Embedding Nursing Informatics Education into an Australian Undergraduate Nursing Degree

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Abstract. Alongside the rapid rise in the adoption of electronic health records and the use of technology to support nursing processes, there is a requirement for nursing students, new graduate nurses, and nursing educators to embrace nursing informatics. Whilst nursing informatics has been taught at post graduate levels for many years, the integration of it into undergraduate studies for entry level nurses has been slow. This is made more complex by the lack of explicit nursing informatics competencies in many countries. Australia has now mandated the inclusion of nursing informatics into all undergraduate nursing curricula but there continues to be an absence of a relevant set of agreed nursing competencies. There is a resulting lack of consistency in nursing curricula content nationally. This paper describes the process used by one Australian university to integrate nursing informatics throughout the undergraduate nursing degree curriculum to ensure entry level nurses have a basic level of skills in the use of informatics.

Keywords. Undergraduate nursing, curriculum, nursing informatics, education, curriculum development, competency

1. Introduction

In rapidly advancing technology-rich environments worldwide, nurses are expected to have proficiency in nursing informatics (NI) knowledge and skills to enable them to provide patients with high quality, safe and cost-effective care [1,2]. The evolution of information computer technology has had enormous impact on the healthcare sector by expediting healthcare services and enhancing the quality of patient care [1]. The implementation of electronic health record (EHR) systems has been supported by national initiatives and projects internationally since 2000. This support for implementation of technology at all levels has further increased global demand for work-ready graduate nurses who are proficient in using NI tools efficiently and effectively, where in use to support the delivery of high quality and safe patient care in hospital settings [3, 4].

Numerous studies have reported the gap between graduates' knowledge and skills acquired at university and the nursing competencies graduates are expected to

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demonstrate in practice [for example; 5,6]. This paper describes one university's journey in the process of integrating NI in the design phase of a new undergraduate curriculum.

2. Background

During the late 1970s informatics researchers began efforts to identify and develop NI competencies [7, 8]. A set of four NI competencies' levels developed by Staggers and her colleagues [8] were later used by other NI researchers to evaluate the extent to which NI knowledge and skills were integrated in nursing courses [9,10,11]. Early NI competencies focused primarily on computer skills and basic information knowledge as the definition of NI emphasised technology use [12].

 Academic healthcare educators were urged to teach core informatics competencies to prepare graduates who could be competent in providing safe patient care during the early 2000's [13]. The Technology Informatics Guiding Educational Reform (TIGER) Initiative developed by nurse leaders was specifically aimed at preparing nurses and student nurses to meet NI competency requirements to suit technology-rich work environments [4]. The Quality and Safety Education for Nurses (QSEN) Project focused on six competency domains including informatics and evidence-based practice [4]. These were used to assess new graduates' information technology skills, and measure the extent of NI competencies in nursing curricula [4,14].

Partnerships between nursing schools, health system suppliers and educational software program developers have provided nursing students with opportunities to practice electronic documentations, care planning, medication information management and searching for evidence as part of a decision-making process [13,15,16]. There has been little improvement in NI education at undergraduate level worldwide despite these efforts. There are few nursing programs including in Australia, Canada, Denmark, and the USA where NI is formally integrated as part of the undergraduate nursing curricula [11, 17].

Numerous studies have identified that nursing students are not prepared to use EHRs in clinical settings [18,19]. Even experienced nurses need more training to efficiently and effectively make use of EHRs. Additionally, a lack of national NI competency standards has led to *ad hoc* NI competency levels and statements suitable for graduates nationwide. The purpose of national standards is to prescribe the structure and content for nursing programs to achieve the desired outcomes. They provide a framework for ensuring high quality nursing education is able to be delivered by educational institutions to ensure graduates are prepared for using NI competence in the workplace [20].

In 2012 the Australian Nursing and Midwifery Accreditation Council (ANMAC) released new standards for accreditation of nursing education and acknowledged the importance of developing "the capacity to innovatively use information technology and electronic resources to research the growing evidence base for improved care and treatment methods" [21]. As from 2013, undergraduate nursing degrees must include NI to achieve accreditation in Australia. However, the required curriculum redesign to include NI is complicated by the lack of national NI competencies for undergraduate nursing students.

3. Methods

The nursing undergraduate degree in Australia is a three-year degree, resulting in registration as a graduate nurse. All degrees must be accredited by ANMAC and registered with the Nursing and Midwifery Board of Australia. The accreditation process is comprehensive and takes at least nine months to complete. The initial stage of curriculum development requires the mapping of all content against the nursing competencies and the ANMAC requirements [21]. This includes the development of unit (sometimes known as course in other jurisdictions) outlines for every unit throughout the degree.

