

Integrating an Academic Electronic Health Record: Challenges and Success Strategies

Valerie M. Herbert, DNP, RN, CNE, Helen Connors, PhD, DrPS(Hon), RN, FAAN

Technology is increasing the complexity in the role of today's nurse. Healthcare organizations are integrating more health information technologies and relying on the electronic health record for data collection, communication, and decision making. Nursing faculty need to prepare graduates for this environment and incorporate an academic electronic health record into a nursing curriculum to meet student-program outcomes. Although the need exists for student preparation, some nursing programs are struggling with implementation, whereas others have been successful. To better understand these complexities, this project was intended to identify current challenges and success strategies of effective academic electronic health record integration into nursing curricula. Using Rogers' 1962 Diffusion of Innovation theory as a framework for technology adoption, a descriptive survey design was used to gain insights from deans and program directors of nursing schools involved with the national Health Informatics & Technology Scholars faculty development program or Cerner's Academic Education Solution Consortium, working to integrate an academic electronic health record in their respective nursing schools. The participants' experiences highlighted approaches used by these schools to integrate these technologies. Data from this project provide nursing education with effective strategies and potential challenges that should be addressed for successful academic electronic health record integration.

KEY WORDS: Academic electronic health record, Adoption of innovation, Electronic health record, Health information technologies

The increasing use of information technology (IT) is drastically changing healthcare organizations. Utilization of data through electronic health records (EHRs) has demonstrated positive outcomes for patient safety and quality of care, and organizations are adopting the EHR as the major data collection and communication tool in clinical settings.¹⁻³ The healthcare workforce has undergone significant cultural changes and

Author Affiliations: School of Nursing (Dr Herbert), Husson University, Bangor, ME; and Integrative Technologies, School of Nursing, University of Kansas, Kansas City (Dr Connors).

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Corresponding author: Valerie M. Herbert, DNP, RN, CNE, School of Nursing, Husson University, 1 College Circle, Room 238, Bangor, ME 04401 (Valerie.Herbert@maine.edu).

transformations by integrating the EHR into practice.^{4,5} Currently, clinical organizations bear the costs associated with training new nurses and care providers but are looking for educational programs to integrate EHR training and learning experiences.⁶

As practice-setting EHR utilization evolves, nursing education must prepare students to be competent with these technologies. Although some nursing programs have been very effective at integrating an academic EHR (AEHR), many still struggle. Identification and analysis of AEHR implementation obstacles and success strategies assist nursing programs to address gaps in their integration plans and ultimately improve patient safety by allowing students' access to the same technology tools they will use in clinical practice. The purpose of this project was to identify organizational barriers and success strategies of effective AEHR implementation into the nursing curriculum.

BACKGROUND AND REVIEW OF LITERATURE

In the last decade, substantial focus and funding have been directed at technology utilization to improve patient safety and quality outcomes of care in healthcare settings after reports of significant healthcare errors.^{7,8} The 2000 landmark report by the Institute of Medicine highlighted that the American healthcare system was responsible for approximately 98 000 annual deaths due to medical errors.⁸ Twelve years later, Heineman and Froemke⁹ report a substantial increase in annual deaths from medical errors at 187 000 in the documentary *Escape Fire*. These reports propose that technology holds great potential for healthcare to meet quality and safety goals, reducing medical errors and improving overall patient care.

Health IT includes a wide variety of computerized devices aimed at (1) improving healthcare quality, (2) preventing medical errors, (3) reducing healthcare cost, (4) increasing administrative efficiencies, (5) decreasing paperwork, and (6) expanding access to affordable care.^{2,4} Healthcare technology expansion has been stimulated by several key national policies and guidelines. As part of the American Recovery and Reinvestment Act of 2009, the Health IT for Economic and Clinical Health (HITECH) Act was enacted to spur meaningful use of health IT (HIT) to improve safety, quality, and efficiency in delivery of patient care.^{1,10,11} The backbone of HIT is the EHR, and the US Department of Health and Human Services (2010)

has dedicated significant resources toward EHR adoption by hospitals and eligible providers.¹²

To attain federally mandated “meaningful use” of technology, healthcare organizations are purchasing and adopting EHRs. Introduction of the EHR into clinical workflows has created numerous changes in nursing practice, requiring significant training in systems operations, effective data entry, and utilization of information for practice decisions.^{13,14} Healthcare employers are now looking for educational programs to include IT and EHR experiences as part of the program of study.^{6,15}

