simplicity and compatibility need to be improved for better adoption of EHRs in geriatrics.

As mentioned previously, health care workers may adopt innovations more easily through learning about barriers that impede their adoption (Cain & Mittman, 2002). In this study, the barriers associated with the product were the time needed to learn about the EHR and its lack of modifiability. Grol (1997) states that once barriers are identified, changes can be made in an effort to adopt an innovation. Educators who use academic

EHRs must be aware that their adoption is somewhat complex and time-consuming. They can then take steps to improve the adoption of academic EHRs by planning time for nurse educators and students to learn about the product, and diffuse the complexity of learning about the EHR by scaffolding learning activities.

Recommendations

Recommendations for Nurse Educators

The researcher recommends the use of academic EHRs in nursing education, as benefits to learning were noted in the current study. Nurse educators should continue to enhance their technological skills and incorporate technology into their teaching, embracing these newer technologies which hold promise for learning potential.

When using academic EHRs, nurse educators need adequate time to fully integrate them into their teaching/learning activities for students. Time was a hindrance to the adoption of this EHR, as previous researchers found (Chang, 1997; Faria & Wellington, 2004; Lean et al., 2006) who listed time as a barrier to technology implementation. When adopting EHRs, nurse educators need support in terms of time and financial reimbursement for initial and ongoing education about the EHRs. Remuneration and recognition may also be needed for nurse educators who are the "champions" for the EHR's introduction.

EHRs should be introduced early in the curriculum and their use linked to curriculum and course objectives (Elliott et al., 2011). New technologies, such as EHRs should be investigated and their effectiveness in academia or lack thereof should be communicated to colleagues, to maintain high quality standards in education, as

suggested by the Scholarship of Teaching and Learning (SoTL) (Boyer, 1990; Laksov, McGrath, & Silen, 2010).

Scaffolding of information, experimenting with the product, and having super-users were all identified as facilitators for introducing the EHR. Recommendations from other studies include stepped implementation, where integration of EHRs occurred one course at a time (Meyer et al., 2011), due to the overwhelming nature of the introduction of EHRs.

In this study, SimChart use was facilitated with administrative support and funding, and its use resulted in positive effects on student learning. Without question, administrative support and funding is needed for the implementation of new technologies, and should include technical support for troubleshooting issues that arise (Meyer et al., 2011). Infrastructure that includes funding for initial and ongoing training of EHRs is critical.

Recommendations for Researchers

Further identification of the factors associated with electronic health record implementation is needed. Studies about the best way to implement EHRs may be of benefit, e.g., studying whether online learning methods, available from companies that develop the products for nurse educators, are superior to having an on-site training or super-user on-site may be of value.

Further studies which compare various academic EHRs are recommended. In particular, studies which compare non-academic and academic EHRs would be helpful.

It is recommended that nurse researchers study academic EHRs and their relationship to patient safety. It is yet to be determined whether paper and pencil or

electronic documentation methods are superior for promoting patient safety. Ultimately, research which demonstrates a connection between what students learn in educational programs and patient safety outcomes is important.

An academic EHR can be used throughout a nursing curriculum in a variety of ways. Studies about teaching and learning strategies associated with EHR use are recommended, and the development of a model of academic EHR usage throughout the nursing curriculum using sound pedagogical theory would be beneficial.

Limitations

The current study sample was small, including 37 nurse educators in Phase 1, 39 in Phase 2 and 27 in Phase 3. Furthermore, the study was conducted in one state and related to the use of one type of electronic health record. Therefore, one cannot generalize the findings of this study to other states or programs utilizing other electronic health records.

Missing data resulted from participants who did not complete the entire survey, particularly in Phase 2. This is somewhat unexpected but is explained by a Qualtrics® question that asked participants if they had participated in Phase 1 of the study. The question was intentionally placed after the Likert-type scale questions in an effort to obtain demographics only for those who had not participated in Phase 1. It was the researcher's intent to not tax the participants who had already completed the demographics in Phase 1. Because this was a three-part Delphi study, unduly asking the same questions could fatigue participants and discourage participation in Phase 3, which was an important phase of the study. Nearly every subject who had not completed Phase 1 responded to that question that they had in fact completed Phase 1, and the resultant

effect is that this "display logic" type question sent them to the end of the survey without completing demographics. Demographics were subsequently only obtained for a maximum of 17 participants in Phase 2. This could limit the study's findings.

There was attrition of the original panel members. In anticipation of that at the outset of the study, it was decided that all 133 identified nurse educators would be invited to each phase, yet readers must understand that doing so limits study findings, since the expert panel was composed of differing participants throughout the study.

Finally, the study sample was small for each phase of the study. While there were adequate numbers of responses, particularly in qualitative data items, from which to draw conclusions and meet the purpose of this study, the amount of missing data in demographics from Phase 2 compromised the content validity of these items, since it was not possible to fully describe the demographics of the expert panel.

Reflections

The opportunities provided in this research study were many. Interacting with colleagues from around the state of North Dakota was enlightening and encouraging, in that their responses were full of meaningful information and intensity that may not have been fully captured with quantitative methods alone. I was encouraged by their persistence and interest in the topic. While EHRs are new to the state and may not be fully implemented for several years, I am confident that they are in the hands of enthusiastic educators in nursing education.

APPENDICES

Michelle L. Bowles, M.P.A., CIP
Coordinator, Institutional Review Board
Research Development and Compliance
University of North Dakota
Twamley Hall, Room 106
264 Centennial Drive Stop 7134

March 19, 2013

To: Members of the Institutional Review Board, UND

As members of the College and University Nursing Education Administrators (CUNEA), we are pleased to provide this letter of support for Darlene Hanson's study entitled "Nurse Educator Consensus Opinions on Using an Academic Electronic Health Record."

We are interested in learning about the factors that have hindered or facilitated the use of the academic record that was chosen by the Nursing Education Consortium for our students and faculty in the state of North Dakota. Please consider this our endorsement for the study to occur. Thank you for your consideration.

Sincerely,

CUNEA members
Glenda Reemts   Glenda Reemts

REPORT OF ACTION: EXEMPT/EXPEDITED REVIEW
University of North Dakota Institutional Review Board

Date: 3/21/2013   Project Number: IRB-201303-279

Principal Investigator: Hanson, Darlene

Department: Practice and Role Development

Project Title: Nurse Educators' Consensus Opinion on Using an Academic Electronic Health Record

The above referenced project was reviewed by a designated member for the University's Institutional Review Board
on ___3/22/2013___ and the following action was taken:

☐ Project approved. **Expedited Review** Category No. _____
   Next scheduled review must be before: _____

   ☐ Copies of the attached consent form with the IRB approval stamp dated _____
      must be used in obtaining consent for this study.

☒ Project approved. **Exempt Review** Category No. _2_
   This approval is valid until ___December 10, 2013___ as long as approved procedures are followed. No
   periodic review scheduled unless so stated in the Remarks Section.

   ☐ Copies of the attached consent form with the IRB approval stamp dated _N/A-Online_
      must be used in obtaining consent for this study.

☐ Minor modifications required. The required corrections/additions must be submitted to RDC for review and
   approval. **This study may NOT be started UNTIL final IRB approval has been received.**

☐ Project approval **deferred. This study may not be started until final IRB approval has been received.**
   (See Remarks Section for further information.)

☐ Disapproved claim of exemption. This project requires Expedited or Full Board review. The Human Subjects
   Review Form must be filled out and submitted to the IRB for review.

