

## **Supporting Workforce Development of Nurses: Exploiting the Synergies Between Technology In Education And Practice**

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### **Abstract**

*Nursing, claims Christine Hancock [1], is rightly recognised as vital to a nation's health. As President of the International Council of Nurses, Hancock highlighted the central role of nurses in meeting the health care challenges of the 21st century. The context of nursing is characterised by rapid technological change, bringing into focus the importance of advanced nursing education and life-long learning. Postgraduate education equips nurses for advanced clinical practice, supports safe and effective practice and, moreover, is key to retaining experienced nurses in the workforce. Flexible learning is a contemporary approach to learning that utilises the benefits of technology. This paper reflects on a completed doctoral study about technology-enabled advanced education to argue that technology in education is not just a means to an end but impacts synergistically on the use of technology in practice and thereby on the workforce development of nurses.*

### **1. The Role of the Nursing Workforce in Improving Health Outcomes**

An increasingly skilled health professional workforce has developed in response to improving health outcomes of growing numbers of people with long-term and complex health conditions and a higher prevalence of co-morbidities, in part driven by population aging [2]. At the same time there is a shift of health services from hospital-based to primary and community settings [3]. In combination, the ageing of the population is compounded by demands for increasingly complex health care delivered in community settings, with nursing undertaking an increasingly prominent role in service delivery. This highlights the importance of a well prepared nursing workforce to contribute to the growing requirements for health care services.

The nursing workforce is the single largest health professional group with enormous potential to advance health and disability outcomes [4]. However to achieve its full potential, advanced nursing education is essential for building on educational programmes that prepare people for registration to practice as nurses. Postgraduate education is part of the preparation for advanced clinical practice roles; it supports effective practice; and can aid in retaining experienced nurses in clinical roles. A major problem for the New Zealand health sector is the inability to retain its nursing workforce. The development of new opportunities in advanced clinical nursing, such as the Nurse Practitioner role, is part of a solution to retain nurses in the profession. However, advanced nursing roles require higher education. As nurses use technology in their professional practice in healthcare, it makes sense to incorporate technology in their advanced education too.

The aim of the doctoral study (that this reflection draws from) was to explore flexible learning for nurses engaged in postgraduate education. The study employed a case study design and used a range of data including participant observation, a survey, students' assessed work and interviews with key stakeholders: student, teacher and the organisation. This paper considers nurses' use of technology for education and how the transfer of skills, knowledge and attitudes to the use of technology in practice provides a basis for lifelong learning.

### **2. Nursing in the Technological Age**

Technological advances, principally the increased access to information, have fundamentally changed society [5]. The advances in technology within healthcare promise the benefits of "increasing longevity, improving health and functioning, and alleviating pain and suffering" [6, p. 2]. Nurses need to be discerning users of information to meet the

changing demands of patients and their questions. For example the World Wide Web has opened up a whole new source of health information, information that is also accessible to the health care consumer. However, there is concern about the reliability of that information and this places pressure on healthcare professionals, often nurses, to be discriminating users of health information to be able to respond to patients' questions. There is a worldwide trend of health care consumers becoming more knowledgeable, and this occurs in conjunction with an increased range of treatment options and a plethora of health related information [7-9]. Patients, as well as health professionals, use the Internet to locate information. As patients seek out information, become better informed, and request a range of options, nurses need to be able to assist patients to understand their choices. Healthcare advances occur rapidly and health care information is growing exponentially, hence the need for nurses to develop strong information literacy skills.

To gain a vision of the nurse for the future, an independent review of undergraduate nursing education was commissioned by the Nursing Council of New Zealand in 2000 [10]. One of the key issues identified to impact on health care and nursing education in the future was technological advancements which is similar to trends internationally [11-13]. New Zealand nurses need to be prepared for increased use of technology in the health arena. Preparation includes knowledge, skills and attitudes, and the necessary preparation needs to commence at the undergraduate level of nursing education, and continue through education at the postgraduate level.

