Pioneering the Australian Academic Electronic Medical Records (AAeMR) Program Prototype to Enhance Nursing Students’ Readiness for Practice: A Cohort Study

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KEYWORDS
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Abstract

Background: An Australian academic electronic medical records (AAeMR) program was tested amongst third-year undergraduate nursing students at one large regional university.

Methods: An inductive qualitative thematic analysis of focus group data was applied.

Results: Four themes emerged 1) Being prepared for an e-change; 2) Is e-learning better or just different? 3) Learning to be safe using workstations on wheels in a safe environment and 4) Caring for patients when connecting with technology.

Conclusion: Students identified the AAeMR software promotes the delivery of patient centred care and enhances their preparedness to use electronic records in clinical practice.


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Introduction

Despite the widespread adoption of electronic medical records (eMR) in the healthcare industry, nursing education has been slow to catch up, leaving students ill-prepared for the realities of contemporary clinical practice (Mollart et al., 2020; Mollart et al., 2021). The digital transformation of the healthcare industry continues unabated affecting nursing education globally (Booth, Strudwick, McBride, O’Connor, & López, 2021). Higher education nursing institutions are facing significant challenges to keep pace with the rapid adoption of new digital technologies leading to a widening theory-practice gap (Mollart, Irwin, Noble, & Kinsman, 2023). Therefore, an urgent response is needed to ensure the nursing profession remains digitally literate both now and, in the future, (Booth et al., 2021). In Australia, there is acknowledgment and discussion that health digital technologies, such as electronic patient records, are priority areas that need to be implemented in the entry-to-practice nursing programs (Australian Digital Health Agency, 2020). To future-proof the profession, nurse educators and academics have the responsibility of leading the authentic integration of digital technology into undergraduate nursing programs and ensure student digital literacy. The term digital literacy can be defined as “the ability to identify and use technology confidently, creatively and critically to meet the demands and challenges of life, learning and work in a digital society” (Coldwell-Neilson, 2020, p5). Digital health technology refers to using technology such as electronic medical records to improve the healthcare system for providers and patients alike (Coldwell-Neilson, 2020).

Background

Following completion of degree programs, new graduate nurses (NGNs) are expected to be ‘work ready’, possessing the knowledge and skills to practice as registered nurses competently and safely within the dynamic and complex healthcare contexts (AlMekkawi & Khalil, 2020). In a constantly evolving nursing landscape, NGNs must also be equipped with digital literacy and familiarity to meet industry expectations (Elliott, Marks-Marlan, & Bach, 2018). Therefore, and a focus of this paper, is that higher education providers have a responsibility to offer specific knowledge and job-related skills to undergraduate learners that relate to developing digital literacy. Simulation learning is one strategy to ensure clinical confidence and competency, supporting students’ transitions into real-world professional practice (AlMekkawi & Khalil, 2020). Contemporary healthcare is complex where digital literacy is an essential skill. The inclusion of eMR into undergraduate simulations has been shown to improve students’ competence and confidence with the opportunity to rehearse the skills and develop knowledge in a safe environment (Mollart et al., 2020). Recent recommendations support the integration of eMR into nursing education to maximise students’ readiness to participate in workplace learning and ultimately the health workforce (Irwin, Hanson, McDonald, Noble, & Mollart, 2024; Woods et al., 2023).

Simulated learning in the higher education context provides additional opportunities for experiential learning experiences and continues the cyclical construction of knowledge as described by Kolb (1984). Kolb’s experiential learning theory (ELT) is a prominent concept in the field of adult education (Kolb, 1984; Kolb, Boyatzis, & Mainemelis, 2001). According to ELT, learning is a transformative experience that occurs through the construction of knowledge from experience within a reflective process (Kolb, 1984). This theory promotes a learner-centered approach and seeks to involve the learner as the central figure in the process. The emphasis on active reflection, a hallmark of ELT, makes it well suited to nursing education. Simulation provides an opportunity to have a concrete experience, to then reflect on for abstract conceptualisation which leads to active experimentation to incorporate into clinical practice (Spence Laschinger, 1990).