☐ Proposed project is not human subjects research as defined under Federal regulations 45 CFR 46 or 21 CFR 50 and
   does not require IRB review.

      ☐ Not Research   ☐ Not Human Subject

PLEASE NOTE: Requested revisions for student proposals MUST include adviser's signature. All revisions
              MUST be highlighted and submitted to the IRB within 90 days of the above review date.

☒ Education Requirements Completed. (Project cannot be started until IRB education requirements are met.)

cc: Dr. Myrna Olson

Michelle L Bowles 3/22/2013
Signature of Designated IRB Member   Date
UND's Institutional Review Board

If the proposed project (clinical medical) is to be part of a research activity funded by a Federal Agency, a special assurance
statement or a completed 310 Form may be required. Contact RDC to obtain the required documents.

(Revised 10/2006)

March 25, 2013

Darlene Hanson
430 Oxford Street
Grand Forks, ND 58202-9025

Dear Ms. Hanson:

We are pleased to inform you that your project titled, "Nurse Educators' Consensus Opinion on Using an Academic Electronic Health Record" (IRB-201303-279) has been reviewed and approved by the University of North Dakota Institutional Review Board (IRB). <u>The expiration date of this approval is December 10, 2013.</u>

As principal investigator for a study involving human participants, you assume certain responsibilities to the University of North Dakota and the UND IRB. Specifically, any adverse events or departures from the protocol that occur must be reported to the IRB immediately. It is your obligation to inform the IRB in writing if you would like to change aspects of your approved project, prior to implementing such changes.

When your research, including data analysis, is completed, you must submit a Research Project Termination form to the IRB office so your file can be closed. A Termination Form has been enclosed and is also available on the IRB website.

If you have any questions or concerns, please feel free to call me at (701) 777-4279 or e-mail michelle.bowles@research.und.edu.

Sincerely,

Michelle L. Bowles, M.P.A., CIP
IRB Coordinator

MLB/jle

Enclosures

Informed Consent Form

STATEMENT OF RESEARCH

A person who is to participate in the research must give his or her informed consent to such participation. This consent must be based on an understanding of the nature and risks of the research. This document provides information that is important for this understanding. Research projects include only subjects who choose to take part. Please take your time in making your decision as to whether to participate. If you have questions at any time, please ask.

WHAT IS THE PURPOSE OF THIS STUDY?

You are invited to be in a research study about factors that have facilitated or hindered using an academic electronic health record, which in this case is entitled "SimChart" because you are teaching in one of the schools of nursing in the state of North Dakota which has agreed to purchase this EHR for their nursing students. The purpose of this dissertation study is to determine which factors have made a difference in the adoption of SimChart, as well as to obtain instructor consensus opinions on whether or not the product is facilitating or hindering student learning. It is important to base our instructional methods on evidence-based research, and this study will gather evidence and analyze the factors which nurse educators list as being important.

HOW MANY PEOPLE WILL PARTICIPATE?

It is hoped that approximately 70 people will take part in this study across the state of North Dakota.

HOW LONG WILL I BE IN THIS STUDY?

Your participation in this study could last approximately 6 weeks if you choose to participate, but only 3 short surveys will be completed during that time. You will complete the surveys via Qualtrics® survey format, which is an online survey method, and you may complete this from your own office or computer. Each survey is expected to take less than 15 minutes to complete. You may discontinue participation at any time.

WHAT WILL HAPPEN DURING THIS STUDY?

Initially, you will complete a demographic data collection form, which asks about your years of experience with teaching, with SimChart, and basic demographic information such as age, gender, and educational preparation. You are to feel free to skip any

questions that you would prefer not to answer. The survey will then simply ask, in an open-ended manner, about factors that you feel have facilitated the use of SimChart and factors that you feel have hindered SimChart use. Additional questions will ask whether or not you feel the product has helped or hindered student learning. Once all instructors have completed the initial survey, results will be analyzed and you will be sent a survey to verify statements made by other instructors, in Likert scale fashion. Following the second survey, you will be given the other instructors' percent of agreement (without any instructor identifiers) with the statements and asked to verify your opinions, knowing what other instructors have responded. The surveys will be sent out approximately 2 weeks apart, for a total of 6 weeks participation time.

WHAT ARE THE RISKS OF THE STUDY?

There are no foreseeable risks to participating in the study. Data will be reported in aggregate from so no nurse educators who participate will be identified in any study reporting. You may stop at any time or choose not to answer questions.

WHAT ARE THE BENEFITS OF THIS STUDY?

You may not benefit personally from being in the study. It is hoped that in the future, other instructors and nursing students might benefit from the results of this study because the knowledge gained is pertinent to how innovations in nursing education are adopted.

CONFIDENTIALITY

 Your identity will be guarded by coding the data that is obtained. E-mail addresses will be deleted from the researchers' institutional e-mail files after study completion. If you choose not to participate, this will not affect your employment or status. All data obtained from participants will be kept confidential and will only be reported in an aggregate format (by reporting only combined results and never reporting individual ones). All questionnaires will be concealed, coded and analyzed using a statistical package. No one other than then primary investigator and advisor listed below will have access to them. The data collected will be stored in the HIPAA-compliant, Qualtrics-secure database until it has been deleted by the primary investigator.

WILL IT COST ME ANYTHING TO BE IN THIS STUDY?

There will be no costs for being in this research study.

WILL I BE PAID FOR PARTICIPATING?

You will not be paid for being in this research study. Names of individuals completing the survey who consent to be in a drawing will be entered into a drawing for a $50.00 gift

certificate for each phase of the study, and will be notified within 1 month of completing the study phase. This information will not be disclosed to other participants.

WHO IS FUNDING THE STUDY? The study is being funded by the researcher. The University of North Dakota and the researcher is not receiving payments from other agencies, organizations or companies to conduct this study.

CONFIDENTIALITY

The records of this study will be kept private to the extent permitted by law. In any report about this study that might be published, you will not be identified. Your study record may be reviewed by Government agencies, the UND Research Development and Compliance office, and the University Of North Dakota Institutional Review Board. Any information that is obtained in this study and that can be identified with you will remain confidential and will be disclosed only with your permission or as required by law. Confidentiality will be maintained by means of coding the survey results and maintaining the data in a locked file for 3 years after data is compiled.

IS THIS STUDY VOLUNTARY?

Your participation is voluntary. You may choose not to participate or you may discontinue your participation at any time without penalty or loss of benefits to which you are otherwise entitled. Your decision whether or not to participate will not affect your current or future relations with the University of North Dakota. If you decide to discontinue your participation in the study, I ask that you notify the study researcher through a phone call or e-mail. E-mail: darlene.hanson@und.edu Phone - 701-777-4551. Your e-mail will be deleted as soon as your withdrawal is noted.

If you have questions regarding this study, you may contact Darlene Hanson, at 701-777-4551 or darlene.hanson@und.edu

If you have questions you do not feel comfortable asking the researcher, you may contact Dr Myrna Olson, advisor, 701-777-3188, myrna.olson@und.edu If you have questions regarding your rights as a research subject, or if you have any concerns or complaints about the research, you may contact the University of North Dakota Institutional Review Board at 701-777-4279.

Your answer to the next item indicates that this research study has been explained to you, that your questions have been answered, and that you agree to take part in this study. Please feel free to print this form for future reference.

