A QUALITATIVE DESCRIPTIVE STUDY EXPLORING ASSOCIATE DEGREE NURSING FACULTY'S EXPERIENCES TEACHING ELECTRONIC HEALTH RECORD SYSTEMS USE

By
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Submitted to the graduate degree program in Nursing and the Graduate Faculty of the University of Kansas in partial fulfillment of the requirements for the degree of Doctor of Philosophy.

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Date Approved: 10 October 2017

Abstract

There has been a persistent call for nursing education to prepare students to practice safely and competently in the technology-rich, information-laden healthcare system. The growth of the national health information infrastructure, built on an expanding foundation of interconnected electronic health record systems (EHRS), continues to change the healthcare environment in which nurses and nursing students practice. Nursing stakeholders are influencing nursing education to integrate informatics competencies, including the use of EHRS, into curricula. Reports from the literature show that nursing faculty face many challenges, including the lack of sufficient education or experience, to teach EHRS use and broader informatics concepts. Little is known about associate degree nursing (ADN) faculty's preparedness to teach EHRS use. This qualitative descriptive study explored the lived experiences, perspectives, challenges, and teaching strategies of ADN faculty related to teaching EHRS use to pre-licensure nursing students. Faculty who teach EHRS use were recruited from a Council of Associate Degree Nursing in New York State Directors' meeting and faculty development conference. Data collection tools included a brief qualitative survey and an interview guide that facilitated discussion of teaching EHRS use in diverse settings. An immersive approach with an iterative, inductive process was used for concurrent data collection and analysis. The two major categories that emerged from the study were Facing Challenges and Building Successes. This study found that ADN faculty faced formidable challenges around teaching EHRS use. Most pressing were limitations to clinical EHRS access. Faculty stressed the need for students and faculty to have deliberate opportunities to practice using EHRS to gain familiarity, comfort and expertise. Faculty strove to adapt to the barriers by creatively managing students, time, and activities across academic and clinical settings. Their goals for students included using EHRS in

the process of forming professional nurses, contributing to their development as mindful, ethical students proficient in using EHRS with patients. Some successes in teaching EHRS use leveraged resources, including using Academic EHRS (AEHRS) and partnering with clinical facilities to use training versions of their EHRS, and employed diverse teaching strategies, including enhancing simulation activities by integrating AEHRS and clinical decision support tools. Implications and recommendations for action and future research are elaborated.

Keywords: Electronic health record systems, associate degree nursing faculty, pre-licensure nursing students, teaching strategies, informatics, forming nurses

Acknowledgments

I am most thankful for the gifts that I received during this doctoral journey. I would like to acknowledge Dr. Wanda Bonnel, my dissertation chair, for her steadfast support and voice of clarity. She and my dissertation committee members, Dr. Cara Busenhart, Dr. Kristin Stegenga, Dr. LaVerne Manos, and Dr. Winnie Dunn, have been beacons. The journey was made navigable when the path was illuminated.

I would like to thank the past and present faculty of the University of Kansas, School of Nursing for sharing their wisdom. So much learning was done in so little time. It is a welcome habit to view the world and journal articles through a doctoral lens. Special nods to Dr. Helen Connors and Dr. Judith Warren for beckoning me to Kansas. Another nod to the team behind the HITS – COLAB, Health Information Technology Scholars Program, for facilitating the learning opportunities that helped to seed my doctoral work.

Nurse educators uniquely draw inspiration from students, patients, nurses and faculty colleagues. This dissertation is richer for the contributions of the faculty participants. Thank you for generously sharing your thoughts and experiences. Believe in synergy!

My husband, Roy Winstanley, deserves to be lauded for traveling beside me – the whole way. I am forever grateful for the love of five generations of family. Lastly, thank you to all of the friends, librarians and colleagues who cheered me along this journey. It is sweet to arrive at this moment, look around, breathe and think about what might come next.

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Chapter 1: Introduction & Background

The pervasive integration of Electronic Health Record Systems (EHRS) over the past decade continues to dramatically change the health care practice environment and many nursing workflow processes. This concomitantly demands that nursing faculty teach pre-licensure nursing students to develop expertise using EHRS to provide competent patient-centered care, document accurately, and utilize data to improve nursing practice and patients' health (Institute of Medicine (IOM), 2010b, 2011).

As multipurpose tools in health care that vary across a spectrum of functionalities, EHRS require a spectrum of user skills (Technology Informatics Guiding Education Reform (TIGER), 2009b). The continual change inherent to computerized products (e.g. updates, revisions, and emerging technology integration), variety of EHRS and Academic EHRS, and differences in systems' functionality present challenges for faculty, students, nursing programs and clinical partners. The integration status of EHRS into the academic nursing environment is difficult to assess. Unlike the Health IT dashboard (The Office of the National Coordinator for Health Information Technology (ONC), 2016), there are no readily available statistics to assess the adoption rates and level of meaningful use of EHRS in nursing education. That is, there is no way to determine the numbers of nursing education programs using EHRS in meaningful ways. Despite an extensive search, only one estimate was uncovered. Brooks and Erickson (2012) reported that 1% of nursing programs in the United States had an academic EHRS.

Previous studies have reported that there is limited faculty preparedness to teach about EHRS and correlated informatics concepts (De Gagne, Bisanar, Makowski, & Neumann, 2012; Hunter, McGonigle, & Hebda, 2013; IOM, 2011; McNeil et al., 2005; Thompson & Skiba, 2008). In 2012, The Technology Informatics Guiding Education Reform Initiative (TIGER)

(TIGER, 2009a, 2012) offered recommendations to address the curricular gaps in nursing education. In response to recognition of the learning needs of students who will practice in the technology-rich, information-laden health care environment, the necessity for nurse educators to gain technological fluency and competency was emphasized in the National League for Nursing's (NLN) publication, *A Vision for The Changing Faculty Role: Preparing Students for the Technological World of Health Care* (NLN, 2015). While this is important for all faculty, it is especially important for associate degree faculty, who continue to prepare a majority of entry-level nursing graduates.

Background

Significant forces are propelling the radical electronic transformation in the health care practice environment through the present into the future. The impact on nursing faculty, curriculum and education is pervasive and multidimensional.

Electronic heath record systems. Currently, the Office of the National Coordinator of Health Information Technology (ONC, 2016) reports that 97% of all hospitals and 71% of all office-based physician practices meet the criteria for demonstrating use of certified health information technology (HIT), which includes EHRS, in increasingly meaningful ways (CMS.gov, 2016). Electronic health records (EHR) are proliferating in health care with the expectation that, ultimately, every person will have a record that begins pre-birth and extends through their lifetime (Skiba, 2014). "An EHR system encompasses (1) longitudinal collection of electronic health information for and about persons, (2) electronic access to person- and population-level information by authorized users, (3) provision of knowledge and decision support systems, and (4) support for efficient processes for health care delivery" (IOM, 2003b; 2004b, p. 4). The EHRS are distinguished from single electronic health records by the addition

of decision support tools, such as medication libraries and clinical treatment guidelines; secure platforms for the exchange of patient information across health care settings; and, data standards that make information understandable to all users (IOM, 2004b).

The U.S. health care system is moving toward the IOM's vision of a national health information infrastructure that is built on a foundation of interconnected EHRS (IOM, 2004b). The evolving infrastructure will be supported by well-designed electronic systems, technologies, applications, standards and policies; accessed and utilized by skilled users; and sustain interoperability (the ability of users and systems to use and exchange information). The overarching goal is to make patient safety a true standard of care (IOM, 2004b, p. 8).

In the clinical learning environment (CLE), nurses and nursing students utilize EHRS for a wide range of activities (IOM, 2003a, 2003b). Throughout the work period, they access different components of the EHRS to review, document, and utilize patient data; administer medications; and, organize care for individuals and groups of patients. They customize plans of care, compare the plans to standards of care, assess core measure compliance and identify deviations from expected courses of care. The EHRS are also used for intra- and inter-professional communication and information exchange.

In addition, integrated clinical decision support tools such as medication information, vocabularies, diagnostic tools, medical calculators, practice guidelines and treatment algorithms that support nursing care can be utilized without leaving the EHRS (IOM, 2001). Patient data can be aggregated and applied to population health information (IOM, 2004a, 2004b). Functionality, that is, the range of operations or capabilities, of the EHRS improves with the addition of core and ancillary charting components, enhanced clinical decision support systems, and updated versions of software and hardware (IOM, 2003b).

Academic EHRS (AEHRS). Academic EHRS (AEHRS) are basically EHRS specific to the academic setting. In the academic environment, the EHRS used by nursing programs vary greatly (Gloe, 2010). In the literature, EHR products for academic use have been described as clinical EHRS with actual patient records; modified clinical EHRS - which may be a staff-training version of clinical EHRS; vendor-created educational EHRS; nursing publisher-created EHRS associated with textbooks and academic ancillary resources; or, a product that is a hybrid of any of the aforementioned systems (Gloe, 2010). For this dissertation, the systems used in academic programs are generically referred to as AEHRS.

Any system's functionality will depend on the vendor, type of product, its age, adoption date, level of integration into the program, ongoing support, software, hardware and application of upgrades (Gloe, 2010). Optimally, AEHRS will mimic clinical EHRS while also possessing enhancements for educational use that facilitate learning objective achievement; maintain nursing care, process, and science focus; use technologies that enhance quality care and realism; and have an intuitive design that enables ease of use for all users – students, faculty, and support staff (Bristol, 2012; Gloe, 2010).

Advanced AEHRS might also feature portals or access for simulated patients as well, increasing realism as the AEHRS mirror evolving EHRS of the clinical environment (Irizarry, DeVito, Dabbs, & Curran, 2015). The customization and resulting variations in functionality of EHRS or AEHRS by nursing programs and health care facilities results in different user experiences (and training needs) which may affect faculty and student experiences, their ability to gain competencies, and subsequently, meet program outcomes.

Legislation affecting EHRS adoption and integration. United States legislation is driving the rapid, almost exponential, adoption and integration of EHRS into the U.S. health care

system. In 2004, the ONC was created by an executive order (HealthIT.gov, 2014). At the first Health Information Technology (HIT) Summit that same year, an initiative was launched to provide Americans with EHRs by 2014 (TIGER, 2007). The American Recovery and Reinvestment Act (ARRA) (Public Law 111-5) of 2009 included the Health Information Technology for Economic and Clinical Health (HITECH) Act, which called for staged improvements in national health care through the adoption and meaningful use of EHRS (HealthIT.gov, n.d.). Conceptually, meaningful use entails health care data capture and sharing, utilizing advanced clinical processes, and improving outcomes by acquiring and using certified EHRS according to sequenced sets of rules outlined by the Centers for Medicare & Medicaid Services (CMS) (CMS.gov, 2016; HealthIT.gov, n.d.). The adoption and implementation schedules are linked to reimbursement incentives for eligible (participating) CMS providers. Over time, these incentives will convert to financial penalties for noncompliant providers.

In addition, HITECH specifically charged the ONC to coordinate nationwide health information technology policies and programs and maintain the nation's HIT agenda (HealthIT.gov, 2014, n.d.). Subsequently, the Patient Protection and Affordable Care Act of 2010 (ACA), allowed for expansion of the HIT infrastructure intending to meet the increased demand of more insured Americans safely, effectively, efficiently, and competently (HealthIT.gov, n.d.). The ACA created extensive changes in the health care system, care delivery, and the increasing populations served.

Initiatives influencing integration of EHRS use into nursing curricula. These national initiatives called attention to the sweeping changes in the healthcare environment and the need for nursing education to be responsive. Synopses offer relevant connections to nursing faculty teaching about EHRS use and related informatics content.

Institute of Medicine reports. *The Future of Nursing: Leading Change, Advancing Health* report (IOM, 2011) fortified the overarching goal for nurses to provide safe, quality, patient-centered, accessible, evidence-based, and sustainable care that meets the needs of diverse American populations across the lifespan, across a practice continuum of health, and within a variety of care environments. Particularly relevant was the recommendation that nursing curricula need to be updated to ensure that nursing students acquire the competencies to practice in the changing health care environment. The report amplified the need for pre-licensure nursing students to gain competency in the five areas originally reported in *Health Professions Education: A Bridge to Quality* (IOM, 2003a). These included patient-centered care, interdisciplinary teams, evidence-based practice, quality improvement and informatics. The latter, informatics, included specific competencies related to using computers to improve communication and manage information. Faculty need to be prepared to teach this curricula.

The role of EHRS will continue to expand as more health care and academic entities implement systems, increase their functionality, and achieve more criteria for meaningful use (IOM, 2003b). To meet the expectations for key capabilities outlined by the IOM, core functionalities for all systems should improve patient safety, support the delivery of effective patient care, facilitate chronic condition management, increase efficiency, and be feasible to implement.

The expanding list of primary EHRS uses includes supporting the delivery of personal health care services, care management, care support processes, patient access and administrative processes. Secondary uses include education, regulation (e.g., credentialing), clinical and health services research, public health and homeland security, and policy support. Nurses are primary users of EHRS for all of these applications (IOM, 2011). The design, implementation and use of

EHRS directly impact nursing workflow, care provision, quality and safety (IOM, 2012). It is important to note that EHRS can be tools that support patient safety, but if not used correctly, can become hindrances that may cause patient harm (IOM, 2012). This emphasizes the need for comprehensive student education.

The recommendations of the IOM's landmark reports (IOM, 2000, 2001, 2003a, 2003b, 2004a, 2004b, 2010a, 2011, 2012) are influential catalysts for the health care transformation. The recommendations consistently emphasize strategies to improve safety, promote error prevention and mitigation, improve quality, and integrate evidence-based practice by improving interprofessional communication, preparing the future workforce, forming a national health care information infrastructure, redesigning health professions' education, and leveraging the use of information technology. They further challenge nursing faculty to sufficiently prepare nursing students to practice in this changing health care environment (IOM, 2010).

Quality and Safety Education for Nurses (QSEN). To address the recommendations in the IOM's *Health Professions Education: A Bridge to Quality* (2003a) report, the Robert Wood Johnson Foundation began funding the QSEN project in 2005 (Cronenwett et al., 2007). The project's aim of educating the future nursing workforce to competently practice in an evolving health care system continues to be relevant. There is an ongoing effort to redesign nursing education to produce nursing graduates who can provide safe, quality patient care in an increasingly complex, technological environment. The QSEN project team defined six core quality and safety competencies for all for pre-licensure nursing graduates: patient-centered care, teamwork and collaboration, evidence-based practice, quality improvement, safety and informatics (Cronenwett et al., 2007). Safety was added to the five competencies previously outlined in the IOM report (2003a) to emphasize its importance in nursing care. The QSEN team

identified the requisite knowledge, skills, and attitudes (KSAs) for each competency for pre-licensure nursing students.

The informatics competency is defined as "the use of information and technology to communicate, manage knowledge, mitigate error, and support decision making" (Cronenwett et al., 2007, p. 129). The informatics KSAs address gaps in nursing education identified by the QSEN team and target the need for students to acquire information technology skills, navigate through EHRS to provide and support patient care, and communicate effectively for care coordination. Specific competencies and skills for using EHRS include planning and documenting care, utilizing appropriate clinical decision support systems/resources, maintaining confidentiality, and contributing to institutional EHRS use processes (Cronenwett et al., 2007). Skillful use of EHRS requires expertise in all six of the competencies.

The QSEN website (www.qsen.org) is a rich repository of QSEN content and resources for nurse educators. Stratified by educational level, the six core competencies, their definitions and the requisite knowledge, skills, and attitudes are accessible. Teaching strategies are searchable and site-visitors are invited to share strategies. There are 18 faculty development modules of QSEN content as well as links to additional courses. Resources include annotated bibliographies, patient-centered care resources and Joint Commission resources. The site is actively maintained, featuring upcoming events and courses for faculty development.

The project has encouraged nursing programs to adopt and integrate QSEN competencies, and foster curricula revisions (Barnsteiner et al., 2013; Disch, Barnsteiner, & McGuinn, 2013). Dissemination of QSEN content continues with publications and annual QSEN conferences. The effects of the QSEN project are extending beyond academia and into

the practice environments as graduates of QSEN-infused programs move into the workforce (Lyle-Edrosolo & Waxman, 2016).

Technology Informatics Guiding Education Reform (TIGER) Initiative. The TIGER Initiative was formed in 2004, in response to the absence of an articulated nursing role in the National Health Information Technology Agenda, the ONC's plan for the adoption and integration of EHRS into the U.S. health care system (Schlak & Troseth, 2013; TIGER, 2009a). Two years later, at the TIGER Summit, a diverse group of nursing stakeholders helped to develop TIGER's vision, mission, and action plan to leverage HIT to improve nursing education, nursing practice, and the delivery of patient care (TIGER, 2009a). A strong sense of urgency was fueled by concerns that nursing faculty lacked sufficient informatics knowledge, skills and curricula to adequately prepare future nurses (Hebda & Calderone, 2010; Skiba, Connors, & Jeffries, 2008).

The TIGER Initiative's goals, consistent with the IOM recommendations, included nursing workforce development to effectively use EHRS, engaging more nurses in developing the national healthcare information technology infrastructure, and increasing "adoption of smart, standards-based, interoperable technology that will make healthcare delivery safer, more efficient, timely, accessible, and patient-centered (TIGER, 2009a, p. 5)." In addition, the Initiative strived to encourage nurses' input into the design and implementation process to increase usability, workflow and information management requirements of nurses.

The TIGER Initiative's work has influenced faculty and nursing programs, practicing professionals and professional organizations, accrediting bodies, vendors, and governmental agencies (Hebda & Calderone, 2010, 2012). Notably, TIGER prompted the NLN and AACN to include informatics competencies, specifically directing the use of EHRS, in their competency

statements. Further, the Commission on Collegiate Nursing Education (CCNE) and the Accreditation Commission for Education in Nursing (ACEN) added the inclusion of informatics competencies as requirements for reaccreditation (Hebda & Calderone, 2012; TIGER, 2009a). The TIGER Initiative's website, with an abundance of resources, is maintained on the Healthcare Information and Management Systems Society's (HIMSS) site (Healthcare Information and Management Systems Society (HIMSS), 2016). *Collaborating to integrate evidence and informatics into nursing practice and education: An executive summary* (TIGER, 2009a) provides an overview of the Initiative's work and summarizes the nine collaborative group reports.

Carnegie Foundation for the Advancement of Teaching report. As part of the *Preparation for the Professions* series sponsored by the Carnegie Foundation for the Advancement of Teaching, *Educating Nurses: A Call for Radical Transformation* (Benner, Sutphen, Leonard, & Day, 2010) outlined a vision for the redesign of nursing education to meet the challenges of changing society, health care systems, and complex nursing practice. A key theme was the integration of the three apprenticeships of cognition, skilled know-how, and ethical comportment throughout the classroom, laboratory, and clinical learning so that practical relevance would not depend on educational setting.

In this report, Benner et al. (2010) emphasized that becoming a nurse is formative, involving increasing technical expertise, relational interactions, and engagement in practical, ethical and clinical reasoning. Teaching should emphasize a sense of salience, situated cognition, clinical reasoning and action, avoid decontextualization, and promote multiple ways of thinking that include critical thinking. Teaching strategies should include situated coaching,

experiential learning, integrative teaching, progressive skill acquisition, role-playing and simulation (Benner et al., 2010).

***Competency-based organizational priorities*.** In response to the changing health care environment and its implications for nursing education and practice, key nursing and informatics organizations published policy statements or reports that addressed the importance of information and technological advances and defined competencies in information management, informatics, and EHRS use (American Association of Colleges of Nursing (AACN), 2008; American Health Information Management Association & American Medical Informatics Association, 2008; American Nurses Association, 2015; Halstead, 2007; NLN, 2008, 2010, 2015; TIGER, 2009a, 2009b). The *Essentials of Baccalaureate Education for Nursing Practice* (AACN, 2008) and the *Outcomes And Competencies for Graduates of Practical/Vocational, Diploma, Associate Degree, Baccalaureate, Master's, Practice Doctorate, and Research Doctorate Programs in Nursing* (NLN, 2010) provided significant informatics guidance for nursing education. Informatics and EHRS use competency criteria were added to the accreditation guidelines of national nursing education accreditation organizations, CCNE and ACEN, with the goal of increasing their integration into nursing programs (TIGER, 2012; IOM 2003a). TIGER and QSEN recommendations influenced the inclusion of these criteria (TIGER, 2009a).