Nursing Education and Electronic Health Records

With clinical settings integrating more HIT and relying on the EHR for data collection, communication, and decision making, nursing faculty need to prepare graduates with the knowledge and skills for EHR utilization. As these technologies become part of healthcare workflow, nurses’ roles have expanded to include HIT competencies to ensure organizational compliance in “meaningful use.”¹⁶ The literature highlights the need to prepare nursing students within educational settings to facilitate development of the technology knowledge and skills that ultimately improves patient care.^{17,18}

To address nursing graduate competencies with IT, accreditation bodies and national educational initiatives are driving the changes needed in nursing programs. The National League for Nursing Accrediting Commission and the Commission on Collegiate Nursing Education currently have program standards that include technology and informatics to meet healthcare needs and expectations.^{19,20} These accreditation organizations recognize the essential need for nurses to have skills and abilities in information management to function in today’s healthcare system.

Program and Faculty Development

Beyond program standards, substantial efforts have been established to support nursing programs and faculty development in adopting information technologies.^{18,21–23} In 2005, the Quality and Safety Education for Nurses (QSEN) project began with funding from the Robert Wood Johnson Foundation to meet the challenges of preparing future nurses to improve patient safety and the quality of care.²⁴ The QSEN framework identifies six competency areas for nursing programs: (1) patient-centered care, (2) teamwork and collaboration, (3) evidence-based practice, (4) quality improvement, (5) safety, and (6) informatics. Although the informatics competencies specifically highlight the need for EHR access, the EHR technology can be used to support all six domains of the QSEN competencies.

In 2006, more than 100 nursing leaders from administration, practice, education, informatics, and governmental agencies gathered at the Technology Informatics Guiding Education Reform Summit (TIGER) and shared a vision

for crossing the quality chasm with IT. The vision outlined seven pillars of critical components as a framework transforming the nursing profession, using timelines and action plans. The TIGER initiative identified essential nursing technology skills needed for the 21st-century practice.^{21,23}

To support faculty development, in 2008 the Health Informatics and Technology Scholars (HITS) program was developed through a collaborative partnership with four nursing programs and the National League for Nursing.²⁵ Supported by a Health Resources and Service Administration (HRSA) grant, the 5-year program provided a yearlong intensive and immersive experience for faculty in the use and application of HIT, culminating in each participating scholar developing a program-based project for their institution.

National nursing efforts have identified a vision, created a framework and competencies, and included faculty development to implement information technologies. Yet even with these national programs and initiatives, many nursing schools have not fully utilized the EHR and lack full integration of information technologies into the curriculum.^{26–28} Although overall goals of patient safety and improved care remain the global focus of both clinical and academic areas, nursing education programs have unique challenges and barriers that affect EHR integration.²⁹

Preparing nursing students for the complexity of today’s technology-rich healthcare setting requires relevant learning opportunities. Nursing faculty need to “prepare nurses to be able to access and synthesize knowledge, integrate evidence into practice, work collaboratively and in interdisciplinary teams, use clinical information and decision support systems, and provide safe and ethical care.”^{30(p9)} Often nursing faculty still lack the knowledge and skills to effectively adopt an AEHR and integrate into the curriculum.³¹ Several national initiatives have been directed toward these learning gaps, but often strategies fail to address faculty buy-in and development needs.³² Evidence indicates nursing faculty can be a significant barrier to implementing EHR technologies.^{33,34} Attention to faculty development should be a cornerstone of any strategic plan for AEHR implementation.

Electronic Health Record Access

Access to an EHR can be a major barrier for some nursing programs in addressing informatics and technology competencies. To attain progressive competency with EHR technologies, nursing students need multiple opportunities to interact with the EHR that mimics the reality in healthcare.^{3,18} Nursing programs are using different approaches to address the EHR access issue.

One approach is for nursing schools to partner with clinical organizations for student access during clinical rotations.^{15,35} To ensure patient confidentiality and data accuracy, students are required to participate in EHR

training, placing a significant financial burden on healthcare organizations. The mandatory training is also a significant commitment for students and takes away from valuable clinical time. Once student-level training is complete, nursing students can then use the institutional EHR to research assigned patients and document on assigned patient care under the supervision of clinical faculty. Access is generally restricted to on-site because of patient confidentiality and security restrictions, preventing nursing faculty from expanding teaching strategies and using the EHR during classroom or laboratory experiences that can build upon competencies.