Appendix D
Phase 1: E-mail Request and Reminder for Survey Participation

To: ND Undergraduate Nursing Faculty

From: Darlene Hanson, RN, MS, PhD

Re: "Nurse Educator Consensus Opinions about Using an Academic Electronic Health Record"

Recently, programs of nursing in the state of North Dakota, through the nursing education consortium, agreed to purchase the same academic electronic health record (SimChart®).

Your opinion on this product's implementation is very much needed. You are invited to participate in dissertation survey, entitled "Nurse Educator Consensus Opinions of Using an Academic EHR." This is Phase 1 of a 3-Phase survey. You are encouraged to take part in all 3 surveys as links are e-mailed to you, but you may discontinue your participation at any time.

Should you choose to do so, your name will be entered into a drawing for a $50.00 gift card for completing the survey.

At this time, the following link will take you to Phase 1 of the Qualtrics survey. A full consent form can be viewed at this link:

_____

The survey will take approximately 15 minutes to complete. In the coming weeks, you will receive two additional requests to verify the results of the initial survey.

Thank you so much for participating – your responses are invaluable to exploring the use of this academic EHR.

E-mail Reminder

Dear Nurse Educator,

Recently you were asked to complete a survey about SimChart, an academic electronic health record which is being used by programs of nursing in the state of North Dakota. Would you please consider completing the survey before ____(date)_____? Your timely response and your expertise in this matter is very important to the survey results.

The survey may be found at the following link.

_____

Remember that you are also eligible for a drawing for a $50.00 gift card if you complete this phase of the study!

If you have already completed Phase 1 of the survey, please disregard this second request. Thank you so much for your time.

Appendix E
Phase 2: Protocol Change Form and Approval

PROTOCOL CHANGE FORM
UNIVERSITY OF NORTH DAKOTA INSTITUTIONAL REVIEW BOARD

Please complete this form and attach revised research documents for any proposed change to your protocol, consent forms, or any supportive materials (such as advertisements, questionnaires, surveys, etc.). All changes must be highlighted. Any proposed change in protocol affecting human participants must be reviewed and approved by the IRB prior to implementation, except where an immediate change is necessary to eliminate a hazard to the participant.

Principal Investigator: Darlene Hanson

Telephone: 701-777-4551   E-mail Address: Darlene.hanson@und.edu

Complete Mailing Address: 2222 11th Ave NW, East Grand Forks, MN 56721

School/College: Student in Teaching & Learning: EHD   Department: College of Nursing & Professional Disciplines

Project Title: Nurse Educators' Consensus Opinion on Using an Academic Electronic Health Record

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Proposal Number: IRB-201303-279   **Approval Date:**   03-25-2013

THE CURRENT STATUS OF THE PROJECT IS (Check one)

X   Project currently in progress. Number of subjects enrolled is: **38**

_____ Project not yet started. No subjects enrolled.

_____ Project closed to subject entry.

1. Briefly describe and explain the reason for the revision or amendment and the justification for the change. Include a copy of affected protocol pages and consent form with specific changes highlighted.

This is Phase 2 of a Phase 3 study. Answers from respondents in Phase 1 were used to create the Likert-type scale that is being used in phase 2 of this study, as planned. The entire survey for Phase 2 is attached, with the Likert-type scale statements highlighted.

2. Does the change affect the study or subject participation (procedures, risks, costs, etc.)?   _____ Yes   X   No

Please explain:

3. Does the change affect the consent document?   _____ Yes   X   No

If yes, include the revised consent form(s) with the changes highlighted, and a clean copy of the revised consent form(s).

By signing below, you are verifying that the information provided in the Human Subjects Review Form and attached information is accurate and that the project will be completed as indicated.

Signatures:

Darlene Hanson   _4-16-13_

Principal Investigator   Date:

_____   _____

Student Adviser (if applicable)   Date:

Revised 5/1/06

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REPORT OF ACTION: PROTOCOL CHANGE
University of North Dakota Institutional Review Board

Date: 4/17/2013   Project Number: IRB-201303-279

Principal Investigator: Hanson, Darlene

Department: Teaching and Learning

Project Title: Nurse Educators' Consensus Opinion on Using an Academic Electronic Health Record

The above referenced project was reviewed by a Designated Member for the University's Institutional Review Board
on ___4/17/2013___ and the following action was taken:

☐ Protocol Change approved. **Expedited Review**   Category No. _____
Next scheduled review must be before: _____

  ☐ **Copies of the attached consent form with the IRB approval stamp dated** _____
  must be used in obtaining consent for this study.

☒ Protocol Change approved. **Exempt Review**   Category No. ___2___
  This approval is valid until ___DEC 1 0 2013___ as long as approved procedures are followed.
  No periodic review scheduled unless so stated in the Remarks Section.

  ☐ **Copies of the attached consent form with the IRB approval stamp dated** _____
  must be used in obtaining consent for this study.

☐ Minor modifications required. The required corrections/additions must be submitted to RDC for review and
approval. **This study may NOT be started UNTIL final IRB approval has been received.**
(See Remarks Section for further information.)

☐ Protocol Change approval **deferred. This study may not be started until final IRB approval has been received.**
(See Remarks Section for further information.)

☐ Protocol Change **disapproved. This study may not be started until final IRB approval has been received.**

REMARKS: **Any unanticipated problem or adverse occurrence in the course of the research project must
be reported within 5 days to the IRB Chairperson or RDC by submitting an Unanticipated
Problem/Adverse Event Form.**

**Any changes to the Protocol or Consent Forms must receive IRB approval prior to being
implemented (except where necessary to eliminate apparent immediate hazards to the subjects
or others).**

PLEASE NOTE: **Requested revisions for student proposals MUST include adviser's signature. All revisions
MUST be highlighted and submitted to the IRB within 90 days of the above review date.**

☒ Education Requirements Completed. (Project cannot be started until IRB education requirements are met.)

cc: Dr. Myrna Olson

Signature of Designated IRB Member   4/17/2013
UND's Institutional Review Board   Date

If the proposed project (clinical medical) is to be part of a research activity funded by a Federal Agency, a special assurance
statement or a completed 310 Form may be required. Contact RDC to obtain the required documents.

(Revised 10/2006)

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Appendix F
Phase 2: Informed Consent Form

INTRODUCTION
The purpose of this dissertation study is determine which factors have hindered or facilitated the use of SimChart, an academic electronic health record, as well as to obtain instructor consensus opinions on whether or not the product is facilitating or hindering student learning. It is important to base our instructional methods on evidence-based research, and this study will gather evidence and analyze the factors which faculty list as hindering or facilitating the introduction of SimChart, our chosen electronic health record by the Nursing Education Consortium in the state of North Dakota.

PROCEDURES
The study in total has 3 phases; Phase 1 is already complete. At this time you are being asked to complete phase 2 of the study, and it is okay if you have not done phase 1. It would be very helpful if you complete both phase 2 and 3, but you are free to stop at any time. For this phase (Phase 2)of the study, you will receive a Likert-type scale with instructor opinion statements to respond to. You will be asked to complete the demographic information if you have not already done so. For Phase 3, you will be asked to verify your opinions once you have seen what is reported by other instructors, in aggregate format. Instructors will not be individually identified, nor will they be identified by school. Each questionnaire will take less than 15 minutes to complete, and you are free to skip any questions that you would prefer not to answer. Questions are designed to elicit your opinions about the electronic health record's implementation and its effect on student learning. This questionnaire will be conducted with an online Qualtrics-created survey. The surveys will be sent out approximately 2 weeks apart, for a total of 4 weeks' participation time should you participate in Phase 2 and 3.