Simulations that incorporate experiential learning principles and provide opportunities for hands-on learning and reflection can help bridge the theory-practice gap. While there have been efforts to integrate simulated eMR programs into Australian nursing curricula, such initiatives are still in their early stages (Mollart et al., 2020). Mollart et al. (2020) reported on research from the United States of America (USA), Canada, the United Kingdom (UK), Singapore, and South Korea that demonstrated the value of integrating simulated eMR into undergraduate nursing programs with nursing students feeling better prepared for clinical practice. The broad upscaling of simulated eMRs within Australian higher education institutions is in its infancy.

To address the identified theory-practice deficits, nursing academics from two large regional Australian universities and clinicians from local health services collaborated with an information technology expert to develop and conduct initial testing of a fit-for-purpose Australian academic eMR (AAeMR) simulation software program intended for curriculum integration. The AAeMR was initially tested with first-year nursing students during tutorials at a large urban university in 2019 and 2021 (Mollart et al., 2023). To our knowledge, this is the first Australian qualitative study to report on the concept testing of a specific, inhouse designed and built academic eMR software in a university simulation learning environment. Therefore, the aim of this study was to conduct initial testing of the AAeMR program with a small cohort of third-year undergraduate nursing students to gain initial insights into its relevancy for simulation education and preparedness for professional practice.
Methods

The widespread adoption and variation of eMR systems and user interfaces implemented within the private and public healthcare sectors within Australia meant that it would not be feasible to replicate and capture the nuances of each existing program. Therefore, to address student learning needs, the software was designed to simulate some of the key uses such as the electronic charting of observations, dispensing of medications and entering of patient assessment data. The AAeMR design consists of three user interfaces: 1) An adult general observation chart (eObs) based on key safety features arising from hard copy standardised adult observation charts used across Australian state-based public health facilities (Queensland Government, 2018, Trauma Victoria, 2017); 2) an electronic patient medication chart with features modelled from state-based electronic medical records interface’s (Australian Commission on Safety and Quality in Health Care, 2023); and 3) patient notes (blank text box for students to type in notes), designed from a consensus of nursing experts for the teaching of correct e-documentation procedures.

Sample and Recruitment

After receiving university ethics approval (HREC: H22328), a purposive sample of 32 third-year nursing students from one regional Australian university campus were invited via email (October 2022) to voluntarily participate in the initial testing of the AAeMR program. The email included an invitation, the participant information sheet (PIS), and the study consent form. Students were reassured that participation in the study was entirely voluntary, and that they would not be disadvantaged if they chose not to participate or withdraw. Students participating in the focus group evaluation following testing of the AAeMR program signed another separate consent form outlining their voluntary participation in a one-hour focus group, including information on how their data was going to be used and handled, including data privacy, ensuring transparency.

Study Design

The AAeMR program testing was conducted within the study institution’s nursing simulated learning environment (SLE). The SLE is designed to look like an acute care hospital environment with health care equipment (e.g. Volumetric infusion pumps and observation equipment including sphygmomanometers), mobile computer workstation on wheels (WOWs) and high-fidelity simulation manikins in and out of beds. The testing of the AAeMR program purposively occurred during one timetabled simulated learning session designed for third year first-semester nursing students. The two-hour simulation session was not associated with an assessment and was designed using the Undergraduate Simulation Framework (USF) developed by Irwin, Brown, and Butler (2021) and was part of the planned simulated learning for the subject. According to the USF, the pre-brief should enable students the opportunity to ask questions and rehearse new skills (Irwin, Butler, and Brown, 2023). As such, the simulation pre-brief incorporated the demonstration of the AAeMR program along with other skills that students would be expected to demonstrate during the simulation. A total of 32 nursing students were supervised within the SLE by two nurse facilitators. Students were asked to practice in teams of four, with each student allocated roles within the simulation including the role of the nurse, observer, patient and relative. In accordance with the USF (Irwin et al., 2021), students were asked to rotate through these roles recreating the scenario.