Because of limitations of the clinical EHR to meet complex student learning needs, some organizations have developed or purchased an AEHR. The AEHR is a system that mirrors real life and allows faculty to create a variety of teaching experiences within the AEHR.³⁶ The usability features of an AEHR contain the major components of a true EHR, providing “students with learning opportunities that develop competencies in patient assessment, clinical knowledge, decision making, and documentation.”^{37(pp133–137)} Much like simulation, the AEHR can be utilized to address critical thinking in a safe environment without concern of harming actual patients.³⁸ For some nursing programs, the fiscal resources to purchase the AEHR may be cost prohibitive. Many full-featured products require expensive leases or shift significant cost onto students through fees.³⁶

An access alternative for some schools has been to develop their own AEHR, but this has limits as well. Designing a full-featured EHR capable of allowing students to enter and retrieve data, track performance, and achieve successful informatics capabilities requires substantial time and expertise.³⁹ For schools to create their own AEHR requires significant organizational investment in technology development and support resources and may be too demanding for programs.

Some nursing programs are entering into partnerships with clinical settings to gain access to the training EHR beyond the clinical rotation to promote student learning opportunities.^{15,35} With the cost of orienting newly hired nurses and other healthcare professionals to an organization’s EHR system, practice settings are recognizing the benefits of expanded learning for nursing students.¹⁵ Unfortunately, all nursing programs do not have partnerships with healthcare organizations for access to the EHR beyond the clinical setting.

Framework

This study used Rogers⁴⁰ 1962 Diffusion of Innovation theory as a framework for assessing faculty adoption and diffusion of the AEHR within nursing programs. The theory is utilized to guide the development of concepts and relationships whereby adoption refers to an individual process of decision making, and diffusion is the actual spread of the idea

to others. To effectively diffuse the AEHR within a nursing program, the study considers both the level of individual AEHR adoption and the diffusion process needed for the organization. Diffusion of Innovation theory has been used as a framework in multiple studies and across different disciplines, including “medical sociology, communication, marketing, developmental studies, health promotion, organizational studies, knowledge management, and complexity studies,”^{41(pp418)} and more recently with technology and healthcare records.^{42,43}

In 1995, Rogers⁴⁴ identified five progressive stages in the adoption of an innovation: (1) knowledge, (2) persuasion, (3) decision, (4) implementation, and (5) confirmation. Rogers’ theory identifies adoption as an individual or group process of decision making, and at crucial steps, the advantages and disadvantages are weighted to determine whether to reject or accept the innovation. If the innovation is accepted, the process will move forward to the next stage of adoption. Individuals or groups first gain knowledge or information about the innovation and if interested are persuaded to seek out more information. If innovation is viewed as valuable then a decision is made to implement on a small scale. Finally, the innovation moves to confirmation when fully integrated or utilized by the individual or group.⁴⁴

Diffusion is the actual spread of the idea from one individual to others within the social system and consists of four elements that affect the actual dissemination of the idea: (1) the innovation, (2) communication channels, (3) time, and (4) the social system.⁴⁵ The interaction of these elements determines the length of time for diffusion, defined as the process in which an idea moves through communication channels over time among individuals within the social system.⁴⁰ Depending on the rate of adoption, Rogers⁴⁰ 1962 Diffusion of Innovation theory classifies individuals or groups into five categories: (1) innovators, (2) early adopters, (3) early majority, (4) late majority, and (5) laggards.⁴⁰ The Diffusion of Innovation theory in 1995 clarifies the necessary steps for accepting novel ideas, characteristics of the innovation that influence adoption, actual process used to reach adoption or rejection of any innovation, and established categories based on rate of adoption.⁴⁴

METHODS

Statement of the Problem

A significant need exists for an EHR in the academic setting to provide students with active teaching-learning opportunities that promote integration of technology with practice. Although the literature indicates the need for student preparation, some nursing programs are struggling to achieve implementation, whereas others have been quite successful. The complexities of implementing an AEHR into a nursing curriculum must be considered to meet the ultimate goal of providing safe and effective care for patients.

Purpose of the Study

The purpose of this project was to identify organizational approaches that were success strategies or barriers to implementation of the AEHR. The importance of identifying successful strategies and potential barriers provides nursing programs with essential information needed to implement and sustain integration of AEHR technologies vital for educating today's nursing students.