RISKS/DISCOMFORTS
There are no foreseeable risks to participating in the study. Data will be reported in aggregate form so no faculty who participate will be identified in any study reports.

BENEFITS
You may not benefit personally from being in the study. It is hoped that in the future, other instructors and nursing students might benefit from the results of this study because the knowledge gained is pertinent to how innovations in nursing education are adopted.

CONFIDENTIALITY
All data obtained from participants will be kept confidential and will only be reported in an aggregate format (by reporting only combined results and never reporting individual ones). All questionnaires will be concealed, coded and analyzed using a statistical package. No one other than then primary investigator and advisor listed below will have access to them. The data collected will be stored in the HIPAA-compliant, Qualtrics-secure database until it has been deleted by the primary investigator.

COMPENSATION
A drawing for a gift card for $50.00 will be done after each phase of the study, for all participants in that phase who provide consent.

Participation in this research study is completely voluntary. You have the right to withdraw at anytime or refuse to participate entirely. If you decide to withdraw, please close your internet browser and notify the principal investigator at this email: (darlene.hanson@und.edu). Your e-mail will be deleted as soon as your withdrawal is noted.

If you have questions regarding this study, you may contact Darlene Hanson, at 701-777-4551 or darlene.hanson@und.edu

If you have questions you do not feel comfortable asking the researcher, you may contact Dr Myrna Olson, advisor, 701-777-3188, myrna.olson@und.edu

To: ND Undergraduate Nursing Faculty

From: Darlene Hanson, RN, MS, PhD

Re: "Nurse Educator Consensus Opinions about Using an Academic Electronic Health Record"

Recently, programs of nursing in the state of North Dakota, through the nursing education consortium, agreed to purchase the same academic electronic health record (SimChart®).

You are invited to participate in dissertation survey, entitled "Nurse Educator Consensus Opinions of Using an Academic EHR." This is Phase 2 of a 3-phase survey, and you may participate regardless of whether you participated in Phase 1. In this phase of the study, you will be asked to respond to a Likert-type scale which was created from statements from other instructors in Phase 1. You are encouraged to take part in both Phase 2 and 3 when the links are e-mailed to you, and you may discontinue your participation at any time.

At this time, the following link will take you to a Qualtrics survey. A full consent form can be viewed at this link:

_____

The survey will take approximately 10 minutes to complete. Should you choose to do so, your name will be entered into a drawing for a $50.00 gift card for completing the survey.

In the coming weeks, you will receive one additional request to verify the results of the survey.

Thank you so much for participating – your responses are invaluable to exploring the use of this academic EHR.

Dear Nurse Educator,

Recently you were asked to complete a survey about an academic electronic health record which is being used by programs of nursing in the state of North Dakota. Would you please consider completing the survey before ___(date)_____? Your timely response, along with your expertise about SimChart is very important to the survey results.

The survey may be found at the following link.

_____

Remember that you are also eligible for a drawing for a $50.00 gift card if you complete this phase of the study!

If you have already completed the Phase 2 survey, please disregard this second request. Thank you so much for your time.

Appendix H
Phase 3: IRB Protocol Change

PROTOCOL CHANGE FORM
UNIVERSITY OF NORTH DAKOTA INSTITUTIONAL REVIEW BOARD

Please complete this form and attach revised research documents for any proposed change to your protocol, consent forms, or any supportive materials (such as advertisements, questionnaires, surveys, etc.). All changes must be highlighted. Any proposed change in protocol affecting human participants must be reviewed and approved by the IRB prior to implementation, except where an immediate

Principal Investigator: Darlene Hanson

Telephone: 701-777-4551 `   Darlene.hanson@und.edu

Complete Mailing Address: 2222 11th Ave NW, East Grand Forks, MN 56721

School/College: Student in Teaching & Learning: EHD   Department: College of Nursing & Professional Disciplines

change is necessary to eliminate a hazard to the participant.

Project Title: Nurse Educators' Consensus Opinion on Using an Academic Electronic Health Record

Proposal Number: IRB-201303-279   **Approval Date:** 03-25-2013

THE CURRENT STATUS OF THE PROJECT IS (Check one)

X   Project currently in progress. Number of subjects enrolled is: **39 in phase 1; 41 in phase 2**

_____   Project not yet started. No subjects enrolled.

_____   Project closed to subject entry.

1. Briefly describe and explain the reason for the revision or amendment and the justification for the change. Include a copy of affected protocol pages and consent form with specific changes highlighted

This is Phase 3 of a three phase study. Changes that have been made:

1. Items have been re-numbered.

2. To follow-up on original protocols, content was added to the survey for instructors to respond to, from Phase 2 data, which is completed. In this Phase 3 survey, respondents are given the mean, standard deviation for item Q6, Q7, and Q8 (The questions were split into 3, for clarity). Respondents are asked to rate, on a Likert type scale, their agreement after viewing those statistics for the items.

3. Q9: Because of Delphi methodology, participants in Phase 3 need to be asked to give the researcher reasons why they disagree with any of the items, if they disagree. Item Q9 was added for that reason.

4. Q10. On the original Phase 3 survey, the researcher had a "Skip Logic" question that asked participants if they had already completed Phase 1 or 2 of the study, and if they had, they skipped to the end of the survey, without completing demographic questions. To avoid missing some necessary demographics, that question was changed to ask them to "please complete the following questions about yourself", and the survey will continue on to demographics without the Skip Logic question. This is done to avoid missing some demographic data.

5. Q10: The statistics were added, for instructors to respond to.

6. The very last item was added, for respondents to indicate whether or not they want their name put in a drawing for the gift card (the gift card was approved in the earlier protocols, but there was not a place for them to write their name on the phase 3 survey, as it had been on the first two phases).

2. Does the change affect the study or subject participation (procedures,   Yes X No

   risks, costs, etc.)?

Please explain:

3. Does the change affect the consent document?   Yes X No

If yes, include the revised consent form(s) with the changes highlighted, and a clean copy of the revised consent form(s).

By signing below, you are verifying that the information provided in the Human Subjects Review Form and attached information is accurate and that the project will be completed as indicated.

Signatures:

_____

Principal Investigator   Date:

_____

Student Adviser (if applicable)   Date:

REPORT OF ACTION: PROTOCOL CHANGE
University of North Dakota Institutional Review Board

Date: 5/13/2013   **Project Number:** IRB-201303-279

Principal Investigator: Hanson, Darlene

Department: Teaching and Learning

Project Title: Nurse Educators' Consensus Opinion on Using an Academic Electronic Health Record

The above referenced project was reviewed by a Designated Member for the University's Institutional Review Board on ___5/13/2013___ and the following action was taken:

☐ Protocol Change approved. **Expedited Review** Category No. _____
Next scheduled review must be before: _____

    ☐ **Copies of the attached consent form with the IRB approval stamp dated** _____ **must be used in obtaining consent for this study.**

☒ Protocol Change approved. **Exempt Review** Category No. ___2___
This approval is valid until ___DEC 1 0 2013___ as long as approved procedures are followed.
No periodic review scheduled unless so stated in the Remarks Section.

    ☐ **Copies of the attached consent form with the IRB approval stamp dated** _____ **must be used in obtaining consent for this study.**

☐ Minor modifications required. The required corrections/additions must be submitted to RDC for review and approval. **This study may NOT be started UNTIL final IRB approval has been received.**
(See Remarks Section for further information.)

