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Developing National Level Informatics Competencies for Undergraduate Nurses: Methodological Approaches from Australia and Canada

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Abstract. Health information systems are being implemented in countries by governments and regional health authorities in an effort to modernize healthcare. With these changes, there has emerged a demand by healthcare organizations for nurses graduating from college and university programs to have acquired nursing informatics competencies that would allow them to work in clinical practice settings (e.g. hospitals, clinics, home care etc). In this paper we examine the methods employed by two different countries in developing national level nursing informatics competencies expected of undergraduate nurses prior to graduation (i.e. Australia, Canada). This work contributes to the literature by describing the science and methods of nursing informatics competency development at a national level.

Keywords. nursing informatics, health informatics, education, competencies, methods

Introduction

Internationally, we have seen a significant change in health care delivery with the introduction of health information systems such as electronic patient records (EPRs), electronic medical records (EMRs) and electronic health records (EHRs). For example, EPRs are being implemented in acute care settings in order to streamline health care processes, improve the quality of healthcare and reduce the number of medical errors that arise during health care delivery. In response to this modernization of health care, nurses around the world are being asked to use health information systems in acute care, home care, long term care, and community settings [1]. With these changes there has developed an increased demand for nurses graduating from college and university undergraduate programs to have already acquired competencies associated with the use of health information systems and technologies before completing their program of study [1, 2]. Employers (e.g. regional health authorities) are increasingly placing demands on university and college schools of nursing to

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produce graduates who are able to use these health care specific technologies in patient care [2].

Yet, there are few opportunities for nurses in their undergraduate studies to engage with EMRs, EPRs and EHRs [1]. More importantly, many countries around the world: (1) have not fully described the nursing informatics competencies that will be expected of nurses upon graduating from their undergraduate nursing programs, (2) have not developed a clear strategy for integrating these competencies into undergraduate nursing curriculums, and (3) have not invested in developing tools representative of real-world clinical settings that would help student nurses to understand the underlying theory and principles embedded within health information systems in order to be able to use these technologies effectively [1]. As a result, many student nurses are graduating without sufficient knowledge of nursing informatics to be able to work effectively and efficiently in clinical practice settings such as hospitals and clinics [1]. National governments, nursing educational organizations and nursing informaticians around the world have recognized this is an issue [2-4,6,8-11]. Two countries that are currently engaged in the process of developing and integrating nursing informatics into undergraduate nursing programs are Canada and Australia. In this paper we describe and compare the methods used to develop these competencies, and the strengths and limitations of the approaches in terms of work involving the science of developing national level competencies.

Methods for Developing Undergraduate Nursing Informatics Competencies

Although researchers have attempted to develop nursing informatics competencies at the undergraduate and graduate levels [7], there are few countries that have attempted to develop nursing informatics competencies for undergraduate nurses at a country level. Both Australia and Canada have attempted to do so. Although there are many aspects of undergraduate nursing informatics competency development that can be focused upon [4], we have chosen to focus upon the methods that are used to develop undergraduate nursing informatics competencies in this paper. For the purpose of this work, we have chosen to focus upon the following dimensions (which are contained in Table 1): the process of competency development, the types of background work that was done to develop the nursing informatics competencies, the type of stakeholder involvement, and the validation processes that were used (see Table 1). We have maintained a constant definition of **competency** in reviewing this work. A competency is a complex term that describes a professional's ability to combine knowledge, attitudes and skills with external resources and apply these to specific practice situations [4]. There are many similarities and differences between Australia and Canada where nursing informatics competency development methods are concerned. For example, in both Canada and Australia initial literature reviews were conducted followed by the development of draft competencies. There are differences as well; for example, the validation process in Australia involved sending the competencies to **all** nurses in the country to comment on [11]. In contrast, in Canada a forum of 50 participants that included individuals with diverse geographical representation from across the country and who were nurse educators, practicing nurses, representatives from national nursing associations, students, and other health professionals participated in the competency development process. All of these

individuals had interest in nursing informatics, yet only a few were nursing informatics experts. This team of stakeholders was involved in the validation process, with the competencies being sent to Deans and Directors of Schools of Nursing for additional comments.