When using the AAeMR within the simulations, emphasis was on the use of the eObs interface where the ‘nurse’ was required to input patient observation data and generate an electronic chart to visualise the trends with observations and identify any variations from the normal that would require care escalation. Following the simulation session students were invited to participate in a focus group session to gain their insights and experience of using the AAeMR within an SLE. Consenting students participated in the focus group sessions immediately after their timetabled simulation session for convenience and to reduce recall bias (Althubaiti, 2016).

Qualitative Evaluation

Two separate focus group sessions ($n = 5$, $n = 7$) of no longer than 60 minutes were conducted and facilitated two by experienced nurse educators who were not involved with the teaching of this student group. Prompt questions were designed following the sequenced phases of context, key and probing as described by Dick (1998). To meet the aims of the research, the prompt questions were used by the facilitators to assist with exploring the participant’s experiences during the simulation and their perceptions regarding preparedness for practice (Box 1). Each focus group was audio recorded using Zoom and transcribed verbatim using Microsoft 365 transcription in Word. The transcriptions were checked for accuracy by author AB.

Inductive thematic analysis of focus group transcripts was applied by authors who are academic registered nurses. Initial open coding was manually undertaken by authors LM and AB following open, axial, and selective coding techniques as described by Corbin and Strauss (1990), to expose recurring themes. Axial and selective coding was then conducted by authors PI, SF and LM to derive overarching themes used to describe students’ overall perceptions and experiences of the phenomenon.
Results

A total of 12 third-year students participated in one of the two focus group sessions. Four main themes were derived from the data as follows: 1) 'Being prepared for an e-change'; 2) 'Is e-learning better or just different?'; 3) 'Learning to be safe using workstations on wheels in a safe environment'; 4) 'connecting with technology- connecting with patients. These themes are described and represented through a selection of participant quotes.

Being Prepared for the ‘E-Change’

In the context of digital technology, where an ‘e’ suggests electronic, this theme captures discussion from participants recognising documentation in health care is moving to an electronic platform. Students wanted to be taught to use eMR to feel adequately prepared for clinical practice. When talking about being on clinical placements and working with an eMR for the first time, students described being daunted and predicted that without practice they would feel "shocked when you’re by yourself" (Student 4) and using the system. In agreement, one student felt it "would be nice to see a familiar form" (Student 7).

The understanding is that "using paper is really quite antiquated; we don’t really use that in practice anymore" (Student 1) was generally accepted. It was also agreed, however, that, "it’s important to learn both paper and electronic to know if there’s a system breakdown or something, you can then convert to paper" (Student 4).

Being prepared was important, with some participants sharing that they were not able to complete simple tasks often asked of them by the registered nurse whom they were working with during clinical placement due to not knowing how to use eMR. Highlighting the emotional toll of this, a student remembered when they were:

"Trying to do an adult admission and the nurses are like let’s do an admission- Can you show me how to do that? I don’t know where it is. I haven’t used eMR in my intensives at all. So I struggle, I’m like, no I’ve never seen it before." (Student 2)

Another student recalled that they "didn’t know anything about eMR in theatre, and then they are like just write [type] the obs down and do this, and I wasn’t prepared for that" (Student 4).

Is E-Learning Better or Just Different?

Some of the students in this research perceived e-learning as better, whilst others just understood this to be different. However, the participants overwhelmingly supported the integration of the academic electronic AAeMR medical records program into the simulated learning environment and suggested how this should be undertaken. There was agreement, for example, that the program should develop with each year of study "like start basic, just getting used to a computer system, then your second year… you’re looking for more charts" (Student 4). Complexity was discussed in terms of charts as well as the way information was presented on screen. Participants generally felt that documents presented electronically “help with the flow of learning” (Student 3) and that learning in this format was easier to “pick up cues and stuff that you have often missed on paper form” (Student 2). A student explained further:

“You can better utilise the real estate in a technical way, in an eMR versus paper where you’re having to constantly flick back, pick things up, flick back, compare, you’ve got your drugs and meds in a different section to your notes” (Student 1).