☐ Protocol Change approval **deferred. This study may not be started until final IRB approval has been received.**
(See Remarks Section for further information.)

☐ Protocol Change **disapproved. This study may not be started until final IRB approval has been received.**

REMARKS: Any unanticipated problem or adverse occurrence in the course of the research project must be reported within 5 days to the IRB Chairperson or RDC by submitting an Unanticipated Problem/Adverse Event Form.

Any changes to the Protocol or Consent Forms must receive IRB approval prior to being implemented (except where necessary to eliminate apparent immediate hazards to the subjects or others).

PLEASE NOTE: Requested revisions for student proposals MUST include adviser's signature. All revisions MUST be highlighted and submitted to the IRB within 90 days of the above review date.

☒ Education Requirements Completed. (Project cannot be started until IRB education requirements are met.)

cc: Dr. Myrna Olson

_____ 5/13/2013
Signature of Designated IRB Member   Date
UND's Institutional Review Board

If the proposed project (clinical medical) is to be part of a research activity funded by a Federal Agency, a special assurance statement or a completed 310 Form may be required. Contact RDC to obtain the required documents.

(Revised 10/2006)

Appendix I
Phase 3: Informed Consent Form

INTRODUCTION

The purpose of this dissertation study is determine which factors have hindered or facilitated the use of SimChart, an academic electronic health record, as well as to obtain instructor consensus opinions on whether or not the product is facilitating or hindering student learning. It is important to base our instructional methods on evidence-based research, and this study will gather evidence and analyze the factors which faculty list as hindering or facilitating the introduction of SimChart, our chosen electronic health record by the Nursing Education Consortium in the state of North Dakota.

PROCEDURES

The study in total has 3 phases; Phases 1 and 2 are already complete. At this time you are being asked to complete phase 3 of the study, and it is okay if you have not done phase 1 or 2. For Phase 3, you will be asked to verify your opinions, with the knowledge of what other instructors have responded, to gain a consensus opinion about the academic electronic health record. Instructors will not be individually identified, nor will they be identified by school. Following your response to the opinion questions, you will be asked to complete demographic information if you have not done so in previous surveys. This questionnaire will take less than 15 minutes to complete, and you are free to skip any questions that you would prefer not to answer. Questions are designed to elicit your opinions about the electronic health record's implementation and its effect on student learning. This questionnaire will be conducted with an online Qualtrics-created survey.

RISKS/BENEFITS

There are no foreseeable risks to participating in the study. Data will be reported in aggregate form so no faculty who participate will be identified in any study reports.

You may not benefit personally from being in the study. It is hoped that in the future, other instructors and nursing students might benefit from the results of this study because the knowledge gained is pertinent to how innovations in nursing education are adopted.

CONFIDENTIALITY

All data obtained from participants will be kept confidential and will only be reported in an aggregate format (by reporting only combined results and never reporting individual ones). All questionnaires will be concealed, coded and analyzed using a statistical package. No one other than then primary investigator and advisor listed below will have

access to them. The data collected will be stored in the HIPAA-compliant, Qualtrics-secure database until it has been deleted by the primary investigator.

COMPENSATION

A drawing for a gift card for $50.00 will be done after this phase of the study, for all participants in this phase who wish to participate.

Participation in this research study is completely voluntary. You have the right to withdraw at anytime or refuse to participate entirely. If you decide to withdraw, please close your internet browser and notify the principal investigator at this email: (darlene.hanson@und.edu). Your e-mail will be deleted as soon as your withdrawal is noted.

If you have questions regarding this study, you may contact Darlene Hanson, at 701-777-4551 or darlene.hanson@und.edu

If you have questions you do not feel comfortable asking the researcher, you may contact Dr Myrna Olson, advisor, 701-777-3188, myrna.olson@und.edu

Appendix J
Phase 3: E-Mail Request and Reminder for Survey Participation

To: ND Undergraduate Nursing Faculty

From: Darlene Hanson, RN, MS, PhD

Re: "Nurse Educator Consensus Opinions about Using an Academic Electronic Health Record"

Recently, programs of nursing in the state of North Dakota, through the nursing education consortium, agreed to purchase the same academic electronic health record (SimChart®).

You are invited to participate in a dissertation survey, entitled "Nurse Educator Consensus Opinions of Using an Academic EHR." This is Phase 3 of a 3-Phase survey, which will seek your consensus with the opinions of other instructor statements about the EHR. You may participate regardless of whether you participated in Phase 1 or Phase 2.

The following link will take you to the Qualtrics survey. A full consent form can be viewed at this link.

_____

The survey will take approximately 15 minutes to complete.

Thank you so much for participating – your responses are invaluable to exploring the use of this academic EHR.

Dear Nurse Educator,

Recently you were asked to complete Phase 3 of a survey about SimChart, an academic electronic health record which is being used by programs of nursing in the state of North Dakota. Would you please consider completing the survey before __(date)_____? In this part of the survey, your response is essential, to confirm your opinions about this electronic record.

The survey may be found at the following link.

_____

Remember that you are also eligible for a drawing for a $50.00 gift card if you complete this phase of the study!

If you have already completed the Phase 3 survey, please disregard this second request. Thank you so much for your time!

Appendix K
Phase 1 Qualtrics Survey

SimChart Survey for ND Nursing Instructors: Phase 1 (Exported from Qualtrics, font and spacing modified)

Q1 Welcome to this survey! Thank you so much for taking time to do this - your input is appreciated!

Q2 Informed Consent Form (See Appendix A)

Q3 I have read, understood, and printed a copy of, the above consent form and desire of my own free will to participate in this study.

❍   Yes (1)
❍   No (2)

Qualtrics Display Logic Question: If "No" is selected, skip to "Q31: Thank you. Please close your browser."

Q4 Do you teach undergraduate nursing students in the state of North Dakota?

❍   Yes (1)
❍   No (2)

Q5 Are you using SimChart in your program?

❍   Yes (1)
❍   No (2)

Qualtrics Display Logic Question: If either of the above two questions are answered "No, "then the following item is displayed: Q32: Thank you. At this time, no additional information is needed. Please close your browser.

Q6 How long have you been using SimChart?

o   0 to 6 months (1)
o   7-12 months (2)
o   13 to 24 months (3)

Q7 We are trying to determine what factors have helped facilitate the introduction of SimChart. In your school, what has helped with getting SimChart started? (Please be as descriptive as possible with this answer)

Q8 We are also trying to determine what factors have hindered, or made it hard to get SimChart implemented. Please tell us, in your own words, what has hindered the use of SimChart? (Please be as descriptive as possible with this answer)

Q9 Do you believe that Simchart has helped students learn? if so, in what ways?

○   Yes (1) _____
○   No (2)

Q10 Do you believe that SimChart has hindered student learning? If so, in what ways?

○   Yes (1) _____
○   No (2)

Q11 Please rate your satisfaction with each of the following main areas of SimChart.