Nursing practice is seen as information-intensive [14]. For example, nurses are thought to spend up to 50% of their time documenting patient information [15]. However, there are many other opportunities for gains to be made in practice beyond computerised documentation, including coordination of care, communication, medication management and the ordering of equipment and other services. The advantages of increasing the use of technology for the profession arise because of the storage, processing, retrieval, display, processing, analysis and communication capabilities of information and computer technology. Furthermore, the increase in community-based health care and information technology are considered to be linked to each other [16], because of the availability of information and communication tools that are more mobile and able to be used at the point of care. "Bringing together information and communication technology and health care evidence can help both work more effectively than either one in isolation" [17, p. 96].

### **3. The Role of Flexible Learning in Support of Nursing Workforce Development**

The nurse students in this study were characterised as experienced, mid-career professionals, frequently balancing busy and responsible jobs involving shift work and family responsibilities with postgraduate study. Demographic information collected in this study identifies that postgraduate nurses are predominantly female, with an average age of 37 years showing that the study population reflects the profile of nurses in New Zealand. These nurses combine work and study; 84% of postgraduate students working more than 31 hours per week. Therefore, unlike the typical university student population, this student population was less free to turn up at a campus for short lectures spread unevenly through the days of a week. Flexible learning offered a means to reducing barriers of access to postgraduate study for these nurses. Flexible learning can be understood as a continuum, from fully on-line or web-based courses, to those that are on-campus and supported by technology. In this instance flexible learning is understood to have four characteristics:

1. Student choice in study modes and methods
2. Access to course materials, students and staff from a range of times and locations
3. Student responsibility for their own progress within a supportive environment
4. Learning that makes use of the benefits of technology [18].

Flexible learning can be broadly understood as allowing students choice in place of study; time of study; approaches to learning; availability of courses (including on-line courses); pace of learning within specified parameters; access to teachers and other students; and modes of delivery. Flexible learning that relies on technology is relatively new and continually developing as technology itself develops.

### **4. Limitations to Flexible Learning**

Fundamental to introducing flexible learning is the identification of characteristics and abilities of the target student group. Where there is a high level of dependence on technology, access to and competence in using computers is a prerequisite. Therefore, in the context of this study that investigated the introduction of technology-assisted learning, students' existing access to and skill levels with computers and communication technology were assessed as a basis for appropriate planning for increasing flexible learning. A Postgraduate Nurse Survey, undertaken with all enrolled students in 2002 when technology was just starting to be introduced, found that 94% of students either owned or had convenient access to a computer for their study. A high percentage of these computers had Internet access (87%), a compact disk (CD) drive (88%), and sound capabilities (83%). However, it was also found that some of these students who reported they had access were relatively inexperienced in its use. Asked to rate their overall level of proficiency in

computer use, 5.5% rated their proficiency as very good; 22% good and nearly two-thirds (60%) of postgraduate nursing students rated their proficiency as 'adequate', with a further 13% rating themselves as 'beginners'. Flexible learning that includes use of a computer therefore is reasonable when the majority of postgraduate nursing students (94%) can conveniently access a computer for study purposes. However, the additional findings that 13% of students do not have Internet access and 33% are not confident in their ability to use the web suggests that to design a course reliant on web applications would disadvantage a significant proportion of students. Furthermore, depending on the specific computer and communication technology requirements of the course at least 40% of the students could benefit from some basic skills development to enable them to use computers more effectively for study purposes. It is important, however, to note that over the course of the longitudinal study (2002-2006) this student population's access to and proficiency in computer technology rapidly increased, an observation based on the increased use of such technology in courses and teachers' comments on shifts in students' responses to technology assisted learning towards greater acceptance and confidence.

No matter how good the learning design, students new to flexible learning that has an on-line component may spend undue time learning how to access the course, rather than engaging with the course content [19]. The poor broadband speed for Internet connection in some areas of New Zealand has implications for flexible learning. Issues, such as broadband speed and cost, are a national concern, and until these are resolved so that Internet users have fast, reliable and affordable connection, full use of any learning management system or other web-reliant technology will not be effective. Although new technology is emerging and may have educational uses there remains the need to be aware of students' access, and broadband speed and cost is a major component of access. Technical problems, affecting simple tasks such as downloading a reading, highlighted that although more technologically advanced options might be available, a priority was to ensure that flexible learning was going to be both consistently and reliably accessible to students.