Research Questions

1. In the adoption of the AEHR as a teaching strategy in nursing education, what is the perceived level of adoption by participant's organization?
2. What are the success strategies to accessing and implementing an AEHR in a nursing program?
3. What are the barriers to accessing and implementing an AEHR in a nursing program?

Consent

Human subject rights were protected by obtaining approval from the University of Kansas Human Subjects Committee prior to beginning. An informational letter was sent to all participants via e-mail and included details regarding implied consent upon completion of the online survey, a detailed explanation of consent procedures, and contact information for any questions. Also included in the information letter was a detailed explanation of participant's rights, including: information regarding participant's right to confidentiality of information gained in the survey, use of assigned numbers for data collection, and right to refuse to participate or withdraw at any time without penalties.

Sample

The study utilized a nonprobability convenience sample of deans, program directors, and chairpersons or their designees of nursing schools within the United States involved with the national HITS program from 2008 to 2012, or Cerner's Academic Education Solution (AES) Consortium. Specifically, the participant sample had projects involving the use of an EHR in their nursing programs. The HITS program is a faculty development program supporting the integration of informatics and other technologies into nursing education supported by an HRSA grant awarded to the University of Kansas School of Nursing. The HITS program is in collaboration with University of Colorado Denver, Johns Hopkins University, Indiana University, and the National League for Nursing.²⁵

The AES Consortium is a group of members utilizing Cerner's AES product, an AEHR for teaching and learning in health professional programs. The consortium members are from universities and schools using the AES as an educational strategy.⁴⁶ The consortium consists of users from

healthcare programs including nursing, medicine, health information management, occupational health and physical therapy, and pharmacy.⁴⁷

Inclusion criteria for the study were deans, program directors, chairpersons, or their designees; from schools participating in the HIT scholar's program from 2008 to 2012 who have projects involving EHRs and/or simulated health records in nursing, or from schools active with AES Consortium; and willingness to complete the survey questionnaire. Exclusion criteria for the study included potential participants as listed previously not associated with a nursing program involved in using an AEHR.

Survey Instrument

Data on adoption, diffusion, and organizational strategies and barriers for implementing an AEHR were collected using an online survey questionnaire: Adoption of Innovation—AEHR Form (Table 1). The survey used to collect data on the integration of AEHR was developed through a process of using concepts from the literature and refinement through edits by content experts with extensive knowledge, experience, and leadership in nursing education and informatics. To test usability and concept validity of the survey, a pilot test was conducted prior to data collection and administered to six expert nursing faculty consultants from three nursing programs.

The survey collected information on type of AEHR, instructional setting, type of nursing programs, and use by other healthcare programs. For organizations using more than one system, participants were allowed to select more than one answer on type of AEHR. In addition, data on perceived success strategies were collected and rank ordered using a 5-point Likert scale from "not important" to "essential" and also allowed additional comments about AEHR integration into their respective nursing programs. Data on any potential barriers to AEHR integration were also collected from participants with access.

To determine actual organizational adoption and diffusion of the AEHR, participants were asked to report percentages of faculty adoption for the AEHR in their teaching-learning experiences. To better determine overall organizational integration of the AEHR, the survey used Rogers' Diffusion of Innovation theory from 1962 to identify percentages of faculty within each of five stages from "knowledge" to "confirmation."⁴⁰ To capture data on diffusion or spread of the AEHR throughout the organization, participants were asked to identify their perceptions of AEHR diffusion throughout their respective organizations using a slide bar from 0 to 100.

RESULTS

A total of 157 participants were identified with a total response of 45 surveys or 29% response rate. Only descriptive statistics were used to analyze the data.

Table 1. Adoption of Innovation—AEHR, % (n)