In 2015, the NLN issued a vision statement, *A Vision for The Changing Faculty Role: Preparing Students for the Technological World of Health Care*, (NLN, 2015), highlighting the continuing gap between nursing education, the learning needs of nursing students, and faculty's readiness to teach with technology. The statement magnified the earlier *Preparing the Next Generation of Nurses to Practice in a Technology-rich Environment: An Informatics Agenda*

(NLN, 2008) position statement, renewing emphasis on nurse educators to use educational and health information technologies to improve active teaching strategies and learning outcomes evaluation. Informatics and EHRS are considered health information technologies. The gap is particularly concerning from the polar perspectives that faculty may have had limited exposure and experience with the technologies while students need to build competence with health information technologies to become safe, effective graduate nurses. Recommendations in the vision statement include increasing collaboration with practice partners, finding ways to integrate workplace technologies, leveraging contextual learning, and expanding curricula and faculty development in these areas.

Challenges faced by associate degree nursing programs. *Transforming Education for an Informatics Agenda: TIGER Education and Faculty Development Collaborative,* a TIGER Initiative report (TIGER, 2012) summarized the challenges posted at an associate degree nursing faculty listserv including limited resources, especially an absence of EHRS in academic settings; lack of or restricted access to EHRS in clinical settings; time constraints for teaching in already full curricula and busy clinical practicums; faculty discomfort with technologies in the practice settings, and the steep learning curve for EHRS use. These challenges are formidable when considering that associate degree programs supply more new Registered Nurse graduates annually to the workforce than bachelor's degree programs (Campaign for Action, 2017).

There is limited literature that specifically addresses EHRS use in associate degree programs. Thompson and Skiba (2008), in a survey that included all levels of nursing programs, found that only about half of the associate degree program respondents reported integrating any informatics content into their curricula and that their students were exposed to information systems (earlier versions of EHRS) during clinical experiences. Further, associate degree faculty

reported being less confident about their informatics skills than bachelor's and higher level faculty; and, all faculty were less clear about what specifically constituted computer literacy, information literacy, and informatics concepts (Thompson & Skiba, 2008). Several surveys of informatics integration into nursing programs, including assessment of faculty preparedness to teach about EHRS and correlated informatics concepts, focused only on bachelor's degree and higher levels of education (De Gagne et al., 2012; Hunter et al., 2013; McNeil et al., 2005).

Nurse educator competency issues. *Nurse Educator Competencies: Creating An Evidence-Based Practice for Nurse Educators* (Halstead, 2007) detailed the knowledge, skills, and abilities for eight educator competencies. These are facilitate learning, facilitate learner development and socialization, use assessment and evaluation strategies, participate in curriculum design and evaluation of program outcomes, function as a change agent and leader, pursue continuous quality improvement in the nurse educator role, engage in scholarship, and function within the educational environment. Many of these competencies have become increasingly reliant on educational and clinical technologies. Information literacy and the use of computers and software programs are essential educator skills. Nurse educators without competence and comfort using these technologies may not be able to prepare students in clinical environments where information systems are prevalent (Halstead, 2007). The aforementioned information systems are the precursors to contemporary EHRS.

Professional competence in teaching, clinical, and subject area were found to be necessary for credibility, role-modeling and positively influencing student learning outcomes (Halstead, 2007). Nursing faculty need to demonstrate expertise in educational methodologies and clinical practice. Informatics competencies, including EHRS use, are becoming critical in

both areas for faculty to competently educate future nurses (Bednash, Cronenwett, & Dolansky, 2013; Cronenwett et al., 2007).

An international nursing concern. Many countries are in the process of transitioning to EHRS (WHO, 2016) and the challenges to health care systems, clinical nurses, and nursing education are not unique to a single country. The recommendations of QSEN, TIGER, and, especially, the IOM reports, extend beyond U.S. borders and are referenced in some of the international nursing literature related to EHRS. Nurse educators in every country implementing EHRS are challenged to develop expertise and integrate EHRS use content into their curricula.

Health professions education. All health professional disciplines utilizing EHRS face similar challenges in adjusting to the transformation of the health care environment and teaching students EHRS use (IOM, 2003a, 2012). In 2008, two major informatics associations, the American Medical Informatics Association and the American Health Information Management Association, jointly published core competencies for health care workers using EHRs to serve as a guide for health care professions education (American Health Information Management Association & American Medical Informatics Association, 2008). Health care disciplines have been working, similar to nursing, to address the need for informatics competencies and instruction in effective use of EHRS by incorporating competencies and linking curricular reform to accreditation and reaccreditation (Hebda & Calderone, 2012). The TIGER Virtual Learning Environment offers an alternative training solution to formal academic education (TIGER, 2009b). Teamwork and collaborative inter-professional practice competencies can be integrated into EHRS-focused content due to the commonalities and interrelated use shared by the disciplines (Titzer, Swenty, & Mustata Wilson, 2015).

Recommendations regarding EHRS use to nursing education. Traditionally, nursing faculty address the arrival of new concepts and competencies by adding content to an already expanding curriculum or integrating them into existing or evolving content, when it may be beneficial to redesign curricula using concept-driven organization (IOM, 2010). Teaching EHRS use includes concepts of computer literacy; information literacy, management, and generation; and nursing informatics within the broader health care informatics competencies (Staggers, Gassert, & Curran, 2001; TIGER, 2009b). These concepts should be leveled and progressively integrated into the curricula. In addition, learning to use EHRS requires technical and relational skills within the nursing practice context (Benner et al., 2010).

As part of the TIGER Initiative, the TIGER Education and Faculty Development Collaborative Team report (TIGER, 2012) identified several recommendations for informatics and EHRS use in nursing curricula. These included (a) integrate informatics and EHRS content throughout the curricula in a progressive manner; (b) provide access to EHRS within the program through building or purchasing an AEHRS, or creating academic or clinical partnerships; (c) identify and address limitations of EHRS access and use with clinical partners; (d) build opportunities for faculty and students to practice with EHRS beyond the often limited exposure in the CLE; (e) provide and encourage faculty development to build expertise within current faculty and seek new faculty with informatics expertise, especially those graduated from nursing programs having completed informatics coursework.

The Agency for Healthcare Research and Quality (AHRQ) (n. d.) had been studying EHRS in clinical environments. Some of the lessons learned from their research may be applicable to nursing programs. The AHRQ studies found the following:

1. Successful implementation of EHRS can positively affect the quality, safety, and efficiency of health care.
2. Adoption and integration of EHRS present challenges to organizations that can be facilitated by fostering acceptance, designating champions, and recruiting 'super-users' (staff expert users).
3. User education, training, and technical support should start during planning and continue throughout the process.
4. Networking between organizations may provide advantages beyond individual resources.
5. Attend to process redesign (workflow and integration) early and intently.

Evidence of best practices in teaching EHRS use. Best teaching practices and learning activities that support the acquisition of informatics and EHRS use competencies are important elements of nursing education needed to prepare future nurses. Consistent with evidence-based education (Cannon & Boswell, 2016; Oermann, 2009) tenets, there is a need to determine best practices from the nursing literature to share with nurse educators.

An integrative literature review to determine the best practices in teaching pre-licensure nursing students to use EHRS identified several themes: *developing technologically competent students*, *developing technologically competent faculty*, *evolving technology of the EHRS and Academic EHRS (AEHRS)*, and, *using active learning strategies (student-centered activities in nursing context with practice)*. Within these themes, studies suggest the following points: (a) pre-licensure nursing students need the knowledge, practice, skills, and attitudes to develop the technological expertise to use the EHRS successfully in nursing practice; (b) some faculty integrate educational and clinical technologies in activities to meet learning objectives; and,

(c) faculty need the knowledge, practice, skills, and attitudes to develop technological expertise to use the EHRS and, in turn, to teach students successfully.

Purpose

There have been urgent calls for transforming nursing education to prepare future nurses who can function competently in a health care environment reliant on EHRS. The literature suggests that faculty are not well-prepared to teach essential informatics and technological competencies that include EHRS use. A qualitative descriptive study allows for exploration of a phenomenon to increase knowledge and understanding (Mills & Birks, 2014). The purpose of this qualitative descriptive study was to explore the experiences, perspectives, challenges and teaching strategies of pre-licensure associate degree nursing faculty related to teaching EHRS use to nursing students.

Research Questions

This qualitative study of associate degree nursing faculty preparedness to teach electronic health record systems use aimed to increase understanding of their experiences, perspectives, challenges and teaching strategies. Information gained from this study may promote sharing of positive teaching strategies. Identification of challenges that faculty face may facilitate development of solutions and support for faculty development may be garnered. Results may be used to inform further studies to evaluate the extent of the phenomenon.

Several research questions were posed:

What are associate degree nursing faculty's:

1. experiences in teaching EHRS use?
2. perspectives on preparedness to teach EHRS use?
3. challenges associated with teaching EHRS use?

4. perspectives of effective teaching strategies related to EHRS use?
5. perspectives of how different settings (classroom, laboratory, simulation, or clinical learning environments) affect teaching strategies and outcomes?

Theoretical Considerations

For this qualitative research, complexity theory, the study of complex adaptive systems (CAS), provides context to the intricacies of teaching and learning related to using EHRS. The CAS are defined as collectively organized diverse elements with multiple interconnections (Chaffee & McNeill, 2007; Zimmerman, 1999). The CAS exhibit combinations of their defining characteristics such as nonlinearity, emergence, dynamical, adaptive, uncertainty, and coevolutionary (Patton, 2015). This manifests as an intricate evolution of the system through time and space as the elements influence each other through the interconnections. The four themes that emerged from this researcher's minor synthesis paper (Winstanley, 2016), developing technologically competent students, developing technologically competent faculty, evolving technology of the EHRS/AEHRS, and using active learning strategies (student-centered activities in nursing context with practice), are illustrative of CAS. On one level, students, faculty and AEHRS could be considered individual CASs. On another level, with the additional connections to active learning strategies, they could be elements within a nursing education CAS. Students, faculty, and EHRS could also be elements within a health care environment CAS. This study explored the uncertainty and interconnections at the intersection of the nursing education CAS with the health care CAS and their influences on nursing faculty.

The principles of Knowles Adult Learning theory (Knowles, 1980), Benner's Novice to Expert (Benner, 2001) theory, Dreyfus Model of Adult Skill Acquisition (Dreyfus, 2004), Bandura's Self-efficacy Model (Bandura, 1977), and the Matney Model of Wisdom in Action for

Clinical Nursing (Matney, Avant, & Staggers, n.d.) contextualized the human elements of the CAS. Active learning strategies were considered with the good practices in undergraduate education as outlined by Chickering and Gamson (1987): (a) encourage contact between students and faculty, (b) develop reciprocity and cooperation among students, (c) encourage active learning, (d) give prompt feedback, (e) emphasize time on task, (f) communicate high expectations, and (g) respect diverse talents and ways of learning. These theories enhanced reflection of the complexity of the phenomenon of concern: associate degree nursing faculty's preparedness to teach EHRS use to pre-licensure nursing students.

The categories that emerged from the data collection guided the analysis. These categories were compared back to the four themes that emerged through the integrative review process: (a) developing technologically competent students, (b) developing technologically competent faculty, (c) evolving technology of the EHRS/AEHRS, and (d) using active learning strategies (student-centered activities in nursing context with practice).

Assumptions of This Study

Some of the assumptions of this study included:

1. Better understanding the challenges and strategies of faculty in teaching EHRS can lead to insights for further programming and research.
2. Sources of the multiple realities that exist in this study include this researcher, the participants, and the audience.
3. The study included the multiple perspectives and voices of participants.
4. This researcher minimized the distance between researcher and participants.
5. This research is value-laden in nature.

6. This researcher agrees with the national nursing stakeholders that EHRS use is an essential skill for nursing graduates.
7. All participants teach EHRS use in their nursing programs.
8. The quality and quantity of data collected from interviews in-person and using distance technology was equally rich.

Limitations of This Study

Some of the initial limitations of this study included:

1. The participants were from a convenience sample mainly from one state.
2. Participants chose to participate and this may contribute to bias.
3. Participant responses may have included remembrances that may not be accurate.
4. Participants' responses may have come from a desire to share best intentions rather than actual occurrences.
5. There is a subjective component to coding and analyzing the annotations and transcriptions that may introduce researcher bias, despite researcher efforts to mitigate this.

Definitions of Terms for This Study

The terms used to guide this study were defined as follows:

Associate Degree Nursing Faculty – Nurse educators who lead or teach in pre-licensure Registered Nurse programs that confer Associate of Nursing or Associate of Applied Science degrees (U.S. Bureau of Labor Statistics, 2016). The faculty predominantly possess master's and doctoral degrees.

EHRS – Electronic Health Record (EHR) Systems are comprehensively defined by the IOM. "An EHR system encompasses (1) longitudinal collection of electronic health

information for and about persons, (2) electronic access to person- and population-level information by authorized users, (3) provision of knowledge and decision support systems, and (4) support for efficient processes for health care delivery" (IOM, 2003b; 2004b, p. 4).

AEHRS – Academic Electronic Health Record Systems are EHRS that have been adapted for use in the academic environment.

CLE – Clinical Learning Environment is a broad representation of the multiple settings used by nursing education and includes the interactive elements within those clinical settings that influence learning outcomes (Dunn & Burnett, 1995).

Competency – The National Institutes of Health (NIH) Proficiency Scale (Office of Human Resources at the National Institutes of Health, 2016) provides a common schema for defining competency levels. It describes several levels of ability that range from fundamental awareness, to novice, intermediate, advanced, and expert with associated knowledge, skill, abilities and behaviors/attitudes to match the competency levels. [Benner (2001) used the titles of novice, advanced beginner, competent, proficient, and expert while Staggers et al. (2001) used beginning nurse, experienced nurse, informatics nurse specialist, and informatics innovator.]

Computer competence – The level of ability to utilize computers to complete basic tasks, such as accessing information, communicating, managing files, word processing, using databases and spreadsheets, and web-browsing (using the internet) (TIGER, 2009b). The TIGER Informatics Competency Collaborative (TICC) (2009b) acknowledged the European Computer Driving License (ECDL) Foundation's set of basic computer competencies as a global standard and adopted them as their standard as well. The

TIGER-TICC computer competencies were cited in the *Nursing informatics: Scope and standards of practice* (2 ed.) as foundational for "informatics competencies for all Registered Nurses" (American Nurses Association, 2015, p. 46). Computer literacy is a similar term for basic computer competency (American Nurses Association, 2015).

Distance technologies – Devices such as telephones or online teleconferencing modalities that enable communication over distances.

Nursing Informatics – "Nursing informatics is the specialty that integrates nursing science with multiple information and analytical sciences to identify, define, manage, and communicate data, information, knowledge, and wisdom in nursing practice" (American Nurses Association, 2015, pp. 1-2). An EHRS is a health information technology that is considered both an information repository and a tool for using information (American Nurses Association, 2015; IOM, 2003b; 2004b)

Technological competence – Narrowly inferred as possessing the knowledge, skills and attitudes - including computer competency, information literacy, and information management – to utilize health information technologies in the provision of safe, quality nursing care (NLN, 2008; 2015).

Summary

There has been a persistent call for nursing education to prepare students to practice safely and competently in the technology-rich, information laden health care system (NLN, 2015). The growth of the national health information infrastructure, built on a foundation of interconnected EHRS, is changing the health care environment in which nurses and nursing students practice (IOM, 2011). Nursing stakeholders are influencing nursing education to integrate informatics competencies, including the use of EHRS, into curricula. There is an

expectation that faculty will teach about a practice environment that they may have never experienced (NLN, 2015). Reports from the literature showed that faculty may not have sufficient background information or training to teach EHRS use or informatics. Additionally, faculty face many challenges to teach about EHRS.

There is little information in the literature about the current level of associate degree nursing faculty preparedness to teach pre-licensure nursing students to use EHRS. Use of qualitative description allowed for learning about the experiences of faculty related to teaching EHRS use (Mills & Birks, 2014). Emergent themes provided insight into the challenges that faculty face and areas where education and faculty development may be beneficial. This qualitative study allowed for the exploration of associate degree nursing faculty's experiences, perspectives, challenges and teaching strategies related to teaching EHRS use to pre-licensure nursing students.

Chapter 2: Review of the Literature

The rapid integration of EHRS is part of the health information technology evolution that is transforming the health care practice environment (IOM, 2011). Best teaching practices and learning activities that support the acquisition of informatics and EHRS use competencies are important elements of nursing education needed to prepare future nurses. To develop the literature review for this chapter, an integrative literature review was undertaken to determine best teaching practices in EHRS use for pre-licensure nursing students. Through this integrative review process, limited information was uncovered about faculty's preparedness to teach EHRS use. There was some anecdotal information about faculty's experiences suggesting this as a topic for further exploration. Further details of the review follow.

Method for the Integrative Literature Review

The integrative review began with a search of keyword synonyms within concept groupings that allowed for word variations (concepts, EHRS, teaching and learning) (Winstanley, 2016). A range of databases were searched to address the multidisciplinary nature of the EHRS and informatics. These included PubMed, Cumulative Index to Nursing and Allied Health Literature (CINAHL) Plus with Full Text; Applied Science & Technology Abstracts (H.W. Wilson); Computer Source; Education Abstracts (H.W. Wilson); Education Resources Information Center (ERIC); Health Source: Nursing/Academic Edition; Library, Information Science & Technology Abstracts; Library Literature & Information Science Index (H.W. Wilson); MEDLINE; PsycARTICLES; Psychology and Behavioral Sciences Collection; PsycINFO; and, Teacher Reference Center. Combinations of the concept strings were entered into database searches. Included entries were written in English, contained the keywords, and published between 2005 and 2016. Exclusion criteria removed articles that were outdated or not

peer-reviewed research. For each dissertation identified during the searches, the author was, in turn, searched in case their work was subsequently peer-reviewed. A snowball search (or hand-search) of references produced several useful articles for the background and discussion, but mostly consisted of tangential studies that did not meet inclusion criteria. From the initial 119 articles, 23 articles were identified for the literature review (Winstanley, 2016).

Studies Reviewed

The literature sample was composed of 23 peer-reviewed research studies. All studies pertained to pre-licensure/undergraduate nursing programs. The methods utilized by the studies included 13 quantitative, five qualitative, three mixed method, and two usability human factors studies. Locations included 14 cities across the United States, one in Canada, two in the United Kingdom, two in Turkey, one in Korea, and three (from the same research team) from Singapore. Almost all of the studies used a single site and almost all subjects were from convenience samples. Most studies were self-described as pilot studies and consisted of small samples. Power analyses were only documented in three of the quantitative studies (Feeg, Saba, & Feeg, 2008, low; Kowitlawakul, Chan, Pulcini, & Wang, 2015, enough to detect moderate effect of the structural equation modeling; Mountain, Redd, O'Leary-Kelly, & Giles, 2015, low power with small sample size). Qualitative studies often described rigorous methodology and some stated data saturation.

Many of the studies did not specify the name or vendor of the EHRS or AEHRS that was used. A research team designed one AEHRS which was used in three studies published by the team (Kowitlawakul et al., 2015; Kowitlawakul, Chan, Wang, & Wang, 2014; Kowitlawakul, Wang, & Chan, 2013). Of the remaining studies, none of the named EHRS or AEHRS were used in more than one study. Settings varied across the classroom, college laboratory, simulation

lab, and clinical learning environments (CLE). The CLE encompassed acute care, home care, and out-patient clinics.