	Satisfied (1)	Somewhat satisfied (2)	Somewhat dissatisfied (3)	Very dissatisfied (4)	Haven't used this area of SimChart (5)
Simulations (1)	○	○	○	○	○
Case Studies (2)	○	○	○	○	○
Pre-clinical manager (3)	○	○	○	○	○
Model EHRs (4)	○	○	○	○	○

Q12 How likely are you to recommend SimChart to a colleague at another school?
○   Not at all likely0 (0)
○   1 (1)
○   2 (2)
○   3 (3)
○   4 (4)
○   Neutral5 (5)
○   6 (6)
○   7 (7)
○   8 (8)
○   9 (9)
○   Extremely Likely10 (10)

Q13 If you would, please complete the following demographic questions. What is your gender?
Male (1)
Female (2)

Q14 What is the highest level of education you have completed?

o   Bachelors' degree (1)
o   MSN, MS (2)
o   PhD, EdD, DNP (3)
o   Other (4) _____
o
Q15 What is your current age? (U.S. Census)

❍   20 to 24 (1)
❍   25 to 34 (2)
❍   35 to 44 (3)
❍   45 to 54 (4)
❍   55 to 64 (5)
❍   65 or over (6)

Q16 In what type of undergraduate program do you teach?

❍   Associate Degree (1)
❍   Baccalaureate degree (2)
❍   Certificate Program for Practical Nursing (3)

Q17 How many years have you been a nurse educator?

❍   1 to 5 years (1)
❍   6 to 10 years (2)
❍   11 to 15 years (3)
❍   16 to 20 years (4)
❍   21 years or more (5)

Q18 How comfortable are you with using technology?

❍   I am very comfortable with technology (1)
❍   I am somewhat comfortable with technology (2)
❍   I am not comfortable with technology (3)

Q19 When comparing yourself to other faculty, how would you rate your own proficiency with using the following technologies?

	Not proficient, worse than most instructors (1)	Less proficient than other instructors (2)	About the same as other instructors (3)	More proficient than others (4)	Highly proficient, exceeding what others do (5)
E-mail (1)	○	○	○	○	○
Blackboard (or equivalent course software) (2)	○	○	○	○	○
Word Processing (3)	○	○	○	○	○
SimChart (4)	○	○	○	○	○
Presentation software, such as powerpoint (5)	○	○	○	○	○

Q20 Thank you for taking this survey!

Please enter your information if you would like to be entered in a drawing for a $50.00 gift card. Your identity will only be revealed to the researcher and will not be shared with anyone else.

First name (1)
Email (2)

SimChart Survey for ND Nursing instructors: Part 2

Q1 Do you teach undergraduate nursing students in the state of North Dakota?

❍ Yes (1)
❍ No (2)

If No Is Selected, Then Skip To Thank you for taking this survey! If Yes Is Selected, Then Skip To Are you using SimChart in your program?

Q2 Are you using SimChart in your program?

❍ Yes (1)
❍ No (2)

If No Is Selected, Then Skip To Thank you for taking this survey! If Yes Is Selected, Then Skip To Welcome to Part 2 of a survey on an a...

Q3 Welcome to Part 2 of a survey on an academic electronic health record! Thank you so much for taking time to do this - your input is appreciated!

Q4   Informed Consent Form

Introduction

The purpose of this dissertation study is determine which factors have hindered or facilitated the use of SimChart, an academic electronic health record, as well as to obtain instructor consensus opinions on whether or not the product is facilitating or hindering student learning. It is important to base our instructional methods on evidence-based research, and this study will gather evidence and analyze the factors which faculty list as hindering or facilitating the introduction of SimChart, our chosen electronic health record by the Nursing Education Consortium in the state of North Dakota.
Procedures

The study in total has 3 phases; Phase 1 is already complete. At this time you are being asked to complete phase 2 of the study, and it is okay if you have not done phase 1. It would be very helpful if you complete both phase 2 and 3, but you are free to stop at any time. For this phase (Phase 2): For this phase of the study, you will receive a Likert-type scale with instructor opinion statements to respond to. You will be asked to complete the demographic information if you have not already done so. For Phase 3, you will be asked to verify your opinions once you have seen what is reported by other instructors, in aggregate format. Instructors will not be individually identified, nor will they be

identified by school. Each questionnaire will take less than 15 minutes to complete, and you are free to skip any questions that you would prefer not to answer. Questions are designed to elicit your opinions about the electronic health record's implementation and its effect on student learning. This questionnaire will be conducted with an online Qualtrics-created survey. The surveys will be sent out approximately 2 weeks apart, for a total of 4 weeks' participation time should you participate in Phase 2 and 3.

Risks/Discomforts

There are no foreseeable risks to participating in the study. Data will be reported in aggregate form so no faculty who participate will be identified in any study reports.

Benefits

You may not benefit personally from being in the study. It is hoped that in the future, other instructors and nursing students might benefit from the results of this study because the knowledge gained is pertinent to how innovations in nursing education are adopted.

Confidentiality

All data obtained from participants will be kept confidential and will only be reported in an aggregate format (by reporting only combined results and never reporting individual ones). All questionnaires will be concealed, coded and analyzed using a statistical package. No one other than then primary investigator and advisor listed below will have access to them. The data collected will be stored in the HIPAA-compliant, Qualtrics-secure database until it has been deleted by the primary investigator.

Compensation

A drawing for a gift card for $50.00 will be done after each phase of the study, for all participants in that phase who provide consent.

Participation

Participation in this research study is completely voluntary. You have the right to withdraw at anytime or refuse to participate entirely. If you decide to withdraw, please close your internet browser and notify the principal investigator at this email: (darlene.hanson@und.edu). Your e-mail will be deleted as soon as your withdrawal is noted.

Questions about the Research

If you have questions regarding this study, you may contact Darlene Hanson, at 701-777-4551 or darlene.hanson@und.edu

Questions about your Rights as Research Participants

If you have questions you do not feel comfortable asking the researcher, you may contact (Dr Myrna Olson, advisor), 701-777-3188, myrna.olson@und.edu

Q5   I have read, understood, and printed a copy of, the above consent form and desire of my own free will to participate in Phase 2 of this study.

❍ Yes (1)
❍ No (2)

If Yes Is Selected, Then Skip To Please indicate your degree of agreem...If No Is Selected, Then Skip To End of Survey

Q6 Please indicate your degree of agreement or disagreement with the following faculty statements about factors that facilitated the introduction of SimChart.

	Strongly Disagree (1)	Disagree (2)	Slightly disagree (3)	Slightly agree (4)	Agree (5)	Strongly Agree (6)
1. The fact that there was administrative support helped facilitate our use of SimChart. (1)	○	○	○	○	○	○
2. Students did not have to pay for SimChart themselves and that helped get SimChart initiated. (2)	○	○	○	○	○	○
3. Our "faculty champions" who learned about SimChart first were instrumental in helping us learn about SimChart. (3)	○	○	○	○	○	○
4. The orientation provided by the SimChart company was very helpful in getting SimChart started. (4)	○	○	○	○	○	○
5. Having one designated individual to train faculty (a "super-user") helped the most in learning about SimChart. (5)	○	○	○	○	○	○
6. The fact that other faculty in the state thought it was a good product facilitated our use of the product. (6)	○	○	○	○	○	○
7. The way we introduced it to the beginning students helped. We scaffolded the information for students, by starting with simple assignments and progressing to more complex assignments. (7)	○	○	○	○	○	○

8. Collaborating with other faculty in the state helped us get SimChart initiated. (8)	○	○	○	○	○	○
9. The funding was attractive, to allow us to obtain the product. (9)	○	○	○	○	○	○
10. We had ongoing training sessions which were beneficial to get SimChart initiated. (10)	○	○	○	○	○	○
11. We just went ahead and tried it and it worked well for us. (11)	○	○	○	○	○	○
12. Because SimChart is so easy to use, it was easy to get students using it. (12)	○	○	○	○	○	○

Q7 Please indicate your degree of agreement or disagreement with the following statements about factors that hindered the introduction of SimChart.