Once the unit outlines are assessed by the ANMAC accreditation team the NI specialists review them for areas where NI could and should be included. In this instance there are 25 units across the three-year degree and nursing informatics is overtly included in 21 of these units. The units where NI is not included are where students are on professional experience placement periods in different healthcare environments. However, it is anticipated the students will gain workplace related NI skills during these practicums.

Through this review process a constructivist approach is employed. The principles of educational scaffolding and modular development were used to build knowledge and skills in support of the development of competency. This commenced with the basic premise that although students have experience with technology in their daily lives they are not experts in such use or in concepts underpinning their relevance to the workplace. For example, the understanding of professional use and rules underpinning the use of social media is one of the initial skills required by students, but is rarely taught. The content and context of each NI component was mapped to ensure it linked with the degree requirements.

As there are no currently accepted NI competencies in Australia, the content was mapped against the TIGER [22] and Canadian Association of Schools of Nursing entry level competencies [23]. Each competency from both sets of competencies was found to be included in the newly developed curriculum content.

The work of developing the nursing degree course content was undertaken with the leads for each unit. The lead role was undertaken by a member of faculty with responsibility for, and expertise in, the development and content for the individual unit. The content consistency, continuity, and scaffolding was the responsibility of the year leads who ensured that all nursing competencies were addressed and that content was consistent and not replicated. The introduction of the NI content was undertaken by the NI specialists in collaboration with the writing teams. The core premise was that NI should become integrated throughout the degree, and not be viewed as additional or separate from the core unit content or context.

The final stage, yet to be completed, is the development of an education package for the staff teaching the degree. This package will provide teaching staff with basic skills and understanding of NI to ensure that they are confident and competent in teaching the content to their students. The development of the education package for teaching staff is essential to complete the process of integration.

4. Discussion

Educational preparation of graduate nurses to be competent in NI is essential in rapidly-evolving, technology-rich and chaotic clinical environments. High quality, safe, and cost-effective patient care can be provided when NI is employed efficiently and effectively within healthcare environments. Unfortunately, nurses' actual NI competency levels are frequently inconsistent and nursing students are inadequately prepared to use NI proficiently. It is also recognized that most newly-registered nurses lack ICT skills, information literacy, and NI knowledge and skills, and they use interpersonal information sources, including their colleagues, rather than using the most up-to-date evidence based resources. These practices can threaten patient safety and contribute to reducing the quality of patient outcomes.

In 2012 a set of national NI competencies was developed for Australian nurses [19] but these are yet to be ratified and adopted by national accreditation bodies. Approved NI competencies linked to the ANMAC accreditation standards are essential for consistent inclusion of NI in all undergraduate curricula. Until NI competencies for undergraduate nurses are mandated we will continue to see underprepared graduate nurses in healthcare organisations.

Lack of faculty NI understanding and confidence has been identified as an inhibitor to the implementation of integration of NI into nursing curricula [19]. The inclusion of an education module on NI for all teaching staff is required to assist them in becoming familiar with, and interested in, the concepts of NI and how these impact on daily nursing practice. Lead time and time to practice newly acquired skills will also impact on the preparedness of faculty to be able to competently and comfortably integrate NI into their teaching.

Integration of NI both vertically and horizontally throughout the undergraduate nursing degree is essential to normalise NI as integral to core nursing activities. This process will ensure that NI becomes embedded as part of learning to become a nursing rather than an adjunct activity. To date the majority of NI courses have been post-graduate specialist degrees. These degrees remain essential for those intent on becoming NI specialists, but the inclusion of NI throughout undergraduate degrees is the starting point for cementing NI as a recognised function within all healthcare organisations.

5. Conclusion

Early education of nurses in the principles and use of NI is essential to enable them to provide high quality, safe and effective care in healthcare environments for today and the future. Whilst there is a continued need to maintain specialist post-graduate courses in NI there must be a set of workforce entry level NI competencies and requirements for all nurses. This paper has described the process used by one Australian university to integrate NI throughout the undergraduate nursing degree to ensure entry level nurses have a basic understanding and appreciation of NI. It is anticipated that this process can be used to guide other Universities integrating NI into undergraduate nursing curricula.

References

[1] R Booth, 2006, 'Educating the Future eHealth Professional Nurse', International Journal of Nursing Education Scholarship, vol. 3, no. 1, pp. 1-10.