Theoretical Considerations for the Literature Review

There was no consensus about a theoretical framework for studies about teaching EHRS use in the literature. The NLN/Jeffries Simulation Framework (Jeffries, 2007) has been used to organize educational approaches to simulation. The refined framework was recently validated as the NLN Jeffries Simulation Theory (Jeffries, 2016) and describes the complex interactions of the constructs underpinning simulation activities. Within the theory, circumstances and setting provide the context that envelopes the simulation experience. The background and design features contribute to the experience. The simulation experience is defined as collaborative, learner-centered, interactive, experiential and trusting. There is a dynamic interaction between a facilitator and a participant during simulation, as well as, a shared responsibility for the simulation. The facilitator draws from and utilizes educational strategies in preparation for and during interaction with the participant. Facilitator attributes may include preparation, skill and use of educational techniques. All constructs work in concert to affect outcomes on three levels: participant, patient, and system (Jeffries, 2016). This theory may have relevance to teaching EHRS use.

Themes of the Integrative Review

Four themes from the literature emerged from the integrative review process. They are: (a) developing technologically competent students; (b) developing technologically competent faculty; (c) evolving technology of the EHRS/AEHRS; and (d) using active learning strategies (student-centered activities in nursing context with practice). These themes are described below.

Developing technologically competent students. Even though students may enter nursing courses with diverse computer skill backgrounds, they need to become technologically competent, i.e. proficient in technology use, to achieve specific learning outcomes in EHRS use and informatics. Several descriptive studies suggested that practice to gain proficiency needs to entail dedicated time periods, opportunities for repetition, and then, variations of key components of the skills (Anest, 2013; Bostrom et al., 2006; Jones & Richards, 2013; Jones & Donelle, 2011; Kowitlawakul et al., 2013). Practice in the academic environment may be advantageous to facilitate using EHRS in the clinical learning environment (Anest, 2013). Handbooks or training guides may help students to gain understanding of AEHRS and support learning (Kowitlawakul et al., 2013). Practice using EHRS may enable students to develop their EHRS skills and move from novice toward expert in proficiency (Jones & Donelle, 2011). Ultimately, students may gain sufficient expertise that enables them to move from computer-focused to client-focused nursing care (Jones & Richards, 2013).

Many descriptive studies reported that obstacles limit students' experiences with EHRS. Since most clinical EHRS are site-specific, students may encounter unique EHRS in each learning environment (Baillie, Chadwick, Mann, & Brooke-Read, 2012, 2013). Some sites prohibit students' use of the EHRS and many limit students' viewing or charting interactions. Preparation that includes training for the specific EHRS prior to clinical placement, possession of an individualized secure sign-on, and reinforcement in the clinical learning environment may improve the student experience (Baillie et al., 2012, 2013). User access issues extend to AEHRS which may also be school-based and not web-accessible, limiting students' opportunities for use (Jones & Donelle, 2011). When the AEHRS were web-accessible, concerns for students' compliance with security was amplified even though it provided more opportunities for students

to chart. Understanding the need for secure EHRS sign-on may increase student understanding of privacy and security of patient information (Baillie et al., 2012).

Several descriptive studies focused on students' perceptions of and experiences with EHRS. Student acceptance of EHRS may be enhanced by the cultivation of a positive attitude and increased perceived usefulness (Kowitlawakul et al., 2015). Jones and Richards (2013) reported that students using EHRS stated the benefits of their use included prompting a more thorough patient assessment and access to nursing resources. Students liked active participation in the learning activities with EHRS (Jones & Richards, 2013; Kennedy, Pallikkathayil, & Warren, 2009; Kowitlawakul et al., 2015), although trying an assignment for the first time had a low student comfort level (Ayers et al., 2015; Titzer et al., 2015). A participative teaching method had a greater impact than lecture teaching on students' mean computer anxiety scores and this participative strategy may facilitate EHRS learning (Özbiçakçi, Bektas, Çetin, & Uysal, 2011). Warboys, Mok, and Frith (2014) found that students had stronger perceptions of realism of AEHRS with repeated use, especially when the repetitions reached five. More practice may lead to better perceptions of realism which together may lead to more proficiency (Warboys et al., 2014). Of the reviewed studies, only Mountain (2015) used a sample of associate degree nursing students.

Developing technologically competent faculty. Faculty also have diverse backgrounds, experiences, and skill sets in EHRS use and informatics, yet, all are expected to teach students competently (Mahon, Nickitas, & Nokes, 2010). Ornes and Gassert's (2007) descriptive study found that faculty are the greatest block to incorporating technology into curricula. In a survey of 14 faculty, Titzer and Swenty (2014) found that, while many faculty appreciated the benefits of AEHRS with simulations, only 54% indicated that it enhanced simulation activities.

In theory-based studies, the need for faculty development in EHRS use and informatics was reported by several authors. Faculty may need training and handbooks before AEHRS use or integration (Kowitlawakul et al., 2014; Kowitlawakul et al., 2013). Curricular integration may be dependent on faculty members' experiences and perceptions of technology (Kowitlawakul et al., 2014) While AEHRS development is considered innovative, valuable and challenging, it was perceived as a transitional process that required time from faculty and students as well as support from administrators (Kowitlawakul et al., 2014). Mahon et al. (2010) found that to teach documentation lessons in the clinical learning environment, faculty utilized a cluster of teaching strategies, consistently including role-modeling and demonstration-return-demonstration. They also described surmounting myriad challenges that included lack of access to the EHRS, limited computer work stations, language differences, and time expenditures and constraints. Little information about faculty familiarity and expertise with AEHRS is known. None of these studies sampled associate degree faculty.

Evolving technology of the EHRS/AEHRS. The proliferation and evolution of AEHRS and EHRS presents challenges for students, faculty, administrators, and clinical practice partners. Variations in these technologies exist. AEHRS may have been developed by faculty (Feeg et al., 2008; Kowitlawakul et al., 2013) or modified from existing EHRS through a faculty-vendor collaboration (Choi, Lee, & Park, 2015; Kennedy et al., 2009).

Two descriptive studies reported on modified EHRS that became AEHRS that met the learning needs of students (Erdogan et al., 2013; Kennedy et al., 2009). In the only study that used a randomized control trial, Feeg, Saba, and Feeg (2008) evaluated students (N = 14) and the care plans (N = 28) they produced using a computerized program with standardized nursing terminology. They reported that some improvement in care plan completeness was noted and

that the program facilitated use of standardized terminology by the students. The small sample and low power were identified as limitations. Depending on the system, some AEHRS allow students and faculty access from varied settings on-site to remote (or home) access and across electronic devices.

Studies have specified AEHRS use during seminar class (Kennedy et al., 2009), college laboratory (Anest, 2013; Kowitlawakul et al., 2015; Kowitlawakul et al., 2014), simulation (Ayers et al., 2015; Mountain et al., 2015; Schaar & Mustata Wilson, 2015), or the clinical learning environment (Erdogan et al., 2013; Jones & Richards, 2013; Mahon et al., 2010). The variety of EHRS in the clinical learning environments complicated the instructional plan of faculty teaching students who were going to different institutions (Baillie et al., 2012). Few studies provided the AEHRS brand, vendor or its level of functionality, which limited making comparisons.

Since the use of AEHRS involves human-computer interfacing, human factors methods were utilized to assess and guide system design and functionality (Choi et al., 2015; Jones & Donelle, 2011). In a small pilot study, Choi et al. (2015) found that their mobile application of an AEHRS was easily used by students and required minimal adjustments before planning to integrate it into a nursing course. Jones and Donelle (2011), using a think-aloud method to evaluate documentation in an AEHRS, identified the following issues: being novice, confidentiality and security, and repetition and practice, as three themes of students' interactions. Few studies included inquiry about ease of EHRS use as part of their demographic or questionnaire data.

The literature described the distinct advantages that AEHRS offer. As innovative learning tools, AEHRS provide ready access to nursing resources such as medication guides

(Anest, 2013; Vana & Silva, 2014), care planning references (Feeg et al., 2008; Kennedy et al., 2009; Pobocik, 2015), nursing terminology (Erdogan et al., 2013; Feeg et al., 2008; Pobocik, 2015) and patient education materials (Jones & Richards, 2013). The AEHRS resemble those used in the clinical learning environment and offer a safe virtual environment in which students can learn and document. They also help prevent students from accidentally affecting actual patient records; maintain the security and integrity of the EHRS; and, avoid the potential for harming patients through HIPAA violations, incorrect data entry or omission (Jones & Richards, 2013; Jones & Donelle, 2011; Mountain et al., 2015; Titzer et al., 2015). Repetitive activities within the AEHRS can be planned and encouraged, providing students with practice opportunities (Jones & Donelle, 2011; Mountain et al., 2015). The AEHRS can be utilized by faculty for formative and summative assessments (Erdogan et al., 2013; Titzer et al., 2015).

Using active learning strategies (Student-centered activities in nursing context with practice). Active learning was a common theme across the descriptive studies. Robust case studies provide useful data and context using the AEHRS as students constructed care plans in the student-centered activities (Kennedy et al., 2009). Unfolding case studies with an AEHRS improved students' ability to accurately identify nursing diagnoses (Pobocik, 2015). Jones and Donelle (2011) asserted that although the purpose of their study was not to evaluate the use of their case-based scenario for building documentation skills, their results suggest that this problem-based learning strategy is effective to teach basic concepts.

Case-studies with patient narratives, combined with an AEHRS and an adjunctive medication resource, resulted in greater perception of students' ability and satisfaction (N = 113), as well as, greater accuracy and teamwork during a pharmacology activity (Vana & Silva, 2014). Jones and Richards (2013) reported that students (N = 20) perceived that AEHRS assisted them

to gain nursing and informatics skills during home care visits. Erdogan et al. (2013) described students' (N = 159) use of a standardized terminology program in an AEHRS to collect data about home care patients while working with home care nurse teams. Descriptive studies reported use of teaching strategies that included role modeling by instructors and professional nursing staff and demonstration/return-demonstration that may have contributed to student learning, but were not specifically evaluated (Erdogan et al., 2013; Mahon et al., 2010).

Purposefully crafted simulations that include EHRS utilization and documentation may also provide positive learning experiences. Mountain et al. (2015) found that utilization of AEHRS in simulation provided a safe and supportive environment for students to practice and receive feedback. Noting the wide variability in accuracy and completeness of students' AEHRS documentation following an obstetric simulation, Schaar and Mustata Wilson (2015) reported that students need more activities to improve their documentation skills. In an elaborate 96-hour continuous hospital simulation, Ayers et al. (2015) included an AEHRS to increase the realism, but did not specifically address results about documentation or workflow.

Using AEHRS as a common teaching tool during interprofessional education activities may provide opportunities to build communication, teamwork, and informatics competencies (Ayers et al., 2015; Schaar & Mustata Wilson, 2015; Titzer et al., 2015). While each of these reported simulations is unique, their commonality is that using the AEHRS in simulation activities contributes to the realism of the simulation and focuses attention on developing competence using AEHRS as an integral component of nursing practice (Mountain et al., 2015).

Limitations of the Integrative Review

The results of this integrative review need to be interpreted with consideration of the quality and methodological accuracy of the included studies. The decision to include all of the

studies was predicated on the idea that this review would reflect the current literature instead of an extremely limited selection of the most rigorous studies. Many of the studies were limited by small samples and low power. Several researchers reported using students within their own classes or school. Many of the authors described their work as demonstration projects or pilot studies. This aspect of the search result is consistent with Oermann's (2009) description of the dilemma of limited rigor in nursing education publications. While demonstration projects and commentaries are useful, Oermann (2009) advocates for more rigorous studies to be conducted and published to build the science of nursing education.

Conclusion

This integrative literature review sought to determine the best practices in teaching pre-licensure nursing students to use EHRS. Through the integrative review process, four themes emerged. The *developing technologically competent students* theme suggests that pre-licensure nursing students need the knowledge, practice, skills, and attitudes to develop the technical expertise to use the EHRS successfully in nursing practice. The *developing technologically competent faculty* theme suggests that faculty need the knowledge, practice, skills, and attitudes to develop technical expertise to use the EHRS and, in turn, to teach students successfully – with the caveat that faculty utilize educational and clinical technologies to do so. There is a gap in the literature about associate degree nursing faculty's level of expertise, experiences and challenges related to teaching EHRS use.

The *evolving technology of the EHRS and Academic EHRS (AEHRS)* theme suggests that EHRS content should be incorporated into curricula in progressive stages consistent with competency development schema. EHRS are multipurpose tools that vary across a spectrum of functionalities and require a spectrum of user competencies (TIGER, 2009b). The continual

change of computerized products (e.g. updates, revisions, and emerging technology integration), variety of EHRS and AEHRS, and differences in systems' functionality present challenges for students, faculty, nursing programs and clinical partners. The theme *using active learning strategies (student-centered activities in nursing context with practice)* suggests that teaching strategies/pedagogies that foster active learning, that is, student-centered learning, are most effective. Active learning strategies were utilized in most of the studies. More tentatively, some results suggest that active learning strategies to teach EHRS use may be effective in meeting learning outcomes.

Additional challenges with the reviewed literature were identified. The variety of settings and teaching strategies reported in the literature introduced variables that hindered comparison across studies. There is a need for more research that focuses on students' attentiveness and use of EHRS during simulation activities with the intent to gain more evidence of positive teaching strategies, student learning, and outcomes. There is scant evidence of using EHRS during simulation for instruction or as an adjuvant for realism. Some studies described assessing skills of current students but little is known about the transfer of learned skills into practice. Faculty face significant challenges to acquire and integrate EHRS into nursing curricula. There is limited information in the literature about faculty's perceptions about EHRS use, teaching with EHRS, and using EHRS to meet student learning outcomes. This gap is particularly evident for associate degree nursing faculty.

The exponential and pervasive integration of EHRS is dramatically changing the health care practice environment and nursing workflow while concomitantly challenging how nursing students will learn and practice (IOM, 2010, 2011; NLN, 2015). As described in Chapter 1, significant forces – the combination of legislation, professional nursing organizations' initiatives,

accrediting agency priorities, and stakeholder imperatives – continue to challenge nursing faculty to teach EHRS use.

Qualitative exploration of the experiences of associate degree nursing faculty related to teaching EHRS use provided information about the challenges that faculty encounter, strategies that they used to teach EHRS use, and roadblocks that hindered achieving learning outcomes. Increased understanding of associate degree faculty preparedness to teach EHRS provides direction in better describing challenges and planning future faculty development in EHRS use. The purpose of this qualitative study was to explore the experiences, perceptions, challenges and strategies of associate degree nursing faculty related to teaching EHRS use to pre-licensure nursing students.

Chapter 3: Methods

This study used a descriptive qualitative approach with surveys and interviews of associate degree nursing faculty to explore participants' experiences, perspectives, challenges, and related to teaching students to use EHRS. This chapter details the research method for this study, including the research questions posed, qualitative descriptive design, sample and setting, and the data collection and analytic process. The commitment to trustworthiness and rigor as well as ethical considerations for the research process and protection of participants and their affiliated institutions are explicated.

Purpose and Research Questions

The purpose of this qualitative descriptive study was to explore the experiences, perspectives, challenges, and teaching strategies of ADN faculty related to teaching EHRS use to pre-licensure nursing students. The research questions posed were:

What are associate degree nursing faculty's:

1. experiences in teaching EHRS use?
2. perspectives on preparedness to teach EHRS use?
3. challenges associated with teaching EHRS use?
4. perspectives of effective teaching strategies related to EHRS use?
5. perspectives of how different settings (classroom, laboratory, simulation, or clinical learning environments) affect teaching strategies and outcomes?

Research Design

For this study, a qualitative methodology was used with a qualitative descriptive method (Sandelowski, 2000). As described in earlier chapters, ADN faculty were challenged to teach the fundamentals of EHRS use, nursing documentation and introductory informatics concepts to

nursing students who enter nursing programs with a wide range of computer skills and information literacy (TIGER, 2012). The literature review yielded little research about ADN faculty's experiences related to EHRS use. In fact, a single study sampled associate degree nursing students (Mountain, 2015). None of the studies sampled ADN faculty. Qualitative methods are useful to gain understanding of a phenomenon through the perspectives and experiences of the informants when there is limited information (Mills & Birks, 2014). This study sought to fill this gap.

This study used broad, descriptive survey methods to gather data from a group of conference attendees and in-depth interviews of a smaller group of self-selected individual attendees who were willing to share their perceptions and experiences. Written responses to open-ended survey questions provided opportunities for detailed textual responses and for participants to reflect on their answers allowing for greater richness to their responses (Marshall & Rossman, 2011). In-depth interviews provided information about the *who, what, where,* and *how* of faculty experiences (Sandelowski, 2000; Mills & Birks, 2014).

The qualitative descriptive design allowed the researcher to stay close to the data. Qualitative descriptive studies, in particular, provide rich details to describe phenomena and summarize events using common terms and meanings (Sandelowski, 2000). The information gained from qualitative studies may also be used to inform future studies seeking to quantify *how widespread* issues may be (Mills & Birks, 2014). The surveys and interviews yielded a trove of data for inductive analysis, allowing for the emergence of categories and subcategories to gain understanding of associate degree nursing faculty experiences teaching EHRS use.

Sample and setting. The study included a convenience sample of ADN faculty responsible for teaching EHRS use. Participants were recruited from a state-wide conference

hosted by the Council of Associate Degree Nursing in New York State, Inc. (CADN). Each April, the CADN hosts a membership meeting for Deans, Directors and Program Chairs followed by a faculty development conference that draws ADN faculty from around the state. The CADN is a non-profit organization founded in the 1970's to provide a forum for members' key issues surrounding undergraduate nursing education and continuing education for faculty members. The CADN consists of members from the 64 ADN programs in New York State and the annual conference draws up to 200 nursing faculty (personal communication, M. Markowitz, October 10, 2016). In response to an email request initiated in October, 2016, the CADN Board granted permission for this researcher to recruit at their Spring 2017 membership meeting of associate degree deans, directors, and program chairs (referred to as the "directors' meeting" in this dissertation) and the faculty development conference held the following day. Appendix A contains the Permission from the CADN Board.

New York State has a diverse population with more than 19.8 million people (U.S. Census Bureau, 2015). The state exceeds 54,000 square miles in size encompassing rural to urban neighborhoods with most of the population residing in the greater New York City metropolitan area. Pre-licensure nursing faculty, numbering 943 in 2010-11, were employed in 126 programs across the state; ADN programs equaled about 52% (Brewer, 2012; NYSED.gov, 2016). These extended demographic and geographic ranges increased the likelihood of achieving a desirable sample that encompasses faculty from across the state. This resulted in a diverse sample from multiple programs in contrast to many of the single-site samples described in the literature.

Recruitment and survey procedure. Several opportunities for publicizing the study to recruit faculty were utilized. Initially, the study was introduced by one of the CADN Board

members. Then, with prior email permission from the CADN Board, a brief announcement introducing the study and inviting participation was presented at both the directors' meeting and faculty conference (see Appendices B and C for announcements). At the directors' meeting, attendees were asked to encourage their teaching faculty to participate. This researcher briefly explained the study and conference attendees were offered a paper copy of the recruitment letter/flyer inviting them to participate in the study (see Appendix D for recruitment letter/flyer invitation). Additionally, a space at the registration table was procured for the researcher to display the recruitment letter/flyer invitation, provide additional copies, answer any potential participant questions, and collect completed paper forms.

A paper copy of the demographic questionnaire and written survey were attached to each recruitment letter/flyer invitation (see Appendices E and F for the questionnaire and survey). The written survey consent was also attached to the written survey. Appendix G contains the written survey consent information. The "written survey" represented identical versions of the paper and electronic survey. A link to the online version of the survey was included on the flyer for those who preferred to access it instead of hand-writing their responses. The link was active for four weeks after the Conference. A monitored sealed box was placed at the table for completed surveys around the conference sessions. The box was moved into the conference area to facilitate collection and security of the written surveys completed during the conference hours.