Table 1: Methods of Developing Nursing Informatics Competencies

| Australia | Canada |
|--|---|
| Process of Development | |
| <ol style="list-style-type: none"> 1. Review of literature 2. On line survey of all Australian Nurses 3. Draft competencies developed 4. Draft review by all Australian nurses, nurse informaticians validation 5. National focus groups for further validation of feedback 6. Changes based on feedback and Final draft out to all Australian nurses and nurse informaticians 7. Any further changes made 8. Final competencies developed and validated by nurse informaticians 9. For publication and acceptance into the National Registered Nurses Competencies Framework | <ol style="list-style-type: none"> 1. Development of a Task Force and sub-task forces. 2. Review of the literature. 3. Draft national nursing informatics competencies by the sub-task force. 4. Presentation to the full task force for review and refinement. 5. Presentation to stakeholders (nursing informatics experts and a diverse group of interested nurses and students from across the country) for review and refinement. 6. Presentation for review to Deans and Directors of the School's of Nursing for review and survey completion. 7. Refinement by the sub-task force. 8. Presentation to the full task force and refinement. |
| Background Work | |
| <ul style="list-style-type: none"> - Extensive literature review to ascertain existing competencies outlined in the research - Draft evidence based competencies were formulated from the analysis of the literature in consultation with the Project Advisory Committee, key stake holders and expert nurse informaticians - On line questionnaire (34 questions) of all competencies from the literature review sent to all Australian nurses to identify NI priorities from the profession - Draft competencies then developed from the outcome of the questionnaire | <p>Review of the literature that included:</p> <ul style="list-style-type: none"> -A review of the national and international literature grey and academic literatures. -A review of nursing competencies at both the provincial and regulator levels. |

| Type of Stakeholder Involvement | |
|--|--|
| Project Advisory Committee - oversee all of project Key stake holders (Australian Nurses) and expert nurse informaticians - consultation of competencies from draft through to completion - Focus groups – 8 questions | A taskforce of nursing informatics experts was brought together to develop the methods and oversee the process: The findings were: -presented at a stakeholder forum to 50 nursing informatics experts and others -stakeholders reviewed and 20 competencies developed Draft competencies were also presented to Deans and Directors of Schools of Nursing, stakeholders and the Canadian Association of Schools of Nursing committee. This group of stakeholders was asked to complete an online questionnaire with the competencies. |
| Validation Processes | |
| Following draft competency approval - sent to all Australian Nurses and nurse informaticians for validation - Focus groups - Changes made from feedback - Final draft out to all Australian Nurses and nurse informaticians for final validation - Changes made from feedback [11] | Following draft competency approval - Presented at a stakeholder forum for 50 nursing informatics experts and other nursing groups. - Changes made based on feedback - Presented to Deans and Directors of Schools of Nursing, stakeholders and the CASN committee. This group of stakeholders was asked to complete an online questionnaire with the competencies. [2] |

Discussion and Conclusions

Healthcare is an information intensive industry that requires all health professionals to learn informatics competencies [5]. Nurses represent the largest and growing group of health professionals that work in the industry, yet they have few opportunities to learn about nursing informatics within the context of their undergraduate programs [1]. Both Australia and Canada have taken the first step toward integrating competencies into undergraduate curricula- they have developed nursing informatics competencies that are needed by nursing students. The processes undertaken by both countries have both similarities and differences. Similarities exist in terms of: (1) developing project groups/task forces to initiate work on the competencies, (2) using empirical literature to drive initiate competency development, (3) initiating the process using literature reviews, and (4) engaging in stakeholder consultation to improve the competencies in a series of consultations. There are some differences between the countries. One country has chosen to use the research and grey literature as well as regulatory information to inform their work while the other has used the research literature as their primary source of literature. In addition, to this there are differences in the validation processes between countries. Although both countries consulted key stakeholders (e.g. nurses with informatics expertise), the countries differed in their

decisions regarding whom to consult in terms of the validation process. Australia validated their work by sending out a draft version of the competencies to all nurses and nursing informatics specialists in the country, while Canada reviewed draft versions of the competencies with nursing informatics experts, nurses in practice with particular interest in this area, students and other health professionals as well as Deans and Directors of Schools of nursing [3]. There are advantages and disadvantages to using these differing methodologies. There are advantages to consulting Deans and Directors of Schools of Nursing. Such consultations would enable the developers of the competencies to determine the feasibility of implementing them in Schools of Nursing. There are also advantages to consulting front line nurses who are currently working with the technologies that nursing students will be expected to be working with. Such consultation will ensure that the competencies are representative of real-world nursing practice involving health information systems. It will be interesting to review the strategies of other countries developing national level competencies for undergraduate nursing students – to learn about the methods that were employed. For example, in the United States the first effort to develop nursing informatics competencies at the undergraduate level involved using a Delphi panel of experts in the field of nursing informatics [12]. More importantly, understanding the similarities and differences in competency development will allow for international comparisons in not only methods for competency development but will allow researchers to determine if methodology of development is a factor that influences the type of undergraduate nurse competency development.

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