Please indicate percentage of faculty members for each category that have adopted the AEHR for teaching-learning experiences in your nursing program	0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%	80%–100%
	Not Important	Slight Important	Somewhat Important	Important	Essential	N/A	Important + Essential					
Knowledge—aware of the AEHR	0	0	3 (1)	0	9.1 (3)	12.1 (4)	9.1 (3)	3 (1)	3 (1)	15.2 (5)	45.5 (15)	63.7
Persuasion—seeks more information about AEHR	6.1 (2)	12.1 (4)	15.2 (5)	12.1 (4)	12.1 (4)	9.1 (3)	3 (1)	9.1 (3)	9.1 (3)	9.1 (3)	3 (1)	21.2
Decision—decides to try AEHR	3 (1)	9.1 (3)	6.1 (2)	12.1 (4)	12.1 (4)	15.2 (5)	12.1 (4)	6.1 (2)	12.1 (4)	9.1 (3)	3 (1)	24.2
Implementation—uses AEHR on small scale	3 (1)	9.1 (3)	9.1 (3)	15.2 (5)	18.2 (6)	24.2 (8)	6.1 (2)	3 (1)	6.1 (2)	3 (1)	3 (1)	12.1
Confirmation—fully uses AEHR	3 (1)	9.1 (3)	24.2 (8)	15.2 (5)	15.2 (5)	12.1 (4)	6.1 (2)	3 (1)	3 (1)	3 (1)	6.1 (2)	12.1
How important was the following organizational strategies for integrating the AEHR in your program?	5.9 (2)	11.8 (4)	11.8 (4)	32.4 (11)	35.3 (12)	2.9 (1)	67.7%					
Access to funding for AEHR resources	0	5.9 (2)	0	50 (17)	44.1 (15)	0	94.1%					
Program administrative support	0	0	0	41.2 (14)	58.8 (20)	0	100%					
AEHR champion within the program	11.8 (4)	6.1 (2)	45.5 (15)	30.3 (10)	0	75.8%						
Leadership team for AEHR implementation	11.8 (4)	0	44.1 (15)	23.5 (8)	0	67.6%						
Strategic plan for AEHR implementation	5.9 (2)	11.8 (4)	29.4 (10)	20.6 (7)	29.4 (10)	2.9 (1)	50%					
Nursing curriculum developed for AEHR integration	23.5 (8)	14.7 (5)	29.4 (10)	11.8 (4)	14.7 (5)	41.2%						
Faculty release time for development	0	0	26.5 (9)	52.9 (18)	0	79.4%						
Faculty training and support using these technologies	0	0	35.3 (12)	50 (17)	0	85.3%						
Student training and support	3 (1)	0	48.5 (16)	18.2 (6)	0	66.7%						
Access to teaching strategies using the AEHR	0	6.1 (2)	48.5 (16)	21.2 (7)	0	69.7%						
Effective evaluation strategies of the AEHR												

(continues)

Table 1. Adoption of Innovation—AEHR, % (n), Continued

	Not a Barrier	Slight Barrier	Somewhat a Barrier	Barrier	Major Barrier	N/A	Somewhat-to-Major Barrier	
Of the following barriers, please indicate those that impacted your organization's integration of AEHR.	Access to funding for AEHR resources	31.8 (14)	20.5 (9)	9.1 (4)	11.4 (5)	25 (11)	2.3 (1)	45.5%
	Program administrative support	81.8 (36)	9.1 (4)	2.3 (1)	4.5 (2)	2.3 (1)	0	9.1%
	AEHR champion within the program	68.2 (30)	9.1 (4)	13.6 (6)	4.5 (2)	2.3 (1)	2.3 (1)	20.4%
	Leadership team for AEHR implementation	54.5 (24)	22.7 (10)	9.1 (4)	9.1 (4)	0	0	18.2%
	Strategic plan for AEHR implementation	32.6 (14)	27.9 (12)	20.9 (9)	9.3 (4)	4.7 (2)	4.7 (2)	34.9%
	Nursing curriculum developed for AEHR integration	13.6 (6)	31.8 (14)	36.4 (16)	6.8 (3)	4.5 (2)	6.8 (3)	47.7%
	Faculty release time for development	15.9 (7)	9.1 (4)	22.7 (10)	18.2 (8)	22.7 (10)	11.4 (5)	63.6%
	Faculty training and support using these technologies	14.3 (6)	19 (8)	22.7 (10)	26.2 (11)	16.7 (7)	0	66.7%
	Student training and support	20.5 (9)	34.1 (15)	22.7 (10)	18.2 (8)	4.5 (2)	0	45.4%
	Effective evaluation strategies of the AEHR	15.9 (7)	34.1 (15)	27.3 (12)	15.9 (7)	0	6.8 (3)	43.3%