As explained above, the recruitment letter/flyer invitation described the study, invited participation of ADN attendees, and provided the researcher's contact information. It also included space for potential interview participants to list their contact information (see Appendix D). A request for interview participation, with the researcher's contact information, was also provided at the end of the written survey. These recruitment letter/flyers with sign-up (contact)

information were collected at the table and secured in a folder. An email, with an attachment of the recruitment letter and survey, was sent to the CADN contact people at each member school after the events.

Consistent with qualitative research methods, it was estimated that eight to ten participants would be needed to address the research questions. For qualitative studies, the ideal is to gather participant data until there is redundancy, or theoretical sufficiency (data saturation), deemed the point when no new information is gained (Marshall & Rossman, 2011). In this study sample size was limited to the 10 participants (interview) and 27 participants (survey), respectively who volunteered. The study samples are described in Chapter 4.

Interview procedure. Faculty were scheduled for interviews after they agreed to participate. Space to interview participants was secured for any participants able to interview on site. Alternately, contact information was verified to facilitate scheduling. Even though interviews could have been scheduled around the meeting and conference schedules to take advantage of the common location, none of the faculty were available at those times.

Inclusion criteria for interviewees were (a) faculty that have taught or are currently teaching associate degree nursing students to use EHRS in any setting, (b) are able to communicate in English, and (c) consent to be interviewed and recorded. Faculty who lacked availability to be interviewed or did not have compatible equipment for teleconferencing would have been excluded, but all potential participants indicated that they could arrange contact. There were no incentives or compensation offered to participants, beyond the potential altruism of supporting the science of the profession.

Considering the brief time frame of the one-day conference and the distance that some attendees needed to travel, potential participants were offered the opportunity to interview using

distance technology. Most participants chose to be interviewed via telephone call. Post-conference interviews were scheduled within one month of the conference date to allow for the hectic pace at the end of the semester. Two participants arranged in-person appointments at mutually convenient geographic locations for the participant and researcher. A private office and classroom were obtained as interview space. When using distance technologies, efforts were made to mimic the interview space described above virtually. A quiet space that limited interruptions was recommended to participants.

Current technologies, such as telephones, or online teleconferencing modalities (GoToMeeting or Skype), enable communication over distances. These have been used with increasing frequency in education and health research with similar outcomes to in-person activities (Flodgren, Rachas, Farmer, Inzitari, & Shepperd, 2015).

Data collection: Instruments and procedures. Data were collected through the use of a demographic questionnaire, a written survey, and in-depth interviews. The data collection instruments were designed after careful review of the literature. The semi-structured interviews transpired in the interview spaces facilitated by the interview guide. This researcher was solely responsible for the demographic questionnaires, surveys, and interviews.

Demographic data collection tool. Demographic questions were chosen to provide a description of the sample of ADN educators. These included age, gender, and race/ethnicity. The age ranges were grouped by generation since some of the literature particularly considered the role of the generational influences of Baby Boomers, Millennials and Generation X'ers. There were questions about the number of years of teaching and providing direct patient care, including work with EHRS, to gain information about participants' backgrounds. For example, one question asked for respondents to indicate in which academic setting(s) they teach EHRS

use. This demographic data helped to inform the question of faculty preparedness. The demographic questionnaire is provided in Appendix E.

Qualitative written survey. The survey consisted of seven open-ended questions, consistent with the qualitative descriptive method, and two short-answer questions. The survey was generated from the reviewed literature and professional perspectives. Open-ended questions served to prompt the respondents to use their own words and meanings to describe their experiences and perceptions (Sandelowski, 2000). Both paper and electronic versions of the survey consisted of the same questions in the same order. The survey was constructed with sufficient space to allow for responses to be written on the paper or typed into the online format. The survey is provided in Appendix F.

EHRS interview guide. For the interviews, this researcher developed a semi-structured interview guide from the reviewed literature. To maintain consistency, the survey and interview guide questions were constructed as reflections of the research questions and key reviewed literature. The interview guide consisted of nine broad open-ended questions to prompt participants to share their perceptions and experiences in their own words. Participants were asked to discuss their experiences in each setting in which they teach EHRS. Probing questions were used to pursue greater depth and clarification of meaning. The interview guide is provided in Appendix H.

Pilot Data. Three pilot surveys and interviews with local colleagues were conducted to finalize the survey and interview questions. Minor edits enhanced the clarity of the questions. In addition, two qualitative research experts and two EHRS content experts reviewed the questions and provided feedback. Feedback from piloting the online surveys enabled debugging as the survey deployed. The pilot interviews were beneficial for rehearsing the interview questions,

allowing for the interview flow, and adjusting the probing questions to gain depth. Interviewees' responses were descriptive and plentiful, further suggesting that this phenomenon merited exploration.

Detailed interview process. The interview process started with welcoming the participant and making them comfortable. A brief script provided an overview of the process for the interview: introduction with restated research purpose, demographic questionnaire, interview, and conclusion (see Appendix I for the interview script). The consent form was reviewed and any questions were answered before consent was obtained (see Appendix J for the interview consent). Demographic questionnaires were completed (see Appendix E for the demographic questionnaire).

All interviews were digitally recorded (Marshall & Rossman, 2011). A second recorder was employed as a backup for each interview. The recording equipment was initiated once the participant indicated readiness. Recordings were dated and labeled for reference. During each interview, the interview guide was a source for initial questions. Additional questions were used to probe for depth, request clarification, or seek additional examples. At opportune intervals and at the end of the interview, summarizing also allowed the participant to clarify, add, or correct data. This member-checking engaged the participants' attention before they left the interview.

Notetaking. Field notes were used to collect additional data that enriched the verbal accounts and added depth (Marshall & Rossman, 2011; Patton, 2015). Very cursory handwritten notes were jotted during the interviews as long as notetaking did not interrupt the communication flow. Questions with responses that might require clarification or follow-up were flagged. A personal debriefing followed the interviews either by writing or typing. These notes included

documenting observations of non-verbal communication and cues, in addition to capturing this researcher's thoughts and emotions.

During review of the transcripts and replaying the recordings, additional notes were taken. Annotations documented points of emphasis and other process components of communication that complemented the audible content. These provided additional data to enrich the description as recommended by qualitative research authors Marshall & Rossman (2011) and Patton (2015). Dating, timing and referencing the notes and entries helped organize the data.

Data analysis. This section details the concurrent data analysis and collection process. Initial survey data was collected during the conference and transferred to a spreadsheet that evening, triggering beginning analytic thoughts.

***Demographic information analysis*.** Descriptive data from the demographic questions was organized in table format with descriptive statistics used to analyze the demographic information. Formulas within the Excel spreadsheets (Microsoft. 2013/2016) were used for this purpose. Demographic data from the surveys and the interviews are reported separately with results of the analysis presented in Chapter 4.

Qualitative written survey analysis. Electronic survey data were downloaded and reviewed. Data and annotations from the surveys were organized in Excel spreadsheets (Microsoft, 2013/2016). Survey responses, with the open-ended questions related to perspectives, challenges and strategies in particular, were reviewed for any patterns as recommended by Patton (2015). Results were reported and summarized. The survey data assisted with triangulation, offering an alternate data source for connections to the interview data (Marshall & Rossman, 2011).

***Interview analysis*.** Using the qualitative descriptive method, data analysis started with data collection and continued concurrently (Sandelowski, 2000). Data was first organized by the participant and the date and time acquired. Interview recordings were transcribed verbatim, reviewed, and compared to the recordings for accuracy. This researcher's analytic approach was immersive, intuitive and reflexive as consistent with recommendations (Marshall & Rossman, 2011, Mills & Birks, 2014, Patton, 2015, Sandelowski, 2000). Listening to the recordings and reviewing the transcripts kept the researcher close to the data (Sandelowski, 2000). Repeated listening with simultaneous note-taking along the transcript margins facilitated additional cues and details to be documented and analyzed. For the inductive analysis, an iterative process of coding that started with the determination of significant statements, meaning units, then, grouping the units together, leading to the emergence of categories, was used (Elo & Kyngäs, 2008; Graneheim & Lundman, 2004; Hsieh & Shannon, 2005; Marshall & Rossman, 2011). A worksheet showing this initial process is provided in Appendix K. The terms and meanings of the participants were preserved during the coding process to promote description instead of interpretation as described by Sandelowski (2000).

Several strategies assisted the analytic process. The coding process allowed this researcher to focus on the pieces of actual data and work with them as manageable bits (Hsieh & Shannon, 2005). Data and annotations from the interviews were transferred into Excel spreadsheets (Microsoft, 2013/2016). This facilitated grouping key words and phrases across participants' statements in addition to coding. The handwritten notes taken during the interviews and field notes were transcribed into Word documents (Microsoft, 2013/2016) or indexed. The same immersive, inductive approach was used with the notes. Journal entries by this researcher contributed to making sense of the data during the analysis. Analytic memos were incorporated

into the journal to maintain a log of decisions, while tracking the emergence of insights and alternate understandings. Diagramming and mapping ideas to visualize the relationships of the data groupings was utilized. Peer review with qualitative experts contributed to the analysis. The analytic process continued until all of the available interview and survey data was analyzed for the emergent categories (Marshall & Rossman, 2011).

Trustworthiness of Qualitative Data

Lincoln & Guba's (1985) naturalistic inquiry criteria were used to support the rigor of the qualitative process. Rigor, trustworthiness, and ethics were important considerations for this qualitative research project. Sample, setting, data collection and data analysis were described to facilitate transferability. Member-checking with periodic summarizing was utilized during and immediately post-interview for accuracy and credibility. An audit trail was maintained to demonstrate dependability. Potential researcher bias was examined and explicated through the use and review of field notes, journaling, and the audit trail. An openness to the guidance of qualitative experts along with a receptiveness to alternate viewpoints contributed to the insights of peer debriefing. This researcher was attentive to the steps that demonstrated credibility, dependability, confirmability, and transferability.

Ethical Considerations

The ethical stance of the researcher was to protect participants' confidentiality as detailed within the procedures section. Confidentiality and privacy were maintained and efforts to mitigate potential risks to participants were explained within the consent form (see Appendix G, Written survey consent form and Appendix J, Interview consent form). These included numerically coding individual respondents' identities, de-identifying quotes, and reporting data in aggregate form. Safe storage of recorded content and participant-specific data was assured by

password-protected computers, password-protected data storage devices, a locked box for paper copies, and secure file transfer for digital files and transcripts. Institutional Review Board requirements for the study were followed through the culmination of the research.

Summary

As detailed in initial chapters, recent Institute of Medicine reports and National League for Nursing statements, along with nursing stakeholders, have emphasized the need for nursing education to prepare students to provide safe, competent nursing care in the increasingly technical and information-loaded health care environment. The transition from paper charting to electronic health record systems (EHRS), and subsequent proliferation of EHRS, are influencing how nurse educators teach students to use EHRS. There is little information known about the experiences of associate degree nursing faculty in particular. Qualitative inquiry, because it can facilitate rich description of phenomena, was appropriate for this study.

This qualitative descriptive study explored the experiences, perspectives, challenges, and teaching strategies of ADN faculty related to teaching EHRS use to pre-licensure nursing students. Data collection tools included a brief qualitative survey, consisting of broadly open-ended questions, and a semi-structured interview guide that facilitated discussion about teaching EHRS use across diverse settings. Data collection and analysis occurred concurrently and used an immersive approach with an iterative, inductive process. Information gained in this area, as further described in Chapter 4 and Chapter 5, leads to increased understanding of the challenges that ADN faculty face, as well as, their teaching strategies and suggestions regarding education and faculty development that may be beneficial to nurse educators.

Chapter 4: Results/Findings

Chapter 4 includes a description of the interview participants and presents a rich exploration of the emergent categories and subcategories from the interview data. Excerpts from the interviews are integrated throughout the chapter. A description of written survey respondents and a summary of survey responses is included.

Sample Description: Interview Participants

All ten interview participants completed a demographic questionnaire. Table L1 (Appendix L) provides a summary of the results. Participants were all over the age of 36, with 4 respondents between the ages of 53 – 61, and one over 71 years old. All were female. Nine identified as white and one as Asian race/ethnicity. Respondents' years of experience teaching in associate degree or other nursing programs indicated half (N = 5) had more than 14 years of experience; four had between 9 – 14 years of experience, and only one had 3 – 5 years of experience. The number of years worked in direct care and using EHRS in that position, indicated a full range of responses from less than 2 to more than 14 years.

Most of the respondents indicated that they taught in multiple settings. Each setting of lecture, college laboratory, simulation lab, or the clinical learning environment, included at least 50% of the respondents. Only one had experience teaching EHRS use in an online course. Of the ten interview participants, eight had attended the Council of Associated Degree Nursing (CADN) director's meeting and/or faculty conference in New York State and two had heard of the study from attendees and contacted the researcher to participate. Seven of the participants were each affiliated with a different college from a different county. The remaining three participants were from one large community college, where one taught exclusively in the simulation laboratory and two taught at different clinical facilities that were more than thirty

miles apart. In total, their colleges encompassed diverse geographic settings, representing urban, suburban and rural communities in eight counties across New York State.

Associate Degree Nursing Faculty's Experiences in Teaching EHRS use

This qualitative descriptive study used open-ended questions to elicit the personal responses of the participants. Interviews were transcribed and then analyzed using descriptive content analysis in an iterative approach. Along with participant perspectives came detailed stories around teaching nursing students to use EHRS. This created a rich conglomeration of ideas, opinions, and experiences united with similarities and broadened by individual differences. Two major categories emerged from the inductive content analysis: *Facing challenges* and *Building successes*. Appendix M - Part A summarizes the categories and subcategories from the analysis and Appendix M - Part B details the major categories and subcategories. Elaboration of the findings follows.

Major category: Facing challenges. Participants readily shared their stories about difficulties associated with teaching EHRS use. Three subcategories emerged from the data analysis that facilitated understanding. *Struggling with EHRS* involved many of the daily teaching concerns with EHRS. *Nursing program issues* encompassed the program-wide challenges that extend beyond individual courses. The last subcategory, *Developing faculty*, addressed the status of faculty preparedness.

Struggling with EHRS. This subcategory included exploration of logistical challenges associated with teaching EHRS use. The four components describe aspects of faculty's daily experiences. These include limited access and availability, computer competencies, student documentation and medication administration, and increased frustration and decreased productivity.

Limited access and availability. Access is like the key to a locked door… without the key, one cannot get in. Gaining and maintaining access to the EHRS was a crucial challenge. Five participants described how, "students don't even get the access.... The instructor may get access, and the students are in under the instructor's access," meaning that "the students are not given their own individual log on and only the instructor logs on." A participant, describing how this affected her, "it's one student at a time." She continued, "I can log them in so that they can spend some time, while they're logged in, someone else can't." Since students are "under" the faculty access, faculty are expected to remain with the students, taking up valuable clinical time. Delayed access was problematic as well. A participant explained her challenge as "When I don't have access! It took me seven weeks to get access to the hospital's medication administration record and ambulatory surgery where I had my second year students last semester." The result, emphasized another participant, is that students do "not have the opportunity to have experience [using EHRS in clinical]."

Several participants described restrictions after they had accessed the EHRS, "we don't have full access to the medical records there at that hospital… and we can't give medications… But [at another facility] we can give medications……and chart only in specific areas." One participant, stated that her program's "students have access to [EHRS] with an individual username and a password for all of the sites that we use," but, even with the advantage of individual access, faculty and students often needed to change usernames and/or passwords for each site or semester. Participants reported that privileges (access, viewing or documenting) in the EHRS at each facility that they went to could differ.

Securing a username and password was just one step in the process of accessing the EHRS. An entirely separate transaction involved securing equipment, such as a computer,

mobile cart or workstation to use the EHRS ahead of or with students. One participant "find[s] it more challenging in the clinical setting due to the not-having access to a dedicated workstation on wheels." Another participant worried, if "there is a cart that's available that I can log on to? …and [if] I log on to someone else's cart, do I have to give up the cart in the middle of doing medications?" Another participant stated, "So, we have to wait for the staff nurses to allow us to use their working station or find a spot at the nursing desk to log in. Sometimes, it's just a matter of equipment availability and …the unit culture itself. So, having a receptive staff that engages and facilitates learning for your students" can be helpful. After jockeying with the staff nurses to get time to use the cart to administer medications, one participant attempted to resolve the situation by speaking "to multiple staff members and, of course, the nurse manager to see if there's any way that we could try to negotiate me using a workstation on wheels for a time." This reliance on staff was also a source of frustration for faculty.

Computer competencies. While faculty's perceptions of students' computer competencies varied across the spectrum, there was agreement that computer competencies and information literacy directly correlated with ease of using EHRS and CDST. Several participants thought that "students are so computer savvy now … find their way very quickly … [and] click through different areas," "because I think, regardless of their age, everybody is acclimated to the computer world." Another participant thought, "we're all millennials because we're all so much in tune to electronic systems."

In contrast, one participant found that "many, many of our students, which surprised me in this digital age greatly, have difficulty using a computer." She explained further, that "becoming computer literate for [some of] our students … is major challenge…. Even some of the younger students have difficulty managing all the electronic systems they have to use."

Reflecting on their own computer ability, a couple of participants thought "the students are much more savvy than we are." In summary, the variability in faculty and student ability and competency with computers presented another challenge in preparing them for their work with EHRS.

Student documentation and medication administration. Lack of access to the EHRS increased participants' concern about opportunities for students to learn documentation. Two of the participants addressed the students' inability to document in the facility by showing "them what kind [of] documentation system they have…. [and going through the] documentation with those students." Opportunities to document were missed in the simulation lab as well, one participant explained. Students "go through a simulation and they do a lot of assessing and observing and care and procedures, but then, we don't tend to make them document it all in the simulation, [and] they really need that piece too." Another participant thought that students "have a fundamental idea of what they're doing," but should have opportunities to practice and develop the skill. This was difficult when, "they are not allowed to do any electronic health record charting, All their vital signs, all their assessments, all of it, all they can do is report it off to a nurse." Participants wanted students to connect patient assessments and nursing care to documentation, but lacked opportunities to do so.

Even with opportunities to document in an EHRS, participants still had concerns. One participant thought "electronic charting can be faster. I remember …writing long notes and I think it took me much longer to hand write long notes than to do the clicking, clicking, clicking." Another participant voiced concerns about students clicking through documentation assignments, since they "have to chart everything, so people are becoming very adept at checking off boxes,"

without necessarily understanding what they are documenting. Most participants agreed that teaching students to document correctly in the EHRS was time-consuming.

Participants also indicated that the EHRS provided an advantage for teaching documentation, despite the time investment. One participant thought that "students have an easier time documenting" in the EHRS than "writing notes freely, because the documentation is more precise and it's driven by cues." Another participant said, "When you have a student fill out a form or write a narrative, the narratives seem to be all over the place and they miss elements, where the [EHRS] reminds them, 'You have to document this element.'" They thought that documenting in EHRS was different than paper charting and required targeted instruction to accommodate the documentation style, terminology and electronic forms that replaced blank sheets of paper.

Many participants were very concerned about the effects of transitioning from classroom to facility or moving from one EHRS to a different EHRS. One participant describes that "it is very hard for them [students] to go into clinical on that first day and be faced with a system that they're not at all familiar with." Another participant stated that her students, "go to a different institution where they have to learn a whole different system and it's kind of mind boggling for them." Another participant said that they were "finding that some systems are more difficult than others to navigate," adding to the difficulty of moving from one EHRS or facility to another. "The programs that we use at the different hospitals are different," said one participant about the three facilities where she instructed students. While one facility allowed her students to document medication administration, another facility limited access and restricted documentation in the two software systems that were being used simultaneously there. At a third facility, she and her students "can give medications … and chart only in specific areas at the hospital… so,

there's very little uniformity." This concern extended to faculty, because "some systems are still with the paper record, and you constantly have to adapt to whatever is going to happen one place or another." Participants animatedly explained how the different rules for access and variations in privileges (what faculty and students can do in an EHRS) between campus and facilities, as well as between facilitates, affects the content and methods for teaching about documenting in EHRS.