[2] HF Marin, 2005, 'New frontiers for nursing and health care informatics', International journal of medical informatics, vol. 74, no. 7, pp. 695-704.

[3] EM Borycki, J Foster, T Sahama, N Frisch, AW Kushniruk, Developing national level informatics competencies for undergraduate nurses: methodological approaches from Australia and Canada, Studies in Health Technology and Informatics: Enabling Health and Healthcare through ICT, 2013, vol183, pp 345-349

[4] National League for Nursing, 2008, Preparing the next generation of nurses to practice in a technology rich environment: An informatics agenda [Position Statement]. Retrieved from http://www.nln.org/aboutnln/PositionStatements/index.htm.

[5] SM Dyess, RO Sherman, 2009, 'The first year of practice: new graduate nurses' transition and learning needs', Journal of Continuing Education in Nursing, vol. 40, no. 9, pp. 403-410.

[6] M El Haddad, L Moxham, M Broadbent, 2013, Graduate registered nurse practice readiness in the Australian context: an issue worthy of discussion, Collegian, vol. 20, pp. 233-238.

[7] N Staggers, CA Gassert, C Curran, A Delphi Study to Determine Informatics Competencies for Nurses at Four Levels of Practice Nursing Research: November/December **51**(6) (2002), 383-390

[8] E Hovenga, Nursing informatics in Australia, *MD Computing* **14** (1997), 119–25. ▪

[9] J Choi, JE De Martinis, 2013, 'Nursing informatics competencies: assessment of undergraduate and graduate nursing students', J Clin Nurs, vol. 22, no. 13-14, pp. 1970-1976.

[10] MS Fetter, 2009, 'Graduating nurses' self-evaluation of information technology competencies', Journal of Nursing Education, vol. 48, no. 2, pp. 86-90.

[11] LL Ornes, C Gassert, 2007, 'Computer competencies in a BSN program', Journal of Nursing Education, vol. 46, no. 2, pp. 75-78.

[12] N Staggers, CB Thompson, 2002, 'The evolution of definitions for nursing informatics: a critical analysis and revised definition', J Am Med Inform Assoc, vol. 9, no. 3, pp. 255-261.

[13] J Warren, HR Connors, 2007, 'Health information technology can and will transform nursing education', Nursing outlook, vol. 55, no. 1, pp. 58-60.

[14] J Barnsteiner, J Disch, J Johnson, K McGuinn, K Chappell, E Swartwout, 2013, 'Original Article: Diffusing QSEN Competencies Across Schools of Nursing: The AACN/RWJF Faculty Development Institutes', Journal of Professional Nursing, vol. 29, pp. 68-74.

[15] Y Kowitlawakul, L Wang, SW-C Chan, 2013, 'Development of the electronic health records for nursing education (EHRNE) software program', Nurse Education Today, vol. 33, no. 12, pp. 1529-1535.

[16] T Pobocik, 2015, 'Using an Educational Electronic Documentation System to Help Nursing Students Accurately Identify Patient Data', International journal of nursing knowledge, vol. 26, no. 1, pp. 26-34.

[17] EA Cummings, EM Borycki, I Madsen, Teaching Nursing Informatics in Australia, Canada and Denmark, *Studies in Health Technology and Informatics*,2015, 218 pp. 39-44.

[18] LM Akhu-Zaheya, W Khater, M Nasar, O Khraisat, 2011, 'Baccalaureate nursing students' anxiety related computer literacy: a sample from Jordan', Journal of Research in Nursing, vol. 18, no. 1, pp. 36-48.

[19] E.M. Borycki, J. Foster, A comparison of Australian and Canadian informatics competencies for undergraduate nurses. Stud Health Technol Inform. 201: p. 349-55.

[20] SW Davis, D Weed, JW Forehand. Improving the nursing accreditation process, Teaching and Learning in Nursing, 2015 Volume 10:1 35 - 38

[21] ANMAC, 2012, Australian Nursing and Midwifery Accreditation Council Registered Nurse Accreditation Standards, available at: http://www.anmac.org.au/accreditation-standards, accessed 23 July 2013

[22] Technology Informatics Guiding Educational Reform (TIGER), TIGER Informatics Competencies Collaborative (TICC) Final Report, August 2009, available at: http://tigercompetencies.pbworks.com/f/TICC_Final.pdf

[23] Canadian Association of Schools of Nursing and Canada Health Infoway. Nursing informatics: Entry-to-practice Competencies for Registered Nurses. 2013.