Academic Electronic Health Record Form

Of the 45 participants, 79% had access to an AEHR. Participants without access were redirected by the survey to complete only barrier and any additional comment questions. For participants who had access to an AEHR, 62% were using vendor license for virtual access to AEHR product, and 23% were using vendor-purchased AEHR hardware and/or software products. Fifteen percent of organizations were using other types, such as school- or faculty-developed AEHR products, partnerships with hospital/clinical sites to use their training EHR, or only live patient EHR during clinical rotations. Participants responded that current programs using the AEHR were nursing, 100%; physical therapy, 18%; health information management, 18%; pharmacy, 12%; respiratory therapy, 12%; medicine, 6%; and paramedic and emergency medical services, 6%. Other programs using the AEHR (6%) included speech language, radiology, nutrition, occupational therapy assistant, and medical coding. Participants indicated 85% of undergraduate nursing programs are using the AEHR at least sometimes; graduate nursing, 31%; doctoral programs, 14%; and programs outside nursing, 34%. The setting of AEHR utilization at least sometimes included laboratories, 80%; simulation, 73%; and classrooms, 56%.

Adoption and Diffusion of Academic Electronic Health Record

Participants reported percentages of faculty adoption for the following categories: awareness of the AEHR, 49%; persuasion to seek more information, 15%; decision to try AEHR, 18%; implementation on small scale, 9%; and confirmation/fully uses AEHR, 9% (Figure 1).⁴⁴ Diffusion of the AEHR throughout the organization indicated a range of 17 to 100, with a mean of 59 and median of 62 with an SD of 23.5.

Success Strategies

Top organizational success strategies identified by the participants used for integrating the AEHR included champion within the program, 100%; program administrative support, 94%; student training and support, 85%; and faculty training and support, 80% (Figure 2). Comment boxes allowed participants to identify any additional success strategies and included similar themes reported in the survey: individual success strategies, such as faculty training and development, use of student super users, and identification of AEHR champions; inclusion of institutional supports using technology and strategic planning; and access to appropriate resources, such as funding and teaching resources.

Barriers

Most frequently identified barriers by all participants included faculty training and support, 67%; faculty release time, 64%; access to funding for AEHR resources, 46%;

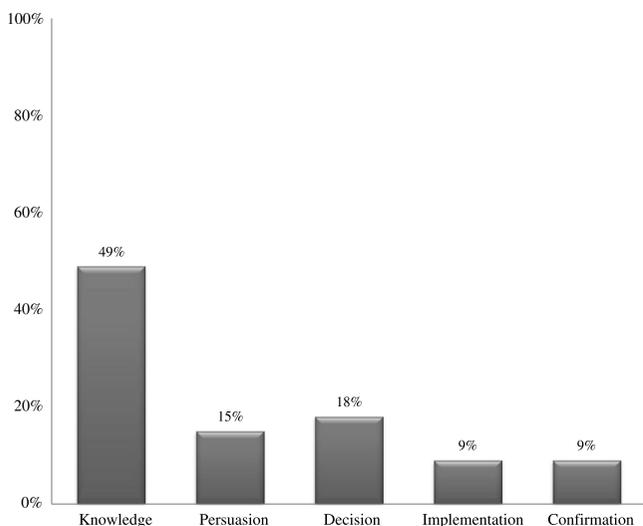


FIGURE 1. Faculty use of AEHR for teaching/learning experiences using adoption process. Process includes five categories: (1) knowledge—awareness of the AEHR, (2) persuasion—seeking more AEHR information, (3) decision—trying the AEHR, (4) implementation—uses AEHR on small scale, and (5) confirmation—fully uses AEHR.

and student training and support, 45% (Figure 3).⁴⁰ The group without AEHR access (n = 9) indicated the top three barriers to integrating an AEHR were access to funding for AEHR resources, 78%; faculty release time for development, 67%; and faculty training and support using these technologies, 67%. For the group with access (n = 36), the top barriers were faculty training and support, 67%; faculty release time, 64%; and student training, 45%. Additional barrier comments involved four themes: AEHR access issues, such as funding, broadband limitations,

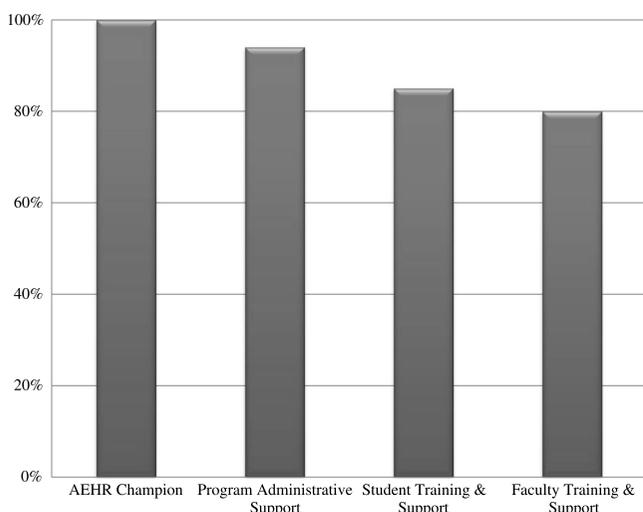


FIGURE 2. Success strategies identified by organizations with access to an AEHR that facilitated AEHR integration into nursing programs. Includes categories of “important” or “essential” for integrating the AEHR.