Medication administration was considered a high-stakes integrative process. Faculty spent much interview time talking about their experiences using the EHRS for medication administration with students. One participant captured this process:

> The first major hurtle" that students face is integrating documentation into patient care, "and then, the second one is integrating the med [medication] tasks. It's just again using the [medication dispensing] machine, and then the scanning process, and then again using the system for documentation, and knowing how to know when meds are overdue, and just kind of remembering all the different pieces and parts to medication administration, and still using the computer documentation system, so it's just a challenge for them to integrate it into their care routine when they get to that point.

Participants described the necessity of including additional charting elements required in the records (*i.e.* vital signs or assessment data) with medication information which added to the complexity of documenting medication administration in the EHRS. Many aspects of the medication administration process are integrated across findings to describe additional challenges and show some indications of success.

Increased frustration and decreased productivity. Faculty expressed their feelings without hesitation. One participant was blunt about teaching students to use EHRS: "Well, it's

been kind of frustrating, to be honest with you." Another participant "a faculty member may go to a different institution, and again in our region, I have to tell you it's very... different systems that are being used. Some systems are still with the paper record, and you constantly have to adapt to whatever is going to happen one place or another." Like students, faculty are also stressed by having to adjust to different EHRS in multiple facilities. As one participant described trying to navigate in different systems, "it takes longer to be comfortable with finding what you're looking for." Participants explained that facilities update their EHRS. One participant noted she had to "keep up with changes, and the things that they are doing, so that I can make sure that my training that I do with students stays in sync with what they're doing on the unit." Participants struggled to stay current with updates to EHRS, especially since they are not always consistently in the facilities. Sometimes, facilities changed EHRS products completely and faculty had to learn another new system.

One participant shared that without "a dedicated workstation on wheels…and being unable to complete a med pass in the clinical setting with real patients, it's disturbing to me that there are times I don't have the opportunity to do that, which is what just happened to me this semester." Another participant, describing her feelings when challenged without access to the electronic medication administration record, said, "I was stymied." Yet, having access engendered other feelings, as another participant explained, "In a way, we feel like sometimes we're slaves to the computer."

One participant recounted this experience, "I've also had problems where students go to use the records, say they're administering a medication and all of a sudden, on this particular week, the system just has decided that this student is inactive and their password is no good or their code is no good and no matter what we do, we can't get them on the system, and we waste

an awful lot of time trying to get them back in the system." A participant reported about one student who was assured by the help desk that they had resolved the loss of access issue over the telephone. After they went back into the patient's room and found it still wasn't working, they "looked and felt very foolish." Additionally, the student, "actually had to go down to the bowels of the hospital to where the IT [information technology] people are for them to re-scan her ID and re-put her passwords in and everything manually. It was a big probably an hour and 45 minutes' worth of nonsense before we could administer meds. We were late with meds through all of that."

Faculty felt burdened by the limitations and lack of access. One participant noted, since students depend on information from the EHRS, she has "to collect the data for the student[s] for the most part." Another participant thought the whole process of using the EHRS without individual student access was too slow, "because local institutions still insist that the instructor … sits with each student as they use the system, so no errors are being made and documentation is appropriate."

As participants reported, with vital sign machines transmitting data directly to the EHRS, lack of access to the EHRS prevented students from getting even basic information, forcing them to rely on faculty for "accessing trends and vital signs and things like that." "It has been problematic," said one participant. Another participant thought that students could learn more if they could access the EHRS without relying on her. In addition to the history and physical, patient data, and consults, "there are the nurse's notes, physician notes and all the other disciplines' writing … they could be looking at in the chart," she thought. Several participants worried about the learning gap lack of access created when "some facilities don't allow students to document in the health records, so that impedes their ability to learn how to write

professionally and … communicate effectively." Participants thought that they could accomplish more if students had individual access to the EHRS and equipment was readily available.

Even the AEHRS were noted to be time-consuming for faculty. As one participant explained, "Due to time constraints, ... even in the [AEHRS] electronic health records, we only use maybe 30% of the system itself, because there's just not enough time to train students to all the different areas, or we haven't had the time yet to incorporate the other pieces into a meaningful learning experience…. [Entering data for students] has to be done almost in real time, and we just don't have that manpower to do that every day." Another participant described her faculty's frustration with building their AEHRS " …because we put so much effort into creating our own and it just doesn't look as realistic and as true to life as what we could purchase." The prevailing sentiments were frustration and stress related to time constraints and loss of productivity.

Nursing program issues. This subcategory included exploration of program-wide challenges associated with teaching EHRS use. Four components describe the broader curricular and conceptual aspects of teaching EHRS use related by faculty: Curriculum concerns, seeking a culture of safety, financial, legal and ethical issues, and preparing students for transition to practice.

Curriculum concerns. Integration of EHRS content in participants' associate degree nursing programs varied from minimal through complete integration with some nursing programs starting in the beginning nursing course and others, not early enough. One participant explained that, "in my school of nursing, we don't have a format that we use or vehicle to teach students about electronic health records," relying instead on the time students spend in clinical with the EHRS. Another participant explained that, "we [faculty] have made our own … very

simple electronic health record." Another participant used "electronic health systems from the beginning fundamentals through the end in live clinical experiences." Another participant described the "just basic theory" of "informatics kind of technology area" that she taught in her "fundamentals nursing class." Another participant thought that students would "love to" learn more about EHRS and have simulations earlier in her nursing program. She expressed concern about the curriculum gaps that occurred with inconsistent integration of AEHRS. "Again, it's not driven across all our courses. So, it's kind of like some holes there, and with [those] holes, it sometimes becomes a challenge for other faculty to try and have the students catch up." Several participants presumed that gaps would be compensated; one participant said, "I think that they certainly have the opportunities in other courses," to give medications and document. This was countered by a participant, as she reflected about working with students in a medical-surgical course, "it's scary because they didn't even do what they should have done in the fundamental [course]."

Participants related that nursing programs had to consider how to address the multiplicity of EHRS, i.e. different EHRS products used in multiple facilities, in their curriculum. One participant stated, "the different formats almost preclude us from teaching … one specific method," while another participant agreed that "it's not like we can just teach them one system." Few had sorted through this issue. The AEHRS products were similarly vexing, with one participant having "gone through several different companies and vendors, looking for electronic charting." The participants elaborated very little on the challenges of using specific AEHRS products, they were more focused on the broad problems associated with accessing and acclimating to the different clinical EHRS.

Seeking a culture of safety. Faculty were concerned about promoting safety and reducing errors associated with EHRS use. They expressed a general wariness about student naiveté exacerbated by computerized processes. Major concerns were that students would inadvertently open and use the wrong record or trust that everything in the EHRS was correct. One participant shared, "I have found things written in electronic health records that are not for that particular patient and I think … that's the biggest obstacle because people believe that … [the EHRS] is infallible and there's no errors." This was echoed by another participant, "student[s] have to be careful … the EHR is less than 100% foolproof. There's room to improve [it]. Still, human error can occur." She thought students were somehow more easily misled by the EHRS "to presume because [a medication has previously] been given that it's okay to give it."

Barcode scanning to identify patients, associated with EHRS use by these participants, was also worrisome. A participant stated, "Just because you can scan someone's name bracelet doesn't mean you've got the right patient, okay? I see that go on all the time, where people are just going in and scanning, instead of saying: what is your name [and] what is your date of birth?" She continued, "They're relying too much on technology and not going through their safe checks … that's one of the obstacles that I have definitely found." The inconsistency of available technology added difficulty for another participant. She reported that "in some units, we have barcode scanning, and in some units we don't. In some units, the [medication dispensing system] is connected to the MAR [medication administration record], in some units it's not…. There has to be a mainstream network for that patient, throughout the entire system. It's not everywhere yet."

Financial, legal and ethical issues. Several financial issues were mentioned relevant to nursing program issues and faculty's experiences teaching EHRS use. Two participants noted

the concerns about purchasing an AEHRS. One participant explained, “in planning something like this, it's easy to buy the toys, but then comes the maintenance, and the person to run it,” which impacted her nursing program, because “it's not just a one-time adopting to go the electronic route. It's an ongoing budgetary concern.” Another participant explained about her nursing program without an AEHRS, “I think that we're kind of a small school without a lot of money for faculty development. You know, I think that there's probably a financial flavor or variable with this [AEHRS] that might be better addressed.” Funding for faculty development was not discussed by the other participants. The potential costs that participants attributed to ‘future employers of nursing graduates’ are discussed in greater detail below. Also the financial impact of documentation and patient outcomes is discussed in context in other sections of the results.

Relevant to nursing program issues, legal and ethical issues were considered by participants and related throughout this study. The participants focused mostly on the need for lessons about electronic signatures, confidentiality with HIPAA [Health Insurance Portability and Accountability Act] safeguards, and documentation for safe effective defensible patient care. One participant reiterated teaching her students that “When you put your ID and password on, that's how the system tracks what you've documented … make it a big point never to share their ID and password … [setting and resetting their] password; and then just making sure that they realize how important it is to shut their computer system down at the end when they're done, so that nobody can access the screens that they're using and the documentation that they've done.” Participants described yet another challenge with sending students to multiple sites; this meant that “for each system they use, they had to e-sign confidentiality clauses, HIPAA clauses, et cetera.” A lesson from another participant, taught students about reimbursement, “When you

look at a home care environment, if your team doesn't document appropriately, you're not getting money for that…. you have to use the [EHRS] proficiently in order to generate honest and truthful information regarding that visit."

Participants expressed concerns about students' impressions of nursing staff, hoping to capitalize on observations of appropriate nursing practices and counter inappropriate staff behaviors. One participant cautioned her students about unsafe practice: "As I tell them … sometimes, they've heard nurses … talk about charting it [assessments] ahead of time …" [As paraphrased], they are told not to document until after actions are completed. Another participant was emphatic about the need for appropriate documentation, "when you talk about failure to assess and failure to rescue, it's a big legal concern of beginning nurses and nursing students, it [appropriate assessment and intervention documentation] could show them how to avoid that." Additional participant concerns about workarounds, error prevention, and error mitigation are discussed in context in other sections of this chapter.

Preparing students for transition to practice. Most participants expressed concerns about struggling to prepare students to transition into nursing practice with EHRS competencies. "I think it's important to look at how we've used these [EHRS]…. in nursing education, in nursing practice … very few places are using paper charting. Even a lot of your long-term care facilities are now moving toward electronic documentation. So, it is where we are in terms of practice and documentation, it's essential that this [EHRS] is a component of nursing education." Another participant voiced a twofold concern about graduating "RN's who have not charted and they're more likely as new grads to make errors….it's a bit messy." The latter comment expressed her discomfort with the situation. This concern extended to the potential employers (the facilities). As one participant noted, "I do know that the hospital that hires many of our graduates … their

biggest complaint or concern about our graduates is that they have a hard time documenting … on the electronic health record." Another participant "I mean we're hearing it all the time from institutions. Our graduates aren't ready to jump in and hit the ground running. Well, you don't let them do anything while they're students, so that's a problem." None of these participants had resolved this issue.

Without opportunities to teach the particulars of documenting in the EHRS or time to practice, one participant wondered how to "get a student to [be ready to document]… just everything from your drop-downs on, to use it efficiently and fluidly - because that's what the expectation is when they go to work." The potential concern was shared by another participant, "and when they graduate, they are starting the first time really using the system." She went on to explain that the "worst part is transition to practice. When they orient as registered nurses, it's going to take them more time to orient." Another participant said, "It's a concern that the clinical affiliates need to know … that they [future employers] may need to spend a little more time with them [new graduate students]." Other participants also shared concern that unprepared graduates would shift some of the financial burdens and longer orientations to employers and preceptors.

Developing faculty. Faculty noted they often 'grew into' their teaching roles. One participant explained, "Personal experience has probably been the better part of what's helped me to teach electronic health records. I was a bedside nurse for many years. We had electronic health records where I worked and that certainly made things easier…. but at the point where I was getting my masters in nursing education, we didn't really have a lot of electronic health records at that time. So, I think it was mostly learning from using the system." Another participant described, "When they [the hospital] went to the electronic medical record I was 'interested' to sit on the core team [of integrators at the hospital] because of my expertise in

education, and so, because of my expertise in technology, … and [after} rolling the education out to all the staff members in the organization, then, it just was a natural fit to take on the technology teaching for the students." Another participant described, "I really came [to the clinical agency] and got involved in electronic documentation and community health in the '90s… [I was] a super-user … then [I was] assigned to be the computer nurse so [then] I was the software applications manager." These faculty who reported strong EHRS clinical backgrounds were more confident about their ability to teach EHRS use.

Faculty with less experience or training were more tentative. One participant stated, "on an annual basis, I'm required to attend a four hour mandatory EHR training." When she switched to a different unit, she explained, "on my own time of course, I did go up to the unit and worked a little bit with the staff nurse." Similarly, another participant would also spend time preparing "in the hospital; I was oriented, but again, I'm a person who will go in and I really learn by doing it." One participant "stopped working at the bedside about four years ago, and the only [electronic] thing that existed then was medication administration," so she had no clinical experience with EHRS prior to working with students. Even with some experience, the demands of the faculty role appeared to interfere with gaining expertise. One participant explained, "So, when I stopped working per diem and I started to do some more scholarly work … and I couldn't do everything at the same time, so I'm not as literate as a lot of faculty are. I don't feel as literate with the system." One participant, who trains faculty to use the EHRS, summarized, "I really focus on faculty, and I think some faculty are still a little intimidated by these [EHRS] because some faculty who have been teaching for quite some time, and have not been clinically practicing, are not fully comfortable with the use of an EMR [EHRS]."

Participants had similar sentiments about their preparedness to use AEHRS. One participant, who hadn't had any experience using EHRS in the clinical setting, started using AEHRS with students "and the more I worked with it the more I became familiar with it." Another participant, "So again, I need to make a point of going in ahead of the class and getting some assistance from whomever was familiar with the software to navigate it myself prior to the class that I'm giving to the students." Some participants took advantage of vendor training for commercial products. Most faculty stated that they had limited opportunities to practice with or without students. Only three had extensive experience, the rest confessed to having limited opportunities, time or expertise.

Major category: Building successes. Participants also readily shared their stories about strategies and activities associated with teaching EHRS use. Three subcategories emerged from the data analysis: *Teaching strategies*, *Negotiating settings,* and *Forming nurses*.

Teaching strategies. Grouping the teaching strategies for using the EHRS and AEHRS by different settings helped to organize the teaching activities and strategies offered by the participants. The components of this subcategory are: *Using EHRS in Clinical*, *using AEHRS, focus on simulation,* and *taking advantage of CDST.*

Using EHRS in clinical. Faculty shared a multitude of teaching strategies. Strategies that were deliberately used to teach EHRS use in the clinical learning environment are highlighted here. Generally, faculty thought that all experiences with EHRS were worthwhile. They sought activities that provided "hands on" opportunities for students to build familiarity with EHRS. Faculty emphasized the spontaneity of the clinical environment, as "a 'learning-on-the-spot' type of situation." The most common verbs faculty used for teaching EHRS use during the interviews

were: teach and taught, show, do, practice, and learn, implying using EHRS as an activity. (Less common verbs were: provide, review, guide, demonstrate, model, and reinforce.)

Participants noted that working with students in clinical required planning. One noted, "when giving medications and documenting responses to the medications [or] when documenting vital signs and basic assessment," she would elaborate those tasks in the EHRS to teach documentation skills to compensate for limited student access. For beginning students, "not all of your students are going to document in the [EHRS] every clinical day, because it is a timely process and they have to acclimate to it." Another participant said, "it becomes a time allocation issue, depending on the size of the clinical group and the focus of the day. So, I try to at least alternate days where we focus more on the health records sometimes and other days we focus more on achieving skills instead." One participant posed this question to her students for discussion: "Do we spend too much time with the machine, or do we allocate the time with the patient?"

An assignment that included critiquing documentation as a learning activity was suggested by two participants. "Have students compare a variety of nurses notes or documentation [and ask] which one seems most thorough and complete," offered one. Other strategies included having students "identify and reflect [on] an area of strength and weakness in their utilization of the [EHRS]" and "think, critically -- think, in terms of efficiency, and how user friendly and what limitations" EHRS have that they should consider.

Participants highlighted the connection between classroom and clinical, pleased "when you talk about things in lecture and they [students] can actually see it … working [in clinical]." One participant advised other faculty to teach "critical thinking [as a component of EHRS] so you can use all the different methods [EHRS] that you have exposure to." Another participant

suggested that faculty "always push for the next level of higher thinking, critical thinking … [to] go from faculty-driven to student-driven navigation through the electronic health record."

Using AEHRS. Faculty saw AEHRS as good tools for teaching. Participants encouraged striving to make "it as real as you possibly can to what they would see in the clinical setting." With mock patient records, AEHRS provided a platform for mock patient care in a learning environment. One participant noted, "we have fake patients set up so that there is lab data for them to find, and there [are] X-ray reports. There's all the past nurses notes, so they might have to look up something in past nurses notes, and so forth. So, we do all of that, and they also get a chance to view allergies, and weights, and different things like that." The more robust AEHRS contained familiar components of health records, including those most often noted by faculty, (such as history, progress notes, orders, medication record, labs and diagnostic tests, nursing care plans, problem lists, case management and discharge plans). One participant, talking about AEHRS noted:

> I found it was more useful, and, when you could see the patient's progress, like I said, the history, the progress, the timeline, what's going on, the medications, the care plan, our outcomes, what we need, everything was bundled together in one package. You didn't have to go different places, you didn't have to second guess, it was laid out for the best care possible for that patient. It's not just for any patient, you take the patient that you're working with and it's geared to that specific patient information for patient care, including labs, which reinforce learning.

Faculty provided opportunities for students to learn to navigate and document in the AEHRS and then practice to build their skill level. One participant described coaching beginning students, "when we teach them about the health record, we teach them not only how to

document, but also how to look up history … allergies … lab data, and I would go through [showing, and] … work together on how to actually find information in the system." Coaching is important because, "I want them to basically, be very comfortable and to be able to open a record. One can only learn so much from watching. You have to be able to do." Another participant said that, "Any experience they get on an [EHRS] is going to be beneficial; I think that improves over time. I think it takes a while for students to gain familiarity." Finding the right AEHRS was considered helpful. One participant noted, "Some of it was just a patient chart with medications, and now we've advanced with the help of some of the faculty. We've developed some electronic health records that provide patient safety, provide resources for the students to use; and, I think it's a little more valuable than when we first started."

Students and faculty noted having a distinct advantage when the AEHRS in class was a training version of the EHRS used by a partnering facility. One participant explained, "then, all of our students come to classroom sessions to specifically learn how to use the electronic health records before they actually go into clinical practice." Increasing students' comfort level with EHRS, she explained, made it a little easier to manage patients and EHRS, decreased their stress a bit, and saved time in clinical. She felt they transitioned into the clinical learning environment more quickly and easily.

Faculty used demonstration, repetition, reinforcement and feedback methods to teach students documentation skills in the AEHRS. "In my fundamentals lab, each week they have to document on our little electronic health record that we've created. They have to document whatever care and procedures they did in the lab and they'll get used to it." For assignments, one participant used an online AEHR that enabled student documentation about clinical patients. Another participant had "students engage in their learning … [by charting on an AEHR] in

which, as part of their post-clinical assignments, they need to go and document their patient assessments and teaching; and submit it to faculty to grade." She continued, "and [I] look at how they're writing focus notes and critique or help, give them constructive feedback on how to improve documentation skills."