	Strongly disagree (1)	Disagree (2)	Slightly disagree (3)	Slightly agree (4)	Agree (5)	Strongly agree (6)
1. Our affiliating agencies did not want us to use SimChart, so that inhibited getting it started. (1)	○	○	○	○	○	○
2. Our faculty were not technologically skilled enough to use SimChart. (2)	○	○	○	○	○	○
3. SimChart is not compatible with our computer resources at our clinical agencies, so we could not use it effectively. (3)	○	○	○	○	○	○
4. SimChart is not compatible with the simulations that we use. (4)	○	○	○	○	○	○
5. There are some things about SimChart that need to be fixed before implementing it successfully, like barcoding issues. (5)	○	○	○	○	○	○
6. It is really hard to modify or change the simulations in SimChart once they are in there. This needs to be fixed. (6)	○	○	○	○	○	○
7. The "timing" in SimChart is a problem. Students get timed out before they can make entries. (7)	○	○	○	○	○	○
8. Faculty did not want to take the time to learn about this product. (8)	○	○	○	○	○	○
9. Faculty wanted to learn to use SimChart to its full potential but felt they only had time to learn the basics about it. (9)	○	○	○	○	○	○

10. As a faculty member, I wish I had time to understand the advantages of SimChart more before incorporating it into simulations or courses. (10)	○	○	○	○	○	○
11. Students resented having to learn about SimChart because of the time involved. (11)	○	○	○	○	○	○
12. SimChart just took too much time to learn and implement. (12)	○	○	○	○	○	○
13. SimChart is just too complicated. Our students get lost in it. (13)	○	○	○	○	○	○
14. SimChart is too complicated for faculty to use, as the setup seems to be problematic, as well as the phases. (14)	○	○	○	○	○	○
15. We did not want to add another piece of technology to an already overflowing workload. (15)	○	○	○	○	○	○

Q3 Welcome to Part 3 of a survey on an academic electronic health record! Thank you so much for taking time to do this - your input is appreciated!

Q4   Informed Consent Form

Introduction

The purpose of this dissertation study is determine which factors have hindered or facilitated the use of SimChart, an academic electronic health record, as well as to obtain instructor consensus opinions on whether or not the product is facilitating or hindering student learning. It is important to base our instructional methods on evidence-based research, and this study will gather evidence and analyze the factors which faculty list as hindering or facilitating the introduction of SimChart, our chosen electronic health record by the Nursing Education Consortium in the state of North Dakota.
Procedures

The study in total has 3 phases; Phases 1 and 2 are already complete. At this time you are being asked to complete phase 3 of the study, and it is okay if you have not done phase 1 or 2. For Phase 3, you will be asked to verify your opinions, with the knowledge of what other instructors have responded, to gain a consensus opinion about the academic electronic health record. Instructors will not be individually identified, nor will they be identified by school. Following your response to the opinion questions, you will be asked to complete demographic information. This questionnaire will take less than 15 minutes to complete, and you are free to skip any questions that you would prefer not to answer. Questions are designed to elicit your opinions about the electronic health record's implementation and its effect on student learning. This questionnaire will be conducted with an online Qualtrics-created survey.

 Risks/Discomforts

There are no foreseeable risks to participating in the study. Data will be reported in aggregate form so no faculty who participate will be identified in any study reports. Benefits

You may not benefit personally from being in the study. It is hoped that in the future, other instructors and nursing students might benefit from the results of this study because the knowledge gained is pertinent to how innovations in nursing education are adopted.

Confidentiality

All data obtained from participants will be kept confidential and will only be reported in an aggregate format (by reporting only combined results and never reporting individual ones). All questionnaires will be concealed, coded and analyzed using a statistical package. No one other than then primary investigator and advisor listed below will have access to them. The data collected will be stored in the HIPAA-compliant, Qualtrics-secure database until it has been deleted by the primary investigator.

Compensation

A drawing for a gift card for $50.00 will be done after this phase of the study, for all participants in this phase who wish to participate.

Participation

Participation in this research study is completely voluntary. You have the right to withdraw at anytime or refuse to participate entirely. If you decide to withdraw, please close your internet browser and notify the principal investigator at this email: (darlene.hanson@und.edu). Your e-mail will be deleted as soon as your withdrawal is noted.

Questions about the Research

If you have questions regarding this study, you may contact Darlene Hanson, at 701-777-4551 or darlene.hanson@und.edu

Questions about your Rights as Research Participants

If you have questions you do not feel comfortable asking the researcher, you may contact (Dr Myrna Olson, advisor), 701-777-3188, myrna.olson@und.edu

Q5   I have read, understood, and printed a copy of the above consent form and desire of my own free will to participate in Phase 3 of this study.

❍ Yes (1)
❍ No (2)
If No Is Selected, Then Skip To Thank you for taking this survey!

Q6 For the following statements about student learning, you are given Phase 2's average (mean) instructor rating and standard deviation.

If the mean is below 3.5, it indicates some form of disagreement (They chose 1, 2, or 3 on the scale) If the mean is 3.5 to 6, it indicates some form of agreement with the item. (They chose 4, 5 or 6 on the scale)

Do you agree with the average (mean) instructor rating? Please indicate below.

	1 Strongly Disagree (1)	2 Disagree (2)	3 Somewhat Disagree (3)	4 Somewhat Agree (4)	5 Agree (5)	6 Strongly Agree (6)
1. Using SimChart, our students learned how information is organized in an electronic record (M = 4.44, SD = 1.32). (1)	○	○	○	○	○	○
2. Using SimChart, our students learned how to navigate an EHR (M = 4.37, SD 1.37). (2)	○	○	○	○	○	○
3. Using Simchart, our students learned about data collection and entry (M = 4.46, SD 1.31). (3)	○	○	○	○	○	○
4. SimChart slowed down our simulations too much, and that hindered student learning (M = 3.40, SD = 1.54). (4)	○	○	○	○	○	○
5. SimChart took the focus off the patient and put the focus of the learning on the computer (M = 3.53, SD = 1.46). (5)	○	○	○	○	○	○
6. Students had to re-enter documentation and spend a lot of time looking for things in SimChart, which hindered their learning (M = 3.85, SD= 1.27, 66.7%) (6)	○	○	○	○	○	○

Q7 For the following statements, you are given Phase 2's average (mean) instructor rating and standard deviation. If the mean is below 3.5, it indicates that they disagreed

(they chose 1, 2, or 3 on the scale).If the mean is 3.5 to 6, it indicates some form of agreement with the item. (they chose 4, 5 or 6 on the scale). Do you agree with the average (mean)   instructor rating? Please indicate below.