Perhaps it was because the students were in their third year of study that they commented on the flow of their workload and were actively thinking about utilising the AAeMR to assist them to time manage and plan for practice. Such that, “you’ve just got a simple click and you’re in a different space and click, quickly comparing different
pieces of information to pull together... you plan and work out how you need to prioritise things” (Student 1). Indeed, there were suggestions that using the AAE-MR could assist students to learn the coordination of care by giving an "opportunity to deal with more than one situation at a time, like a patient load” (Student 11).

Students saw the value in being able to use the AAE-MR program as a reflection tool. A particular student could see the value in being able to "go back to first year, and going this is how I write my notes.... Go into third year and look at my progression from where I came” (Student 5). Apart from their own professional development, participants agreed, using an academic electronic medical records program would be useful for making learning connections between on-campus and clinical practice and be "able to see that when we're doing our class simulations, then help us flag the same sort of things in our placements” (Student 3).

Learning to be Safe Using Workstations on Wheels in a Safe Environment

It was clear that students valued opportunities to practice skills prior to clinical placement to enable the delivery of safe care. Interestingly, they positioned the use of the workstation on wheels (WoWs) in the same space as other clinical skills requiring rehearsal. An experience from placement was shared to make this point by one of the participants:

"Like the amount of times on one of my first placements when I was dragging one of the computer on wheels around and I like whacked into the side of the wall or a chair or something, like just learning how to manoeuvre them. So that like, you can adjust that to the right height to make sure you're typing in with the correct posture and you know, not having your back or whatever, like just those little things that you are not prepared, you're not thinking about that when you're on placement...When they're [WOW] in our SIM [labs] like we can learn these little tricks and you know, learn how to drive them around.” (Student 3).

The simulated learning environment is viewed as a safe learning space and the participants raised the 'safeness' of this space not only about manoeuvring the WoW. Safety was also about successfully incorporating the WoW and the software into a caring relationship so that the patient was not at risk. Ideally, "learning how to incorporate it into your patient care early will help with your patient interaction, for when you're out there by yourself and not feel so awkward” (Student 12). Students wanted time to rehearse how to integrate technology with care prior to clinical placement. Student 1 captures this sentiment: "Whereas we could have had an opportunity to do that beforehand in a simulation, which is safe, and in an environment where we were not going to put at risk patients... I just think it will help us organise ourselves, be better when we are first presented with patient responsibilities”.

Caring for Patients When Connecting With Technology

Students spoke about the adjustments they made when talking with a simulated patient when using the AAE-MR. They all agreed that having the WoW was "just that access at the bedside... being close with the patient” (Student 6). This was seen as a positive difference to paper based documentation where often students would have to leave the bedside to access the complete patient file. The information that students could share with patients could change with the use of the AAE-MR as well. Collectively students agreed and predicted that they would be able to provide patient education more easily at the bedside with the use of a computer on wheels. "It allows you to have easy access to that education.... at the bedside” (Student 4).

Students shared tips on "knowing how to interact properly with the patient and a computer at the same time” (Student 7). This included: "Making things as simple as like knowing what way to angle the computer at, so you're sort of still having that connected conversation with your patient...not like, you know, sitting in front of a screen, just typing down what they're saying. Just small little communication adjustments that you need to make when you're using technology in the room with them” (Student 3).

A closing comment from one of the participants was cautionary and insightful "I think, if you want to bring this up in the future, just make students are aware that, if you're on the computer, you still want to interact with the patient.”