Focusing on simulation. Participants emphasized that simulated experiences mimicked real practice while providing a safe, controlled environment for practice. To prepare for providing care, students were taught to review AEHRS components. Students "bring up the patient's care plan … MAR … orders, and with some of the software they can even bring up some notes" and "spend time in a lab, completing a simulated med pass." Other simulations involve "contacting a healthcare practitioner that maybe something should be changed. They're using the SBAR [Situation-Background-Assessment-Recommendation] format to also contact the doctor." Participants use AEHRS to guide students to organize patient care, since students are "still not familiar with it [EHRS/AEHRS], so the continual use of the electronic record, continuing to look up the medications with the use of something electronically that they can reference the information quickly, is helping them learn better and remember these medications better. It's safe for them."

One participant described using simulation with AEHRS and students in teams to prompt clinical decision-making. She thought that students "don't know how to make decisions," so guidance during simulation allowed students to work through the decision-making process, getting it all "worked out that way." She also focused on teamwork, "We have a resource person [student] who looks up the care plans, so we have on the care plan evidence based information, we also have the outcomes that should be achieved, and it's referred back to the team that we have working." Other participants described simulated experiences. One stated, "in simulation,

we have the students working through a simulation/ simulated patient chart while they're noticing and assessing the simulated patient … to help guide their care."

One participant shared her observations about students wanting "to use the health record. They want to use that computer at the bedside." Another participant, in explaining further about teaching students to use EHRS and CDST, summarized participants' comments about students and computers, "they like to play with computers, but if you don't give them that challenge, they won't do it." Participants described how simulation allowed for repeated rehearsal, use of unfolding scenarios, and repetitive activities with varied outcomes that increase learning with positive reinforcement and opportunities to build clinical reasoning.

Taking advantage of clinical decision support tools. Clinical decision support tools (CDST) were considered an asset of some EHRS and AEHRS and optimized by faculty. Faculty explained that they often used them with students to "access information about the medications," to look "if the lab results being high or low is particularly significant" or use "little buttons" that link to more information about a word or term in the record. Students "don't have to leave … the computer system if they have a question, they would have the ability to look it up right there," giving them easy access to information. Since CDST were not available on their own AEHRS, one participant said that "we talk about it -- talking about it we do all over the place," but she thought that was insufficient to meet students' needs and that further strategies were needed.

Some participants were less familiar when asked about the term, CDST, but once rephrased as 'resources,' they could then respond about using online medication references or in one case, "books." Some faculty responded with some of the resources that they utilized with students. These included "Daily Med … or a policy and procedure … if they have to look up,

like a disease, Medscape or e-medicine.com … [and] go into the nursing care," and "mostly UpToDate, and the evidence based [resources], and the patient portal to teach." One participant liked that students "can actually look at their patients ultrasound results and x-rays and so forth. If they were to see some terminology … that they didn't understand, they can actually click on it and then, it will bring them up a definition of what they're looking at."

Faculty enthusiastically discussed medication references in CDST, because using EHRS, "didn't change that I need them to know: Why are we giving this med? What are the side effects? What are the nursing implications? [It] didn't change that, it just changed how we look it up." Faculty encouraged and modeled accessing the CDST to help students navigate to and understand new information. The most significant advantages of using the CDST described were that the resources were readily available and enabled students to access information at the point of care to apply to the patient situation or nursing care. One participant shared this story:

> I had a patient who was delivering an infant with several congenital abnormalities and I wish I could think of exactly what they were but I had never heard of them myself… she [the student] was able to highlight [the anomalies] in the record… there's this little button in the corner of the computer screen and she was able to click right on it and it would tell her what those congenital anomalies were and what expected treatments were and all that kind of great stuff…she should have had to go home that night and look it up and put it on her clinical rotation record…but then that wouldn't help her in moment, when she's trying to take care of her patient. She needed to know in the moment what it was, how significant it was, and to be able to understand the parent's level of upset, and why the NICU [neonatal intensive care unit] team would have to be present during the delivery

and all those kinds of things. So, I thought it was a great tool and I was thrilled that it was there.

Negotiating settings. The settings in which participants taught EHRS directly influenced the teaching – learning process. All of the participants taught in more than one setting. Participants' descriptions, sometimes delivered with staccato precision, portrayed their chameleon-like adaptability to each learning environment. They often appraised the assets, barriers, and adjustments to the circumstances related to using EHRS. The participants' perspectives of EHRS use related to the clinical setting are described in context throughout the chapter. This section highlights the participants' perspectives about teaching EHRS use in non-clinical settings.

Most faculty discussed using AEHRS in the laboratory setting on campus. A participant said, "When our students first start to come into the curriculum, we sit them down in a computer lab, [to work] in the computer system," and then use it "for our simulation and skill lab practice." Many shared the perspective of one participant: "I would like them to have a chance to play with it in a safe place where mistakes aren't going to cause any challenges or problems for the health care team or the patient." One participant shared, "Honestly, I really feel that a student needs to come into a computer lab and see it, feel it, touch it." The few faculty who had access to training versions of clinical EHRS started the students in the computer lab on campus. They thought that another advantage of using the clinical training EHRS was that it enabled students to practice without worrying about permanently affecting patients or their health records if they made an error.

The safety aspects of simulation settings were viewed similarly to the lab settings. In comparison to her challenges in clinical, one participant said, "I find it much more receptive and

much more of a different type of experience when teaching a student in a clinical sim lab or the laboratory setting." She preferred "the controlled environment" for teaching. One participant was concerned that students learning, "in a computer lab … don't get that experience of 'okay, now I have to document in front of a patient." Participants wanted to use the simulation setting with mock patients to integrate EHRS use with patient care as described in the simulation section.

The lecture setting represented an often untapped teaching opportunity. One participant offered that she briefly mentioned EHRS and informatics during her Fundamentals lecture course. Another participant stated that "the only time I use it in the classroom is, I use it to do case studies…. I'm able to click on that [lab data, and] everyone's able to see." Orientation to the clinical EHRS was sometimes reported as a classroom activity. Even though many of the participants stated that they were not using AEHRS in the lecture or theory course setting, several wished for the ability to do so. One participant imagined herself using an AEHRS in the lecture class saying "Here's how you document medication…. an assessment…. patient teaching. So that, when I talk about something in the classroom like failure to assess or failure to rescue, I can say: 'this is the strategy for not doing this: this is the physical activity of assessing somebody; this is the documentation. This is something that's a deviation from the norm; this is the documentation. This is what you do [and] this is how you document it afterwards." Another participant thought, "that's one of the areas we are lacking right now … [taking] what we see in clinicals and what we're also talking about and seeing in lecture. Being able to tie it all together" with AEHRS would be useful. Participants either described minimal use of available tools for teaching activities using an AEHRS or EHRS; or, described potential activities and wished for the tools to implement the activities.

Forming nurses. Faculty repeatedly talked about the importance of helping students by making associations between the elements of information, using EHRS, students, behaviors, patients, outcomes, clinical reasoning and developing expertise in nursing care. Yet, they also noted lacking time and resources to make this consistently happen. They described the importance of making the associations explicit as part of teaching students to become competent professional nurses. Evidence of the faculty goal for forming nurses was present throughout the narratives and supports this subcategory.

Faculty described the usefulness of EHRS as a repository for some of the plethora of data that nurses need to know to practice safely, competently and efficiently. They taught students to find key content areas of EHRS they will need for patient care and to review chart components in preparation for patient care because knowing what data is important helps them to think like a nurse. One participant engaged "students by teaching them the components of the electronic health records and help them navigate through it into the key areas that they would need to hone in on as a brand new graduate nurse in order to take care of their patient." She taught students to "look at the health care disciplinary teams' input [progress notes] about the patient condition and goal of treatment." Another participant wanted students to "be very comfortable and to be able to open a record; and knowing where to find the information they need to know immediately before they … see the person." She noted providing queries to the students, "What is the latest? What is important? What is my priority with this person?" to get them thinking about how to approach their patients. Reflecting on her role, another participant said that students "have much more information at their fingertips, but it's teaching them now to make sure that the information at their fingertips is appropriate."

Faculty described how they taught students to assess for and recognize relevant data, how the data correlated with patient care situations and informed nursing care. One participant guided students through the record, noting "information they can utilize, H&P [history and physical] labs, medications … diagnosis, results ... and also the nurses' note. They [students] can see … what kind of problem they identified, in terms of the plan of care." Another participant described applying this to physical assessment, "tying again, why we teach them psychomotor skills to do a complete head to toe … in an organized fashion. So how they assess and approach their care is more organized if they realize all the components of what they're required to document and they're seeing the orders themselves. So they can have a better grasp -- clinical grasp." A participant integrated an interprofessional perspective: "The students are starting to see that even though they have to produce these care plans and this NANDA [NANDA International, Inc.] list of nursing diagnoses, and I get that those are important, but we document in a problem list sort of fashion, and it's collaborative. So, it just give them exposure to the collaboration and documentation, where everybody's working off of the same problem list."

While participants saw EHRS use as an additional task for students to layer into their clinical competencies, they wanted students to master integrating patient-centered care with using EHRS at the point of care. One participant noted "When that first day comes along where they have to go onto the unit, and not only care for an acute care patient, but they also have to document; that's very nerve wracking for them." Another participant stated that "documenting is such a huge part of what nurses do." She thought that "it's always challenging for new students to integrate that into their care experience, because all of our computers are at the bedside, with the patient." She wondered, "How do they make that eye contact, and do therapeutic communication, and still use the electronic health record?" She focused on teaching the students

to document in the EHRS and still "make that comfortable for the patient, and include the patient in what I'm doing?"

Faculty anticipated that students would feel stressed when integrating patient care with using the EHRS. They wanted the students to have more practice to increase their attentiveness to patients while using bedside computers. One participant emphasizing teaching documentation and good communication, "So, whether it be in-person, one-on-one in-person, or an electronic health record, they [students] need to document clear notes and clear direction of what did they notice, what did they assess, and what did they do, and what was the outcome." Nursing faculty emphasized the integration of nursing care, patients and EHRS use while connecting history and physical assessment with noticing and interpreting through to intervention, communication, documentation, and outcome. They added caring about patients and cultivating dispositions to contribute to the process of formation of nursing students.

Written Survey Results

Findings of the written survey are described in the following sections. Responses are combined from the 10 handwritten and 17 online surveys.

Sample description: Survey respondents. The sample consisted of 27 written survey respondents. The open-ended survey questions sought similar information to the interview questions. The demographic questionnaire was identical for both interview participants and survey respondents. The survey data are reported separately from the interview data since the surveys were anonymous and it was not known if any interview participants may have completed a survey in addition to completing an interview.

Table N2 (Appendix N) provides a summary of the demographic characteristics of the survey respondents. The majority of respondents were older, with 12 respondents between the

ages 36 – 52 and nine respondents between the ages of 53 – 61, accounting for almost 78% (*n* = 21) of the total. Most were female and three (11%) were male. Twenty identified as white with one Black or African-American, two Asian, one Hispanic, Latino or Spanish, and one indicated both White and Hispanic, Latino or Spanish. Considered together, the ages of the survey respondents were younger than the interview participants; several men completed the survey; and both groups had small minority faculty participation. These demographics are generally consistent with those reported by the National League for Nursing (NLN, 2017) including predominantly older faculty with smaller representations of male gender and minority affiliations.

Respondents' years of experience teaching in associate degree or other nursing programs were spread across the time periods with the largest group (*n* = 12) indicating more than 14 years. In contrast, for the number of years worked in direct care and using EHRS in that position, the largest group (*n* = 10) indicated 3 – 5 years. Most of the respondents indicated that they taught in multiple settings. Each setting of lecture, college laboratory, simulation lab or area, or the clinical learning environment, tallied at least 45% of the respondents. Only four had experience teaching EHRS use in an online course.

Written survey: Qualitative questions results. Descriptive analysis of the survey data was completed with simple content analysis used to generate key points for each survey question. These were then summarized in a table representing key challenges and success strategies. The data represent the perspectives and experiences of ADN faculty responders add support to the major interview categories of Facing challenges and Building successes.

Review of the 27 responses indicated that there was inconsistent use of EHRS across the curricula and variations in use across settings such as classroom, laboratory, simulation, and

clinical learning environments. Key points from surveys indicated that, consistent with the interview findings, challenges existed in both academic and clinical agency settings, while some beginning success strategies were noted. Sample challenges and successes from the surveys follow.

Responses to the question about barriers associated with teaching EHRS use were easily integrated into the subcategories of Facing challenges. Access and technology-related issues, along with "lack of uniformity of EHRS" or AEHRS, were listed. Faculty concerns included limited academic preparation to teach EHRS use, increased workload, "negative attitudes" and lack of faculty buy-in to teaching EHRS. One respondent wrote that "some facilities don't allow us to use … [online AEHRS for documentation] so no "real-time" charting during clinical." Their student-related concerns centered on lack of computer skills and student anxiety. Four responses included "cost of EHRS" or "cost of technology."

Relevant to the major category, Building successes, favorite teaching strategies included using "case studies", "a scavenger hunt to familiarize student[s] with EHR," "evolving patient scenarios," and "pairing students to research a patient in the EHRS." Their teaching was noted to be facilitated by practice opportunities, level of faculty and student computer competency, "faculty competence with EHRS", consistent use of EHRS across the curriculum, and availability of 'user-friendly' academic versions of EHRS. Reported teaching skill development for EHRS focused primarily on practical skills, such as navigation, finding patient information, and basic nursing documentation. Simulation, listed explicitly by seven of the respondents, offered opportunities to integrate teaching EHRS use.

A summary of advice that faculty would share with new faculty included: Practice and allow plenty of time to learn, "gain familiarity," and "become comfortable with the bumps in the

road before trying to teach to others." It helps to "learn how to use it as an RN first." Assess facilities' opportunities for using EHRS and consider how long it takes students to document. Tips for teaching and learning included offering visuals for student learning and gaining online resources for students. One respondent used "picture[s] of the EHRS built into a power point … [to] teach the process." Summarized in Appendix O (Part A and Part B), the survey responses reflect the study's major categories as outlined.

Summary

Chapter 4 summarized the results of this qualitative descriptive study of ADN faculty's experiences related to teaching EHRS use to pre-licensure nursing students. Two broad categories emerged from the qualitative content analysis of the 10 interview transcripts: Facing challenges and Building successes. This chapter included a description of the study faculty and rich exploration of the categories and subcategories with excerpts from the interview transcripts. Responses from the 27 written surveys supported these categories and provided descriptive information. These categories represent a thick description of the perspectives, experiences, challenges and teaching strategies of associate degree nursing faculty interview participants and survey responders. Discussion of the results, implications, and further research follows in Chapter 5.

Chapter 5: Conclusions and Recommendations

Effective utilization of EHRS is one component of the essential competencies identified for nursing practice (Barnsteiner et al., 2013; Healthcare Information and Management Systems Society (HIMSS), 2016; Lyle-Edrosolo & Waxman, 2016). Associate degree nursing faculty have been charged by many nursing stakeholders to teach EHRS use as part of the preparation of nursing graduates to practice in the complex, technologically advancing health care environment. The purpose of this qualitative descriptive study was to explore the experiences, perspectives, challenges and teaching strategies of associate degree nursing faculty related to teaching EHRS use to nursing students. This study found that these faculty faced significant challenges that interfere with teaching EHRS use and have generated some successful teaching and program strategies that can serve nurse educators. This chapter provides discussion, implications, strengths, and limitations of the study, as well as, recommendations for further research needs.

Discussion

This study combined semi-structured interviews with written (paper or online) surveys that contained open-ended questions. The posed questions were derived from the literature and data collection was guided by the research questions. Participants were recruited at the Spring 2017 Conference and Directors' meeting of the CADN and were from 8 counties across one large Eastern state. The interviews and surveys produced qualitative data about participants' experiences and perspectives that was evident throughout Chapter 4. Descriptive analysis yielded findings that addressed the research questions as described in Chapter 4.

In summarizing the professional literature in Chapter 2, four themes were identified from the literature: Developing technologically competent students; Developing technologically competent faculty; Evolving technology of the EHRS and Academic EHRS; and, Using active

learning strategies. These themes are consistent with the major study categories focused on Facing challenges and Building successes. Further discussion follows.

Facing challenges category. The Facing challenges category elaborated the barriers that participants encountered around teaching EHRS use. These were clustered into three broad subcategories that included Struggling with EHRS; Nursing program issues; and Developing faculty. Struggling with EHRS encompassed logistical concerns of everyday use, attempted use and frustrations about teaching with EHRS and AEHRS. Nursing program issues addressed broader curriculum and program concerns including preparing students for transition to practice. The last subcategory, Developing faculty, reflected the status of faculty preparedness to teach EHRS.

In earlier technology literature, Ornes and Gassert (2007) and Feeg et al. (2008) noted that nursing education needed to find ways to integrate technologies, including EHRS, and informatics concepts into the curriculum in anticipation of the proliferation of EHRS in healthcare. The challenges of access, cost, time, systems and faculty development that they described are still being voiced by participants today. Fetter (2009) was concerned that facilities were struggling to implement EHRS and train their staff to the exclusion of considering nursing students and faculty. Her concerns that nursing education may lag behind the healthcare advances was prescient. Study participants voiced consternation at the limitations of access to EHRS and availability of equipment for them. One participant wondered why the EHRS did not accommodate nursing students, as they did medical students, in the initial build. Faculty concern about the effects of restricted access and other student challenges was present in the literature as exemplified by Baillie et al. (2012, 2013) and was pervasive in this study.

Study results suggest that the effects of these constraints manifest in several ways. Participants prioritized the activities related to teaching EHRS use, utilizing most of the available time with students for the absolute 'must-know' knowledge, skill, and attitude acquisition over the 'need-to-know' knowledge, skill, and attitude acquisition. This was evident by their concentration on practical skills such as giving medications and navigating to orders over documenting assessment data, for example. The latter could be completed using student forms, an AEHRS, or following the clinical experience. They seized spare moments to mention the 'should-knows,' such as finding core measures. The constant planning, jockeying and reacting to the constraints fueled participants' frustration and resulted in lost productivity. The constraints contributed to learning gaps for students, potentially worsened by the participants' presumptions that other courses would be able to compensate prior to graduation. Participants worried that students' inability to competently use EHRS would lead to less-prepared nursing graduates, would impact employer's needs, and, most importantly, could impact patient outcomes.

Since medication administration using EHRS was one of the few activities many facilities permitted students to do, faculty focused on this predominant nursing task during their interviews. The complexity of the medication administration process with students using EHRS was described briefly in Chapter 4 to provide information in the context of this dissertation and underscores the importance of continuing to address this problem.

Descriptions about faculty preparedness to teach EHRS use were varied. Across participants, there were differences in their education, academic careers, and clinical training. One had a Masters' in Computer Science and several mentioned graduate studies in Nursing or Adult Education. One participant stated that there had been some discussion of the EHRS within

her graduate coursework. None stated that they had informatics-related coursework, although several reported that they had taken some continuing education that assisted with teaching with EHRS. Survey respondents had similar variety with background preparation including none, in-services or continuing education, work experience as a staff nurse or graduate coursework. Graduate nursing education programs were noted by three of the respondents. The most common experiences related by faculty were on-the-job training or working with EHRS as staff. Many 'grew with the EHRS,' meaning that they gained experience as the EHRS was integrated into their workplaces. Together, the variations in background and stated levels of expertise leave the degree of faculty preparedness to teach EHRS uncertain. The lag in developing technology and informatics curricula in graduate programs to better prepare graduates may be persistent and contributory (Hunter et al., 2013). The older age and more years of teaching experience noted in the samples may also be notable if their graduate degrees preceded the addition of technology and informatics curricula. These findings have implications for educational settings.