	1 Strongly Disagree (1)	2 Disagree (2)	3 Somewhat Disagree (3)	4 Somewhat Agree (4)	5 Agree (5)	6 Strongly Agree (6)
1. Students did not have to pay for SimChart and that helped to get SimChart initiated.(M= 5.19, SD=1.09) (1)	❍	❍	❍	❍	❍	❍
2. The funding for SimChart was attractive, to allow us to obtain the product (M=5.20, SD=.80). (2)	❍	❍	❍	❍	❍	❍
3. The fact that other faculty in the state thought it was a good product facilitated our use of the product (M=4.42;, SD=1.16). (3)	❍	❍	❍	❍	❍	❍
4. Our faculty champions who learned about SimChart first were instrumental in helping us learn about SimChart (M=5.00, SD=1.24) (4)	❍	❍	❍	❍	❍	❍
5. Administrative support helped facilitate our use of SimChart (M=4.89, SD=1.14). (5)	❍	❍	❍	❍	❍	❍
6. The way we introduced it to students helped. We scaffolded the information for students by starting with simple assignments and progressing toward more complex assignments. (M=4.42, SD=1.48). (6)	❍	❍	❍	❍	❍	❍
7. The orientation provided by the SimChart company was very helpful in getting	❍	❍	❍	❍	❍	❍

SimChart started. (M=4.08, SD=1.44). (7)					
8. Our students liked SimChart in that it seemed like a real chart (M=4.02, SD=1.42). (8)	○	○	○	○	○	○
9. Having a designated individual to train faculty (A super user) helped the most in learning about SimChart (M=4.51, SD=1.46). (9)	○	○	○	○	○	○
10. SimChart seemed like the charts that students will see in clinical (M=4.08, SD=1.46; 69.4% agreement) (10)	○	○	○	○	○	○
11. Ongoing training sessions were beneficial to get SimChart initiated (M=3.42, SD=1.70). (11)	○	○	○	○	○	○
12. Collaborating with other faculty in the state helped us get SimChart initiated (M=3.57, SD=1.46). (12)	○	○	○	○	○	○
13. Experimenting with SimChart by " going ahead and trying it" worked well for us. (M=3.71, SD=1.53) (13)	○	○	○	○	○	○
14. Because SimChart is so easy to use, it was easy to get students using it. (M=3.5, SD=1.52) (14)	○	○	○	○	○	○
15. Our students felt like a real RN when using SimChart. (M=3.78, SD=1.41). (15)	○	○	○	○	○	○

Q8 For the following statements, you are given Phase 2's average (mean) instructor rating and standard deviation.

If the mean is below 3.5, it indicates that they disagreed (they chose 1, 2, or 3 on the scale).If the mean is 3.5 to 6, it indicates some form of agreement with the item (they chose 4, 5 or 6 on the scale).

 Do you agree with the average (mean) instructor rating? Please indicate below.

	1 Strongly Disagree (1)	2 Disagree (2)	3 Somewhat Disagree (3)	4 Somewhat Agree (4)	5 Agree (5)	6 Strongly Agree (6)
1. It is really hard to modify or change the simulations in SimChart once they are in there. This needs to be fixed(M= 4.68, SD=1.25). (1)	○	○	○	○	○	○
2.Faculty wanted to learn how to use SimChart to its full potential but felt they only had time to learn the basics about it (M = 4.67, SD= 1.10) (2)	○	○	○	○	○	○
3. As a faculty member, I wish I had more time to understand the advantages of SimChart before incorporating it into simulations or courses (M=4.42, SD=1.42) (3)	○	○	○	○	○	○

4. The "timing" of SimChart is a problem. Students get timed out before they can make entries (M=4.4, SD=1.50). (4)	○	○	○	○	○	○
5. Some things in SimChart need to be fixed before implementing it successfully, like barcoding issues (M=4.28, SD=1.56) (5)	○	○	○	○	○	○
6. SimChart took too much faculty time to learn and implement (M=3.36, SD=1.64). (6)	○	○	○	○	○	○
7. We didn't want to add another piece of technology to an already overflowing workload(M=3.11, SD=1.72). (7)	○	○	○	○	○	○
8. SimChart is very complex to learn and use(M=3.46, SD=1.27). (8)	○	○	○	○	○	○
9. Students resented the amount of time involved in learning about SimChart (M=3.29, SD= 1.58). (9)	○	○	○	○	○	○

10. The set-up and phases in SimChart are very complicated (M=3.23, SD=1.57). (10)	○	○	○	○	○	○
11. SimChart is complicated. Our students get lost in it (M=2.97, SD=1.61). (11)	○	○	○	○	○	○
12. The timing of when we received the training was one of the factors that hindered the introduction of SimChart-(New statement, no means reported) (12)	○	○	○	○	○	○

Q9 If you disagreed strongly with the instructor ratings on any of these items, the researcher would be interested in your opinion!   Please feel free to write your comments here today or e-mail the researcher within the next couple of weeks.

Q10 Please complete the following questions about yourself:

Q11 What is the highest level of education you have completed?

○ Bachelors' degree (1)
○ MSN, MS (2)
○ PhD, EdD, DNP (3)
○ Other (4) _____

Q12 What is your current age? (U.S. Census)

○ 20 to 24 (1)
○ 25 to 34 (2)
○ 35 to 44 (3)
○ 45 to 54 (4)
○ 55 to 64 (5)
○ 65 or over (6)

Q13 In what type of undergraduate program do you teach?

❍ Associate Degree (1)
❍ Baccalaureate degree (2)
❍ Certificate Program for Practical Nursing (3)

Q14 How long have you been using SimChart?

❍ 0 to 6 months (1)
❍ 7-12 months (2)
❍ 13 to 24 months (3)

Q15 For the following items, what is YOUR satisfaction with each area of SimChart? Information is given about what other instructors responded.

	Satisfied (1)	Somewhat satisfied (2)	Somewhat dissatisfied (3)	Very dissatisfied (4)	Haven't used this area of SimChart (5)
95.6% of instructors who had used Case Studies were satisfied with the case studies. (1)	❍	❍	❍	❍	❍
89.5% of instructors who used Pre-Clinical Manager were satisfied with Pre-clinical manager. (2)	❍	❍	❍	❍	❍
87.5% of instructors who used Model EHRs were satisfied with the Model EHRs. (3)	❍	❍	❍	❍	❍
67% of instructors who used Simulations in SimChart were satisfied with the Simulation area of SimChart. (4)	❍	❍	❍	❍	❍

Q16 How likely are you to recommend SimChart to a colleague at another school?

○ Not at all likely0 (0)
○ 1 (1)
○ 2 (2)
○ 3 (3)
○ 4 (4)
○ Neutral5 (5)
○ 6 (6)
○ 7 (7)
○ 8 (8)
○ 9 (9)
○ Extremely Likely10 (10)

Q17 How many years have you been a nurse educator?

○ 1 to 5 years (1)
○ 6 to 10 years (2)
○ 11 to 15 years (3)
○ 16 to 20 years (4)
○ 21 years or more (5)

Q18 How comfortable are you with using technology?

○ I am very comfortable (1)
○ Neutral (2)
○ Not comfortable with technology (3)

○ Q19 When comparing yourself to other faculty, how would you rate your own proficiency with using the following ?

	Not proficient, worse than most instructors (1)	Less proficient than other instructors (2)	About the same as other instructors (3)	More proficient than others (4)	Highly proficient, exceeding what others do (5)
E-mail (1)	○	○	○	○	○
Blackboard (or equivalent course software) (2)	○	○	○	○	○
Word Processing (3)	○	○	○	○	○
SimChart (4)	○	○	○	○	○
Presentation software, such as powerpoint (5)	○	○	○	○	○

Q20 Thank you for completing the survey! Please enter your information if you would like to be entered in a drawing for a $50.00 gift card. Your identity will only be revealed to the researcher and will not be shared with anyone else.

Email address (1)
First Name (2)

Q21 Thank you for taking this survey!

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