Discussion

To the researchers’ knowledge, this is the first Australian qualitative study to test an academic eMR program in a simulated learning environment with undergraduate nursing students. The concept of person-centered care is foundational to undergraduate nursing education and is translated to practice by developing a therapeutic relationship between the nurse and patient (Nursing and Midwifery Board of Australia, 2018). The persistence of the nursing students to uphold this regardless of the presence of technology was a unique and profound finding of this research. In the simulated environment, without prompting, the third-year students in this study implemented nursing practice behaviours that would maintain person-centered care. There appears to be a dearth of nursing-focused research with nursing students that have reported similar findings (Hong et al., 2022; Raghunathan, McKenna, & Peddle, 2023). Additionally Shen, Cristiano, and Ellis (2020) recognized the
need to implement educational content in medicine that targeted the skill of communicating with patients whilst using simulated eMR at the bedside. Results from Shen et al., (2020) study demonstrated that medical students who completed the eMR training performed significantly better than those who had not at a simulated communication skills clinical exam. The third-year nursing student participants were eager to maximise the benefits of technology use at the bedside to improve patient care delivery, and they want to learn how to do this well on campus prior to clinical practice (Mollart et al., 2021; Raghunathan et al., 2023). Students valued using the WoW at the bedside to document care without having to leave the patient, as well as the opportunities technology affords to offer timely patient education. This is a unique finding from our research, where the use of a WoW may translate from a caring moment to an educational one. Although not a primary focus of their study, Everett-Thomas, Joseph, and Trujillo (2021) scored American nursing students on their ability to record patient education in a simulation with learning outcomes of clinical documentation and clinical reasoning using eMR. It is unclear in (Everett-Thomas et al., 2021) research if the WoW was used to source and assist with information delivery for education or only record that it had been completed.

The nursing student participants also highlighted that using the AAeMR assisted them to organize and coordinate care. In the simulated environment, the electronic records were easier to manipulate and collate to plan care rather than with the paper-based charts. International research confirms this finding and has determined that when undergraduate nursing students are provided the opportunity to practice with academic (simulated) electronic medical records programs, they have improved understandings of patient history and demonstrated critical thinking skills (Choi, Lee, & Park, 2018; Elliott et al., 2018; Jansen, 2014; King et al., 2021). Further research on how eMR programs assist in the development of nursing students' organisation or prioritization of skills is needed.

The finding that the AAeMR should be scaffolded into the nursing program over three years is a recommendation from this study. The AAeMR charts and complexity of patient profiles need to increase each year of the nursing program to align with curriculum requirements and scenarios in the simulation learning environment. This finding and recommendation are supported by Mollart et al., (2020) literature review that identified the importance of introducing the use of electronic medical records from the first year with real-life scenarios and increasing complexity. Literature explaining why an academic medical record program is built in a certain way usually offers to reason to either wanting to mimic the local health service Amirav and Borycki (2021) or map to the curriculum (Elliott et al., 2018). It is understood that both processes would be scaffolded at the time of creation to accommodate their own needs for workflow or learning purposes. Changing the intention of the end product, however, may require a re-think of design processes and should incorporate learning theory to inform these changes (Boonstra & Broekhuis, 2010). In other words, building an academic eMR that is a replica of health services may no longer be fit for purpose.

To effectively incorporate ELT in simulated learning (Kolb et al., 2001) opportunities to actively participate, reflect and give and receive feedback are essential. This research demonstrated that student participants were able to use the AAeMR program within the simulation. The inclusion of pre-brief and debrief sessions enabled educators to provide feedback to the participants giving them time to prepare and reflect on their performances, the patient care they provided, and using technology (WOW and AAeMR) as an adjunct to this care. Clearly, the use of (ELT) is well positioned to support simulated learning, inclusive of technology such as the AAeMR and helps learners to link simulation with real world practice, helping to enhance work readiness.

Limitations

A recognised limitation of this study was it was conducted at only one university site and findings cannot be generalized outside of this population. However, many of our findings are supported by research conducted in other countries and provide useful insights into the integration of an AAeMR within nursing simulation education. Due to the small sample size of 12 participants and our commitment to maintaining confidentiality, we did not collect demographic data for this study. This limitation may impact the generalizability of our findings and should be considered when interpreting the results.

Conclusion

The study findings contribute to the understanding of how the delivery of teaching person-centered care is impacted by digital technology. Students viewed AAeMR and the use of a WOW at the bedside could strengthen the delivery of person-centered care and would assist with the organization of their clinical workload. Key recommendations from this work include the incorporation of learning theory such as ELT when developing a simulated eMR program and a scaffolded approach to curriculum inclusion.

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