Building successes category While challenges were plentiful in this study, success strategies were also indicated. As described in Chapter 4, the successes subcategories included: Teaching strategies, Negotiating settings, and Forming nurses. The Building successes category spotlighted teaching strategies described by the participants while attending to the role that settings contributed to the teaching process. Nursing education occurs in many different settings and this study centered on participants' experiences in the classroom (lecture/theory), laboratory, computer laboratory, simulation area, and CLE (clinical learning environment). Their current use of clinical decision support tools was discussed. The process of forming nurses in the context of professional utilization of EHRS was also described.

In reviewing the literature related to this category, literature included studies that utilized case studies with AEHRS to look at students' ability to accurately identify nursing diagnoses (Pobocik, 2015), build documentation skills (Jones & Donelle, 2011), and complete a pharmacology activity (Vana & Silva, 2014). These studies illustrated some of the active teaching strategies under study. Study participants suggested diverse teaching activities as tools and opportunities permitted. The utilization of AEHRS in simulation provided a safe and supportive environment for students to practice and receive feedback (Ayers et al., 2015; Mountain et al., 2015; Schaar & Mustata Wilson, 2015). Study participants agreed with the literature findings in that AEHRS and non-clinical site activities offered safe alternatives that avoided potentially imperiling patients or the integrity of the EHRS. Further, they emphasized the importance of providing opportunities for students to practice using AEHRS and EHRS and providing feedback.

Consistent with findings from this study and the literature, teaching with AEHRS provides a mechanism for integrating clinical practice into classroom learning. Scaffolding learning of EHRS content throughout the curriculum and across settings could create a pathway for progressive learning. Skill development to use AEHRS in the computer or nursing lab could be enhanced with practice opportunities. Integration of AEHRS into simulation activities can increase the realism and students could benefit from the inclusion of nursing process (data collection, planning for care, etc.) and documentation. Validating the use of CDST to augment learning at the simulated point of care with background information, guidelines, and evidence-based practice may encourage this behavior to persist into nursing practice. Faculty could benefit from an AEHRS functionality that facilitates projection and navigation in a classroom or lecture hall setting to make it easier for them to use when teaching. Concomitant faculty

development could provide the support to match faculty's interest in teaching with AEHRS in the classrooms.

Forming nurses seemed an especially important subcategory. Woven through the interviews of this study about ADN faculty's experiences teaching EHRS use, it became apparent that faculty were concerned about producing professional nursing graduates who possessed the skills to use EHRS to find relevant information, navigate and document competently; who protected patients' information and preserved the security of the EHRS; communicated well; and, provided patient-centered care effectively and efficiently.

In the process of forming professional nurses, as described by Benner et al. (2010), nursing faculty guide students to develop skilled know-how, perceptual skills, and knowledge to apply good, ethical nursing practice to care for patients. During data analysis of the interviews, there was growing recognition of formation. What began in the analysis as noting significant statements of 'nursing work' shifted to 'nurse's responsibility to use EHRS to care for patients' and, shifted again to 'student nurses' responsibility to use EHRS to care for patients.' As these significant statements were grouped together during coding, 'the role that faculty wanted to assume in facilitating students' transition to professional nurses' became apparent.'

While no one specifically used the term "forming nurses," through their individual comments, it was clear that participants' goals were to form professional nurses via this clinical work. The many challenges they noted with EHRS in the clinical setting seemed to make their work towards this professional goal achievement even more frustrating. The Forming nurses subcategory described how the participants deliberately sought to elucidate connections between combinations of the elements of information, using EHRS, students, patients, outcomes, clinical reasoning and developing expertise in nursing care to contribute to the development of students

into professional nurses. Studies related to the formation of nurses as supported by EHRS were limited in the literature. "To become a good nurse, one must develop not only technical expertise, but also the ability to form helping relationships and engage in practical, ethical and clinical reasoning (Benner et al. 2010, p. 86)." Teaching nursing students to use EHRS involves all of these elements. Participants described, at the most basic level, working to develop students' technical expertise to navigate the systems, document and interpret information; encourage patient-centered care and effective communication; and, respect confidentiality and security parameters. It may also be true that learning to use EHRS proficiently and effectively contributes to nursing formation. Further research in this area may increase our understanding of this process.

Implications

The major findings provide guidance for education and practice implications, as well as, offer direction for further research. The implications and recommendations were synthesized from the literature, professional experiences and data from this study.

Faced with limited time, faculty focused on practical must-know skills, such as navigation and medication administration. As noted, this analysis suggested that faculty compensate for limited time in the clinical learning environment by dividing the time between essential activities such as preparing students to understand patients' status, provide patient care, or use and document in the EHRS. While topics such as informatics and population health data management had limited mention, they are necessary learning components in forming a professional nurse. If these limitations in addressing data were to persist through the curriculum, students might only gain minimal understanding of EHRS use and informatics concepts. Curriculum review is indicated to improve placement of learning activities. Moving some

activities to non-clinical settings is one suggestion. Support that includes providing needed faculty, staff, and technology resources is indicated for achieving EHRS teaching/learning goals. Educational administration and practice partners' administration will need to be engaged in addressing these issues.

As described earlier, limitations, delays and lack of access to clinical EHRS adversely affect faculty's teaching and students' learning opportunities, as well as create learning gaps, undue burdens and faculty frustration. AEHRS offer a supplement to EHRS and can be potent teaching tools for integrating informatics, nursing, legal and ethical content along with preparing students to use EHRS in the clinical setting. Additionally, AEHRS/EHRS can be used to teach problem solving and critical thinking skills. As indicated, curriculum planning for EHRS content integration, faculty development to implement learning activities, faculty supports, and matching nursing programs with robust AEHRS may facilitate positive student outcomes. Addressing these issues may include the need for broader task groups to address the challenges.

Increasing safety is one of the key purposes of EHRS in the healthcare environment. Teaching about and using the safeguards built into EHRS demonstrates commitment to safe practice and values the process. This is a powerful lesson for students and opportunities to amplify it should be capitalized. Consistent with patient-centered care competencies, it is important to integrate patients' perspectives, preferences and concerns into nursing care and documentation. Students and graduates need time and training to be able to include more caring components when using the EHRS. Curricular supports, as noted, may be considered.

Safety may be an issue even after the EHRS access problem is addressed. It may still be that some students feel unprepared and less capable than peers related to delayed learning and inability to gain expertise in EHRS. They may also perform more slowly in the clinical learning

environment, and as new graduates, as they labor to use the EHRS. As a clinical safety concern, the best recommendation is for strategies that prevent this from happening. Recognition of this problem and its sequelae may promote attention and action. Early identification by faculty and graduate preceptors of sluggish student and graduate performance relevant to EHRS use can lead to early remediation with practice to strengthen skills and promote competency.

Also related to safety and documentation issues, it is important to consider a greater potential for adverse patient outcomes due to novice users making incorrect entries, omissions in documentation or other EHRS-associated errors. The legal and ethical consequences require that programs and facilities give this challenge a high priority. In addressing this important safety concern, faculty and preceptors could plan to include coaching to use EHRS with oversight of documentation efforts, while also providing instruction about correcting documentation.

Quality documentation is a legal requirement of nursing professionals. Documentation and EHRS use are integrative processes identified in the licensure examination test plan (National Council of State Boards of Nursing, 2015). If quality curriculum cannot be provided, it may be that students will require remediation of this content prior to graduation. Faculty may need further support in moving to this level. Faculty can benefit from sharing and incorporating teaching/learning strategies that focus on forming professional nurses who are able to proficiently use EHRS and effect positive patient outcomes. Faculty forums or blogs for sharing strategies could be implemented or enlisted. Support and encouragement for faculty development and training from administrators may assist faculty.

Related to curricular issues, there is an expectation that curricula will be current and sufficient to prepare graduate nurses ready to perform in the healthcare environment. Accreditation agencies, such as Commission on Collegiate Nursing Education (CCNE),

Accreditation Commission for Education in Nursing (ACEN), and The National League for Nursing Commission for Nursing Education Accreditation (CNEA) provide guidance to nursing programs. Faculty and administration review of curriculum and program outcomes to EHRS-related content standards may offer insight into potential changes.

Related to new employees' needs and new staff development, limited knowledge of EHRS use by nursing graduates shifts the teaching of EHRS use to employers (and for the associate degree nurse possibly RN-to-Bachelor's programs). This may result in dedicated coursework for educational programs. Employers need to manage longer orientations, preceptorships and higher costs to acclimate new graduates. This may be addressed with employer participation in task groups promoting EHRS use.

Related to the need for resources, national recognition of the issues related to transforming nursing education, incorporating teaching EHRS use along with the broader issue of teaching with technologies in nursing, has promoted the formation of online resources. These include the QSEN Institute (Quality and Safety Education for Nurses, http://qsen.org/), TIGER Initiative (Technology Informatics Guiding Education Reform, http://www.himss.org/professionaldevelopment/tiger-initiative), American Health Information Management Association (http://www.ahima.org/education/onlineed), American Medical Informatics Association (https://www.amia.org/education), INACSL: International Nursing Association for Clinical Simulation & Learning (https://www.inacsl.org), Society for Simulation in Healthcare (www.ssih.org) and the National League for Nursing's SIRC (Simulation Innovation Resource Center, http://sirc.nln.org/). Faculty support to participate in development activities may require time, funding and encouragement along with an openness to making changes.

Recommendations for Action

Based on the implications just reviewed, national resources additionally support recommendation for action. The National League for Nursing Vision Statement, *A Vision for the Changing Faculty Role: Preparing Students for the Technological World of Health Care* (NLN, 2015), the earlier NLN position statement, *Preparing the Next Generation of Nurses to Practice in a Technology-rich Environment: An Informatics Agenda* (NLN, 2008), and *The Future of Nursing: Leading Change, Advancing Health* Report (IOM, 2011) offer recommendations for incorporating technologies into nursing education to guide deans, directors, and chairs of nursing programs, nursing faculty, the NLN, practice partners/agencies, and other nursing stakeholders. As summarized by *A Vision for the Changing Faculty Role* (NLN, 2015), it is important for faculty, technology, and clinical partners to consider technology needs, develop resources, and seek broad funding support in using emerging technologies to promote the nation's health. The following action recommendations support the role of AEHRS and EHRS as technology resources and faculty teaching tools.

- Seek local, and even regional or national, task groups to address problems such as the challenges of EHRS use in clinical. Partnerships including members from both academic and clinical agencies would benefit this work.
- Support faculty development for practical workshops on managing students, time, activities and technologies in the changing health care setting. Scholarships, grants, sponsorships, and/or consortia should be considered in this effort.
- Develop and expand partnerships that provide online training access to EHRS for pre-licensure nursing students. Several models are in place at the Cleveland Clinic (Bowers

et al., 2011) in California (Bowman et al., 2011), and British Columbia, Canada (Borycki, Frisch, Moreau, & Kushniruk, 2015).

- Promote AEHRS use in nursing programs. Bristol (2012) discussed the features to seek in AEHRS so that they will adequately support key technology and nursing education objectives. Faculty work groups could conduct feasibility studies and selection processes.
- Routine curricular analysis can address the status of EHRS and informatics learning objectives. This includes review with accreditation standards and nursing competency reports that can assist with currency and responsiveness to the changing health care environment.
- Continue to develop and leverage simulation activities that integrate EHRS within nursing programs. Numerous simulation resources are now available. Support for faculty and programs may extend beyond faculty administration, due to equipment costs and space requirements, indicating the need for identifying further advocates and funding.
- Advocate for integration of technologies, EHRS use, population health, and related informatics content into graduate nursing coursework to better prepare faculty and clinical preceptors. Administrators can seek expert faculty in these areas for staff, mentorship or consultant positions.

Recommendations for Further Research

Since this was an early qualitative study in a new study area, the following recommendations are made. These are consistent with select recommendations from the NLN

Research Priorities in Nursing Education (2016), including a focus on technologies as well as education and practice links.

- Further study with larger, more diverse samples are recommended to further address the size and scope of the phenomenon.
- Studies of the "next" generation of faculty in terms of background preparation and readiness to teach EHRS use, to see if they encounter similar challenges, and to learn more about their teaching strategies.
- Further investigation of the effects of the integration of EHRS and barcode medication administration into the teaching and learning of the complex medication administration process.
- More research about how faculty engage in the process of forming nurses. The Benner et al. (2010) work on nursing education and Berragan's (2013) framework for examining learning environments as contributors to the process may be useful in further study of best practices for engaging with EHRS.
- Ongoing research about faculty and students' perspectives on best practices related to EHRS use. Also studies seeking administrators' perspectives on EHRS.
- Research about new graduate nurses' perspectives and experiences using EHRS during their first year in practice. Research in this area could also consider related questions about quality of documentation, patient outcomes and attrition.
- The complex adaptive system theory is just one theory that may offer some insights into the level of complexity that is triggered when nursing students arrive at a unit or visit a patient. Adding EHRS use to the convergence of nursing educators and students with the

changing healthcare system seems to ratchet up the complexity and should be studied further.

Strengths and Limitations

Several factors strengthened this study. First, this study was timely. The adoption, integration and evolution of EHRS into health care facilities continues to change the way that nurses work and impacts nurse educators' preparation of future nurses. Associate degree nursing faculty's experiences related to teaching students in this time of transition are valuable. All of the faculty that offered to participate were interviewed and all of the survey data received was included in an effort to record the breadth of responses. Faculty were eager to share, especially recounting their many challenges, which led to rich description of the phenomenon. The qualitative descriptive methodology allowed for the emergence of categories and subcategories that increase the understanding of faculty's experiences, perspectives, challenges, and teaching strategies related to teaching EHRS use to pre-licensure nursing students. This understanding may fuel changes to decrease barriers to teaching and learning, foster faculty development, and better prepare pre-licensure nursing students for practice. Another strength was that the survey results supported the categories and subcategories that emerged from the interviews.

Limitations of this study were also considered. Participation of the interview participants and survey responders was voluntary. Reasonable for qualitative research, the sample sizes were 10 participants (interview) and 27 participants (survey), and the interviewees self-selected; likely, they were drawn to the topic and interested in finding out more about their collective experiences. While the samples were from diverse areas of New York State, the transferability of study findings is limited. A random sample of associate degree faculty might uncover

different backgrounds, experiences, perspectives, challenges, and teaching strategies related to teaching EHRS use.

Conclusion

For nursing students to become professional nurses who provide safe, effective, efficient patient care that improves patients' health and outcomes in the current and future health care environment, they need to use EHRS competently. Associate degree nursing faculty have been charged to teach EHRS use and other informatics competencies by fostering the development of relevant knowledge, skills and attitudes. Teaching students to use EHRS well may also increase faculty's personal satisfaction and sense of fulfillment.

This qualitative descriptive study found that associate degree nursing faculty face formidable challenges around teaching EHRS use to nursing students. Faculty strive to adapt to the barriers by creatively managing students, time, and activities in each setting. For nursing faculty engaged in the process of forming nurses, there is potential to contribute to the development of mindful, ethical, students who use EHRS proficiently with patients. Providing opportunities for nursing students to acclimate to using EHRS during their education will increase their familiarity, comfort and expertise before they transition into practice. There are efforts within nursing programs to expand opportunities to teach EHRS use by leveraging available resources, including using AEHRS and partnering with clinical facilities to use training versions of their EHRS, and employing diverse teaching strategies, including integrating CDST and enhancing simulation with AEHRS uses.

To effect change, multiple approaches should be considered. First steps toward improving the ability of associate degree nursing faculty to effectively teach nursing students to use EHRS includes better understanding their situation, such as initiated with this study.

Alleviation of barriers, support for faculty development and integration of robust, high-usability AEHRS and informatics concepts throughout nursing curriculum are indicated. Building and enhancing academic and clinical facility partnerships hold promise toward a lasting solution.

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Appendix A

Permission from the Council of Associate Degree Nursing in New York Board

To: Helene Winstanley
From: Kim Sharpe [SharpeK@tompkinscortland.edu]
Thursday, November 03, 2016 6:32 PM

I am the corresponding secretary on the board of the Council of Associate Degree Nursing in New York. The majority of the board has responded positively that you can have a few minutes at our meeting on Thursday and the education presentation on Friday.

To: Kim Sharpe [SharpeK@tompkinscortland.edu]; Marianne Markowitz [Marianne.Markowitz@sjhsyr.org]
From: Helene Winstanley
Wednesday, November 02, 2016 10:58 PM

Dear Ms. Markowitz and Ms. Sharpe,

As we have previously discussed, I am a University of Kansas PhD nursing student in the dissertation phase of my doctoral program. I am interested in the experiences, challenges and teaching strategies of Associate degree nursing faculty, deans and directors related to electronic health records in the nursing education setting. I am formally requesting permission to attend the Spring, 2017, CADN meetings on both faculty and administrator days, to distribute study surveys and offer study interview opportunities to the members attending the meetings. I have previously provided information to you about this research study in brief and I would be happy to provide any further information you request.

Sincerely,
Helene Winstanley
hwinstanley@kumc.edu
University of Kansas School of Nursing
Phone: 631-XXX-XXXX

Appendix B

Announcement to Deans, Directors, and Program Chairs

My name is Helene Winstanley. I am a doctoral student in the School of Nursing at University of Kansas, KUMC. The Board of the Council of Associate Degree Nursing in New York has graciously permitted me to address you. I am seeking associate degree nursing faculty who teach (or have taught) electronic health record systems (EHRS) use for my dissertation research. The Institute of Medicine defines EHRS as "An EHR system encompasses (1) longitudinal collection of electronic health information for and about persons, (2) electronic access to person- and population-level information by authorized users, (3) provision of knowledge and decision support systems, and (4) support for efficient processes for health care delivery" (IOM, 2003b; 2004b, p. 4)." It is a qualitative descriptive study that explores associate degree nursing faculty's experiences, perceptions, challenges, and teaching strategies related to teaching electronic health record systems use. Participation would involve completing the 15 minute survey. If faculty teach about using EHRS, they are invited to complete a survey. I will be handing written surveys out on Conference day for faculty attending the conference. There is also a link to the survey online – please consider asking your faculty to participate. I am really curious about faculty experiences with EHRS!

I am also seeking faculty willing to schedule an in-depth interview that will take between 45 and 60 minutes. The interview can take place while we are here for the Conference, or sometime in the next few weeks, either in-person, or using telephone or teleconference. Please see me to sign-up or complete and return the flyer. Thank you for your attention. I hope that you and your faculty will share your experiences and thoughts with me!

Appendix C

Announcement to Conference Attendees

My name is Helene Winstanley. I am a doctoral student in the School of Nursing at University of Kansas, KUMC. The Board of the Council of Associate Degree Nursing in New York is graciously permitting me to address you. I am seeking associate degree nursing faculty who teach (or have taught) electronic health record systems (EHRS) use for my dissertation research. The Institute of Medicine defines EHRS as "An EHR system encompasses (1) longitudinal collection of electronic health information for and about persons, (2) electronic access to person- and population-level information by authorized users, (3) provision of knowledge and decision support systems, and (4) support for efficient processes for health care delivery" (IOM, 2003b; 2004b, p. 4)." My qualitative descriptive study will explore associate degree nursing faculty's experiences, perceptions, challenges, and teaching strategies related to teaching electronic health record systems use. Participation would involve completing the 15 minute written survey on the Conference day or accessing the link to the survey to complete it online. I am really curious about your experiences with EHRS!

I am also seeking faculty willing to schedule an in-depth interview that will take between 45 and 60 minutes. The interview can take place while we are here for the Conference, or sometime in the next few weeks, either in-person, or using telephone or teleconference. Please see me to sign-up or complete and return the flyer. Thank you for your attention. I hope that you will share your experiences and thoughts with me!

Appendix D

Recruitment Letter/Flyer Invitation

Dear Associate Degree Faculty Member,

You are invited to participate in a research study involving a qualitative survey and/or an interview to explore the experiences of associate degree nursing faculty related to teaching electronic health record systems (EHRS) use. Participants will be asked questions about their experiences, perspectives, challenges, and teaching strategies related to teaching use of EHRS and about EHRS to nursing students at the associate degree level.