and lack of AEHR access for adjunct faculty; implementation challenges, such as lack of teaching/learning strategies including case-studies, coordination to implement with other disciplines, and other curricula changes taking priority; people issues, such as faculty resistance to change, lack of release time, and lack of time to integrate; and technology barriers due to lack of training and support for faculty and students.

Overcoming Barriers. The last AEHR Form question provided an opportunity for participants to identify any strategies to overcome barriers. The comments followed three themes: access, people, and support. Suggestions for overcoming access issues included improved funding opportunities, further development of commercial AEHR systems, and design consistency in the clinical EHR training systems. Recommendations directed toward faculty/staff issues included further development of pilot projects to increase faculty buy-in, release time for AEHR champion, faculty mentors, faculty mandates for AEHR adoption, and increasing number of faculty. To address support issues, participants suggested increased financial resources for faculty/student training and program development and increased technology support.

DISCUSSION

This survey explored the organizational level of AEHR adoption using Rogers’s⁴⁰ 1962 Diffusion of Innovation theory. Conducting an online descriptive survey of deans/program directors/program chairpersons or their designee provided information about existing approaches to adopting an AEHR into their respective programs. The survey highlighted existing program barriers and organizational strategies that facilitated success.

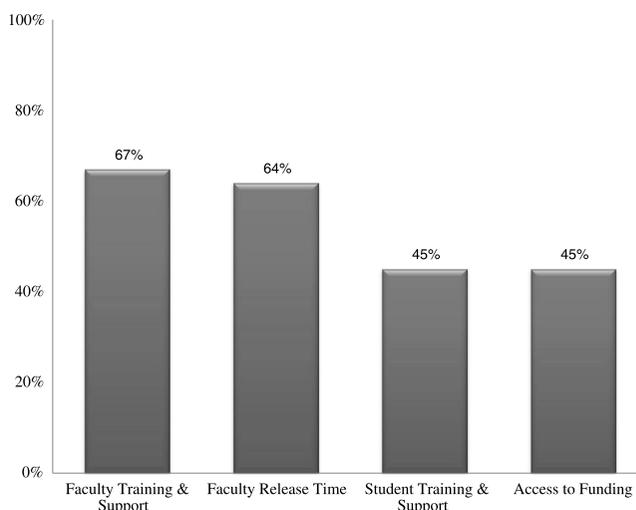


FIGURE 3. Barriers affecting organizational integration of AEHR into nursing programs. Includes categories of “somewhat a barrier,” “barrier,” or “major barrier.”

CONTINUING EDUCATION

Academic Electronic Health Record Access and Usage

These survey results suggest many of the nursing programs in this study have access to an AEHR, but approximately 21% of participants still lack this essential element. As this is a convenience sample from HITS and Cerner Consortium users who have many supports in place, the lack of access may actually be higher for all nursing programs. Approximately 70% of participants' programs are using a vendor license with virtual access for faculty and students. As a teaching/learning strategy, the AEHR is being used in all arenas, but mainly in simulation and laboratory settings. As these settings often utilize case study approaches, integrating an AEHR into these environments becomes a natural progression for inclusion.

Adoption

Of those organizations with AEHR access, faculty adoption as a teaching-learning strategy in nursing education continues to be an issue. Although nursing schools, especially undergraduate, are frequently using the AEHR, participants indicated that 49% of faculty are only at an awareness level of adoption, with only 9% of members actually deciding to use the AEHR on a small scale and 9% fully utilizing the AEHR. Although participants are reporting 100% utilization of an AEHR in nursing programs, the data suggest the actual work is being accomplished by only a few members within an organization. The literature indicated accreditation bodies and national educational initiatives have stimulated changes, but decision to adopt by all faculty is still needed to fully integrate the AEHR into nursing programs. With a wide range of diffusion from 17% to 100% of AEHR technologies, the data suggested little consistency among these organizations in the spread of this innovation.