The Institute of Medicine defines an electronic health record system (EHRS) as "An EHR system encompasses (1) longitudinal collection of electronic health information for and about persons, (2) electronic access to person- and population-level information by authorized users, (3) provision of knowledge and decision support systems, and (4) support for efficient processes for health care delivery" (IOM, 2003; 2004)."

Completing the survey will take approximately 15 minutes. Written surveys will be collected during and immediately after the conference. Simply leave them in the sealed boxes labeled "Surveys" on the research study table. If you would prefer to complete the survey online, go to: https://www.surveymonkey.com/r/EHRSsurvey. The online link will be available until May 14th, 2017.

You may choose to also participate in an in-depth interview, which will take approximately 45 – 60 minutes. Interviews may be completed in-person around the Conference time, or scheduled for a mutually convenient time within the next 3 - 4 weeks. Interviews may also be completed virtually by telephone or teleconferencing (GoTo Meeting) online, depending on your preference. You can write your name and contact information on the back of this form and leave it at the research table, speak with me during the conference day, or contact me, Helene Winstanley via email: hwinstanley@kumc.edu or cell: 631-XXX-XXXX.

Participation in this study is completely voluntary with no specific benefits in participating identified. The purpose of this qualitative descriptive study is to explore the experiences, perspectives, challenges, and teaching strategies of associate degree nursing faculty related to teaching EHRS use to pre-licensure nursing students. Pseudonyms will be used on all interviews and transcripts for confidentiality purposes. You may withdraw from the study at any point without fear of reprisal.

This research is being conducted by Helene Winstanley, MS, RN, ANP-C, CCRN and Wanda Bonnel, PhD, APRN, ANEF, her dissertation adviser at the University of Kansas, School of Nursing. Further information will be provided as requested.

Your time and responses are truly appreciated. Thank you for assisting in this research study.

Sincerely,

Helene Winstanley, MS, RN, ANP-C, CCRN

Please indicate your interest in participating in an interview below:

Name: _____ Contact information (email/cell): _____

Indicate preferred interview: □ On-site: date/time_____

OR: □ Distance-mediated_____□ telephone □ teleconference

Appendix E

Demographic Questionnaire

Or complete online at https://www.surveymonkey.com/r/EHRS-DQ

Please provide the following demographic information before we continue the interview. The information will be reported in aggregate and used to describe the study sample.

Or:

Please provide the following demographic information along with the answers to the survey questions. The information will be reported in aggregate and used to describe the study sample.

Demographic Questions:

□ Survey □ Interview

1. What is your age?

□ Under 26	□ 26-35	□ 36-52	□ 53-61	□ 62-71	□ Over 71

2. What is your gender?

□ Male	□ Female	□ Alternate entry: _____

3. What is your race/ethnicity? Please select all that apply

□ White	□ Black or African American	□ American Indian or Alaska Native	□ Asian	□ Native Hawaiian or Other Pacific Islander

□ Hispanic, Latino, or Spanish		□ Prefer not to answer

4. How many years have you taught in associate degree or other nursing programs?

□ less than 2	□ 3 - 5	□ 6 - 8	□ 9 - 11	□ 12 - 14	□ more than 14

5. How many years have you worked in direct patient care and used EHRS in that position?

□ less than 2	□ 3 - 5	□ 6 - 8	□ 9 - 11	□ 12 - 14	□ more than 14

6. In which setting(s) have you taught nursing students to use electronic health record systems (EHRS)?

Check all that apply:□ Lecture	□ College laboratory	□ Simulation lab/area	□ Online course	□ Clinical learning environments	□ Other: _____

Appendix F

Written / Online Survey Questions:

1. What are some of the skills that you teach students related to the use of EHRS?

2. What is a favorite learning activity or assignment that you think is effective in helping students learn to use EHRS (example can be from Lecture, college laboratory, simulation lab/area, online course, or clinical learning environments).
   (You may provide more than one example if you would like.)

3. What academic version of electronic health records (if any) do you have in the classes that you teach (such as: faculty created, brand or publisher, clinical product)?

4. What are the similarities and differences to electronic health record systems your students use in clinical settings (*i.e.* ease of access, use, functions?)

5. Please list any factors that make it easier to teach students to use EHRS.

6. Please list any barriers associated with teaching EHRS use.

8 What is your confidence level in your ability to teach with EHRS?

□ Low □ Moderate □ High

7. What formal education, continuing education, or training has prepared you to teach with and about EHRS?

8. What advice would you give to other faculty who are just getting ready to start teaching EHRS use?

If you are interested in discussing your experiences in more detail, please consider participating in an individual interview. Please contact Helene Winstanley by email: hwinstanley@kumc.edu or cell: (631) XXX-XXXX.

(BLANK spaces between questions are omitted on this page)

Appendix G

Research Consent Form for Survey

A Qualitative Descriptive Study Exploring Associate Degree Nursing Faculty's Experiences Teaching Electronic Health Record Systems Use

Dear Associate Degree Nursing Faculty,

My name is Helene Winstanley, MS, RN, ANP-C, CCRN and I am a PhD student at the University of Kansas, School of Nursing. Wanda Bonnel, PhD, APRN, ANEF, is the principal investigator and the chair for this dissertation research study. We are contacting you because you may teach associate degree nursing students to use electronic health record systems, EHRS.

We are recruiting research participants to help us gain understanding of the experiences, perspectives, challenges, and teaching strategies of associate degree nursing faculty related to teaching EHRS use to pre-licensure nursing students. Participation involves completing a survey that will take about 15 minutes. No identifiable information will be collected about you, and the survey is anonymous. In addition to the survey questions, we will request your age, gender, and race/ethnicity. Also, the number of years of teaching and providing direct patient care, including work with EHRS, and, to specify the academic setting(s) in which you teach EHRS use. This information will be combined and used to describe the group of participants.

The Institute of Medicine defines EHRS as "An EHR system encompasses (1) longitudinal collection of electronic health information for and about persons, (2) electronic access to person-and population-level information by authorized users, (3) provision of knowledge and decision support systems, and (4) support for efficient processes for health care delivery." These systems have been adopted and integrated into most healthcare facilities.

When you have completed the written survey, please place it in a box labeled Surveys on the research study table.

The survey is also posted at https://www.surveymonkey.com/r/EHRS-survey if you would prefer to complete it online. The link will be active for two weeks after the Conference, ending May 14, 2017.

There are no personal benefits or risks to participating in this study. Participation is voluntary, and you can stop taking the survey at any time.

If you have any questions, please contact Helene Winstanley by email: hwinstanley@kumc.edu or cell: (631) XXX-XXXX or Wanda Bonnel by email: wbonnel@kumc.edu. For questions about the rights of research participants, you may contact the KUMC Institutional Review Board (IRB) at (913) 588-1240 or humansubjects@kumc.edu

Sincerely,
Helene Winstanley, MS, RN, ANP-C, CCRN
Wanda Bonnel, PhD, APRN, ANEF

KUMC IRB # STUDY00140535 |

Approval Period 2/3/2017 – 2/2/2018 | FWA# 00003411

Appendix H

Interview Guide

This qualitative study will facilitate description/exploration of Associate degree nursing faculty's experiences, perceptions, challenges, and teaching strategies related to EHRS use. The Institute of Medicine defines EHRS as "An EHR system encompasses (1) longitudinal collection of electronic health information for and about persons, (2) electronic access to person- and population-level information by authorized users, (3) provision of knowledge and decision support systems, and (4) support for efficient processes for health care delivery" (IOM, 2003b; 2004b, p. 4)."

1. Tell me about the use of EHRS in your school of nursing.
2. Tell me about your own experience using EHRS to teach students. (Probe for teaching about vs teaching with, Probe for different areas - classroom, SIM, online, clinical)
3. Tell me about how you incorporate EHRS into teaching with students (Probe for charting, decision support tools, documentation, finding information etc)
4. Please share a time when the use of the EHRS was particularly helpful to teaching your students.
5. Please share a time when the use of the EHRS presented a challenge to teaching your students.
6. As you prepare students for the future, in what ways do you see opportunities to use the EHRS in your teaching experiences that are not presently being used?
7. Do you have advice for others who might be just starting to use EHRS in their teaching practice?
8. What formal education, continuing education, or training has helped you to teach with EHRS?
9. Is there anything else that you want to tell me about?

Appendix I

Introductory Interview Script

This interview will give us an opportunity to talk about nursing faculty's experiences, challenges and strategies related to teaching students to use EHRS. EHRS have become more common in healthcare and are changing the way that nursing care is delivered. The Institute of Medicine defines EHRS as "An EHR system encompasses (1) longitudinal collection of electronic health information for and about persons, (2) electronic access to person- and population-level information by authorized users, (3) provision of knowledge and decision support systems, and (4) support for efficient processes for health care delivery" (IOM, 2003b; 2004b, p. 4)." The Future of Nursing reports are just one indicator of the transformation and its impact on nursing education. I am very curious about the impact on nurse educators.

Let's take a few minutes to review the consent…

I am going to record this session to help me remember what was said and improve my accuracy. I will also jot down some notes occasionally. I am very interested in your thoughts and experiences. In the interview, there are no right or wrong answers. Please try not to use the actual names of people, schools, or clinical facilities. If you do so unintentionally, I will change them to maintain their anonymity (and your confidentiality).

I have a brief demographic questionnaire for you to complete. It should take about 5 minutes. Your answers will be combined with the other participants, and then, used in the report. Please ask me if you are uncertain about any of the questions.

[After completion…] Alright! Let's start the interview…

Appendix J

Research Consent Form for Interview
A Qualitative Descriptive Study Exploring Associate Degree Nursing Faculty's Experiences Teaching Electronic Health Record Systems Use

You are being asked to join a research study. You are being asked to take part in this study because you teach associate degree nursing students to use electronic health record systems, EHRS. The main purpose of research is to create new knowledge for the benefit of future nursing faculty, nursing students, and society in general. Research studies may or may not benefit the people who participate. Research is voluntary, and you may change your mind at any time. There will be no penalty to you if you decide not to participate, or if you start the study and decide to stop early.

This research study will initially take place at The Council for Associate Degree Nursing in New York State, Inc.'s (CADN) Spring Meeting and Conference. The conference will be held at the Desmond Hotel and Conference Center, 660 Albany Shaker Road, Albany, NY.

Alternately, an interview can be scheduled for a mutually convenient appointment within 3 - 4 weeks of the Conference.

Distance technologies, including GoToMeeting or Skype, and telephone calls can be used based on the distance and associated travel limitations between the researchers and the participant. The researchers are Wanda Bonnel, PhD, GNP-BC, ANEF, as the principal investigator and the chair for this dissertation research study, and Helene Winstanley, MS, RN, ANP-C, CCRN, a PhD student at the University of Kansas, School of Nursing, as the co-investigator. About **8 – 10** people will be interviewed in the study.

PURPOSE

We are recruiting research participants to help us gain understanding of the experiences, perspectives, challenges, and teaching strategies of associate degree nursing faculty related to teaching EHRS use to pre-licensure nursing students.

Recent Institute of Medicine reports and National League for Nursing statements, along with nursing stakeholders, have emphasized the need for nursing education to prepare students to provide safe, competent nursing care in the increasingly technical and information-loaded health care environment. The transition from paper charting to electronic health record systems (EHRS), and subsequent proliferation of EHRS throughout the health care system, are influencing how nurse educators teach students to use EHRS. By increasing understanding of the experiences, perspectives, and challenges that associate degree nursing faculty face, researchers may be able to highlight areas where education and faculty development may benefit nurse educators.

Individual interviews provide an opportunity for researchers to speak personally with you to gain information and insight into this topic of interest. We will ask open-ended questions to encourage you to share your experiences, perspectives, and ideas. We will also ask some questions aimed at understanding specific circumstances. The information helps us to make sense of your experiences teaching about using EHRS.

The Institute of Medicine defines EHRS as "An EHR system encompasses (1) longitudinal collection of electronic health information for and about persons, (2) electronic access to

person- and population-level information by authorized users, (3) provision of knowledge and decision support systems, and (4) support for efficient processes for health care delivery" (IOM, 2003b; 2004b, p. 4)."

General topics of the interview will include:

- Use of EHRS in your school of nursing.
- Your own experiences related to using EHRS to teach students.
- Your perspectives about teaching with EHRS.
- Your background preparation for teaching EHRS use.
- Your ideas for teaching with EHRS in the future.

PROCEDURES

The interview is expected to last about **45 – 60 minutes**. We will audio-record or video-record the interview so that we have correct notes about what was said. Recordings and interview notes will be stored on a secure and password protected server and be destroyed after seven years.

RISKS

The interview questions may be personal. Some of the questions might be embarrassing or uncomfortable. You are free not to answer any questions. The researchers will respect the confidentiality of the interview; however, this cannot be guaranteed. The risk for someone outside of the research study to learn of your participation or responses is low. Your name will not be used in any publication or presentation about this research.

BENEFITS

You may or may not benefit directly from this study. Researchers hope that the information collected from this study may lead to increased understanding of the challenges that associate degree nursing faculty face, lead to sharing of teaching strategies, and identify areas where education and faculty development may be beneficial to nurse educators.

COSTS

There is no cost for participating in this study.

PAYMENT FOR PARTICIPATION

There is no payment for your participation in this study.

QUESTIONS

Before you sign this form, Helene Winstanley should answer all your questions. You can contact Helene Winstanley at (631) XXX-XXXX or talk to her advisor Dr. Wanda Bonnel if you have any more questions, suggestions, concerns or complaints after signing this form (wbonnel@kumc.edu). If you have any questions about your rights as a research subject, if you think you have been harmed by the research, or if you want to talk with someone who is not involved in the study, you may call the Human Subjects Committee at (913) 588-1240. You may also write the Human Subjects Committee at Mail Stop #1032, University of Kansas Medical Center, 3901 Rainbow Blvd., Kansas City, KS 66160.

CONSENT

Helene Winstanley has given you information about this research study. She has explained what will be done and how long it will take. By signing this form, you say that you freely and voluntarily consent to participate in this research study. You have read the information and had your questions answered. You will be given a signed copy of the consent form to keep for your records.

_____

Print Participant's Name

_____ _____ _____

Signature of Participant Time Date

_____

Print Name of Person Obtaining Consent

_____ _____

Signature of Person Obtaining Consent Date

Appendix K

Sample Coding Sheet

Significant Statements (Meaning Units)	Restatements (Condensed Meaning Units)	Codes (Formulated Meaning Units)	Added later in coding process: Subcategories

Appendix L

Table L1

Demographic Characteristics of Interview Respondents

Characteristic	Interview Participants (n = 10)
Age	
Blank	0
Under 26	0
26-35	0
36-52	2
53-61	4
62-71	3
Over 71	1
Gender	
Blank	0
Male	0
Female	10
Alternate Entry	0
Race/ethnicity (Multiple selections accepted)	
Blank	0
White	9
Black or African American	0
American Indian or Alaska Native	0
Asian	1
Native Hawaiian or Other Pacific Islander	0
Hispanic, Latino, or Spanish	0
Prefer not to answer	0
Years of teaching in associate degree or other nursing programs	
Blank	0
Less than 2	0
3 - 5	1
6 - 8	0
9 - 11	2
12 - 14	2
More than 14	5

Years worked in direct patient care and used EHRS in that position	
Blank	0
Less than 2	2
3 - 5	1
6 - 8	3
9 - 11	2
12 - 14	0
More than 14	2
Setting(s) in which respondents taught nursing students to use electronic health record systems (EHRS) (Multiple selections accepted)	
Blank	0
Lecture	6
College laboratory	5
Simulation lab/area	5
Online course	1
Clinical learning environment	6
Other (please specify)	0

Appendix M - Part A

Categories and Subcategories from the Analysis

Major Category: Facing Challenges

- Struggling with EHRS
- Nursing Program Issues
- Developing Faculty

Major Category: Building Successes

- Teaching Strategies
- Negotiating Settings
- Forming Nurses

Appendix M - Part B

Major Categories and Subcategories Expanded

FACING CHALLENGES	
Struggling with EHRS	• Limited access and availability • Computer competencies • Student documentation and medication administration • Increased frustration and decreased productivity
Nursing Program Issues	• Curriculum concerns • Seeking a culture of safety • Financial, legal and ethical issues • Preparing students for transition to practice
Developing Faculty	• Multiple background, generational and resource issues
BUILDING SUCCESSES	
. *Teaching Strategies*	• Using EHRS in clinical • Using AEHRS • Focusing on simulation • Taking advantage of clinical decision support tools
Negotiating Settings	• Diverse issues related to clinical and nonclinical settings
Forming Nurses	• Identifying the importance of helping students make associations between elements of information using EHRS and professional behaviors for patient care.

Appendix N

Table N2

Demographic Characteristics of Survey Respondents

Characteristics	Survey	
	Written (*n* = 10)	Online (*n* = 17)
Age		
Blank[a]	1	0
Under 26	0	1
26-35	2	2
36-52	4	8
53-61	3	6
62-71	0	0
Over 71	0	0
Gender		
Blank	1	0
Male	2	1
Female	7	16
Alternate Entry	0	0
Race/ethnicity (Multiple selections accepted)		
Blank	1	0
White	8	13
Black or African American	0	1
American Indian or Alaska Native	0	0
Asian	1	1
Native Hawaiian or Other Pacific Islander	0	0
Hispanic, Latino, or Spanish	0	1
Hispanic and White	0	1
Prefer not to answer	0	0
Years of teaching in associate degree or other nursing programs		
Blank	1	1
Less than 2	2	3
3 - 5	1	3
6 - 8	1	1
9 - 11	3	2
12 - 14	0	2

More than 14	2	5
Years worked in direct patient care and used EHRS in that position		
Blank	1	0
Less than 2	3	0
3 - 5	2	7
6 - 8	1	3
9 - 11	0	4
12 - 14	1	1
More than 14	2	2
Setting(s) in which respondents taught nursing students to use electronic health record systems (EHRS) (Multiple selections accepted)		
Blank	1	0
Lecture	3	10
College laboratory (plus skill lab)	5	10
Simulation lab/area	2	10
Online course	0	3
Clinical learning environment	5	15
Other specified: skill lab[b] = 1		

Note. [a]One of the written survey respondents omitted the demographic questionnaire and one of the online survey respondents did not answer the number of years teaching in an associate degree program question. [b]A single response to other, specified as skill lab, was grouped with college laboratory for simplicity (statistical purposes).

Appendix O - Part A

Survey Data: Summarized Challenges and Successes

Challenges

- Barriers to Teaching EHRS – Physical Resources

- Barriers to Teaching EHRS – People Resources

- Curricular Issues

Successes

- Favorite Teaching and Learning Strategies

- Advice to New Faculty – Acquiring Expertise in Using EHRS

Appendix O - Part B

Survey Data: Summarized Challenges and Successes Expanded

CHALLENGES	
Barriers to Teaching EHRS - Physical Resources	• Access: Need easier access to EHRS in real-time clinical • Technology issues: cumbersome systems, being locked out, time lost waiting to regain access, getting tech support
Barriers to Teaching EHRS -People Resources	• Faculty issues: Negative attitudes, need faculty buy in, more work • Student issues: Students lacking computer skills, student anxiety
Curricular Issues	• Need faculty competency and organization commitment • Need to assess student comfort/ knowledge of technology and EHRS • If purchasing an AEHRS, do homework • Integrate AEHRS across curriculum and emphasize use in future practice • Plan continuity of academic EHRS to clinical EHRS
SUCCESSES	
Favorite Teaching and Learning Strategies	• Case studies; Simulations • Scavenger hunts; Pairing students to use EHRS in patient care • Visuals and Online resources for student learning • Value of lab practice for students
Advice to New Faculty (Acquiring Expertise in Using EHRS)	• Learn EHRS yourself, practice and allow time to learn, get comfortable • Take training when available and work with staff and/or super-users • Assess agency opportunities for students to use their EHRS