Strategies of Success

Several key success strategies were identified by participants with AEHR access and included identification of an AEHR champion and program administrative support for integrating the AEHR as top approaches. A champion can be pivotal within the nursing program, facilitating faculty adoption and diffusion of the AEHR throughout the program. At the organizational level, program administrators provide essential backing needed for strategic planning and formation of a leadership team to address this complex integration. The review of the literature clearly identified the need for an AEHR in nursing programs, and administrators are in positions to establish essential roles and advocate for adequate funding to purchase and maintain technology.

Other significant success strategies included training and support for faculty and students using AEHR technologies. The literature notes faculty still lack the knowledge and skills to adopt AEHR, and faculty training and support should be

addressed in the strategic plan for implementation.^{31,32} To provide the necessary leadership for implementation, programs may need to hire faculty with expertise using these technologies.

Barriers to Integration

Participants in this survey indicated there are still factors influencing integration of the AEHR into nursing programs. Even though the evidence clearly indicates the need for an AEHR, some nursing programs still cannot gain access to these technologies, and 78% of participants without access indicated funding to be the top barrier. Opportunities for funding will continue to be a priority for programs that lack access and for those that need to maintain or improve on existing technologies. Of the participant group lacking AEHR access, 67% indicated faculty release time for development as a barrier compared with 47% with access and suggested time for faculty development is a significant barrier for all participants.

Although national efforts and initiatives have created nursing program supports and faculty development in adopting AEHR technologies, 67% of all participants indicated the "need for faculty training and support using these technologies" continues to be a barrier to integration. Challenges identified by participants' comments related to training and support themes included lack of teaching and learning strategies, coordination with other disciplines, and technology issues. Participants' recommendations to overcome these barriers included further development of pilot projects, faculty mentors, increased training resources for faculty and students, and providing technology support.

LIMITATIONS

There are two major limitations of the study. First, the sample was one of convenience, and second, the instrument used to measure the concept was not fully validated. As this was a sample of convenience, the results may not be generalized to all nursing programs and faculty because of little opportunity to control biases with extraneous variables. The participant sample consisted of administrators of schools that have participated in a faculty development HITS program or AES Consortium, and will likely have an increase in organizational adoption of the AEHR. Expanding the study to include other nursing schools integrating AEHR technology would improve generalization. The survey sample self-selected to participate and may not be representative of those organizations that did not participate. In terms of instrument validity, as no instrument existed, one was developed relying on extensive literature review and consultation with experts in the area.⁴⁸ Future research on the instrument would be in order.

CONCLUSIONS AND RECOMMENDATIONS

Nursing education programs are expected to include HIT in the curriculum and to incorporate EHR experiences to meet

the needs of today's nursing graduates. To meet nursing student needs, faculty need to develop meaningful learning experiences using an AEHR that closely resembles real-life technologies. Although significant national efforts have been initiated toward this goal, this study provides programs with information regarding current faculty adoption, perceived barriers, and success strategies from schools that have been trying to meet AEHR integration expectations. Further studies are needed to determine best approaches to improving rate of AEHR technologies diffusion.

Adoption of AEHR technology is still being hampered by access for some organizations and needs to be a priority in strategic planning to meet accreditation standards and stakeholder expectations. For those with AEHR technologies, programs must expect more faculty ownership for integrating AEHR technologies into their teaching strategies. To increase adoption, organizations need to focus on moving faculty from "knowledge" phase to higher "implementation" and "confirmation" levels in adopting AEHR using faculty training and development.⁴⁰ Although the literature recognized the need for faculty and student development and data from this survey indicated training is still a barrier, additional studies are needed to know what types of development and training are desired.

To facilitate AEHR integration, this study identified the leading success strategy: assigning an AEHR champion within the program. The actual role of the AEHR champion was not addressed but could be further studied to provide clearer guidance. According to the study, acquisition of funding for resources, identification of a champion, and finding resources to train faculty and students will be key for strategic planning for program administrators.

Much like the stethoscope, the EHR is an essential tool to providing the best nursing care for patients. Preparing nursing students to utilize this tool to full capacity requires schools to integrate the AEHR at multiple levels to ensure the highest competency. Integrating an AEHR into a nursing program is complex and must be addressed through numerous strategies to truly prepare students for their roles in our evolving healthcare system.

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