Technical difficulties experienced by students were found to impact negatively on their learning experience. For flexible learning to be easily accessible students require a level of proficiency that allows them to act with competence and confidence in the learning environment. No doubt a level of proficiency with technology also enables nurses in the clinical setting to act with competence and confidence so activities that improve skill acquisition benefit both the educational and professional sphere [20].

## **5. Synergies Between Technology In Education And Practice**

With education taking advantage of new and emerging technology, and nurses becoming aware of and conversant with technology in both practice and education, introducing more flexible learning into higher education becomes an attractive option. McGuinness and Hardy [21] distinguish between personal, professional and educational technology for health professionals. Personal technology includes the experiences that people bring with them that they have already gained, such as using home computers, Automatic Teller Machines and Internet banking. Professional technology is that which nurses might use in their work; for example nurses use electronic equipment for monitoring blood sugar levels. Educational technology relates to technologies that facilitate education, and students undertaking higher education have an expectation of using technology as part of their study, just as they use technology in other aspects of their life [22]. The focus with educational technology is on learning and how learning about technology in one sphere of life can be transferred to another. DeBourgh [23] claims that technology is embedded in the day-to-day work of many professions, including nursing and therefore technology is best integrated in the learning paradigm to ensure nurses are prepared to assume professional roles and also develop skills for lifelong learning.

While many postgraduate nurse courses have a specific clinical focus, opportunities to develop skills for lifelong learning were embedded in the course and their delivery. Teachers recognised there were transferable skills that related to different foci of clinical work, whether it was related to leadership, management, clinical practice or education, and students acknowledged the wider application of some knowledge and skills developed, commenting on learning technological skills for the future. With the increased use of technology, from word processing an essay, using emailing or with on-line learning, students develop their computer skills as part of postgraduate study which adds to their skills of lifelong learning.

Information literacy is an important skill and competency for professional practice and lifelong learning, and in the case of nurses faced with a rapid increase in information in the clinical context, New Zealand nurses have added reasons to develop their literacy skills [23-25]. Within an educational context, through hands-on use of computer and information technology, flexible learning offers an ideal path to the development and consolidation of information literacy skills [26]. These skills can then be transferred to other contexts in students' professional and personal lives [21, 22]. Moreover, information literacy is one of the attributes that higher education providers commonly recognise in their graduate profiles. A comprehensive definition of information literacy, originally suggested by the American Library Association in 1989, includes recognising when information is needed, knowing how information is organised, and how to find and use information. In the context of formal university study using flexible learning approaches, students in this study were expected to critically appraise articles, identify the relevant details quickly, and be able to assess if an

article was going to be useful or not, thereby consolidating their proficiency in information literacy. Not only did students learn to find, retrieve and use literature, but their assessed work demonstrated depth of learning, structural complexity where issues are integrated into arguments, clinical reasoning and the ideas formulated were related back to clinical practice. While not all students achieved these ideals in earlier pieces of assessment there was evidence of an improvement over time.

Flexible learning is noted for its potential for including interaction and more active learning. The present study found evidence of active learning involving deep approaches to learning with reflection, critical reasoning and inquiry that go beyond superficial approaches, supporting quality learning by students. Additionally, authentic learning that requires sharing among nurses parallels the teamwork and collaboration commonly evident, and definitely preferred, in the delivery of healthcare. An example of this in the present study was seen in on-line discussions where students formed a learning community and worked together to advance their collective knowledge, thereby developing a shared understanding.

The trend of advanced gaming programmes which people may use in their personal lives provides experience that may aid educational use of technology such as Web 3D and virtual worlds. For example, ethical constraints, time and financial considerations limit the clinical practice available for health professionals. Simulated experience using virtual worlds can provide much needed practice in skills and decision-making in a safe, yet realistic environment. Those with experience in virtual gaming worlds may find simulated learning easier and more readily develop clinical skills for practice.

Authentic learning supports student collaboration and co-operative learning. Furthermore, Grabinger and Dunlap [27] consider how authentic learning, based on constructivist principles encourages student responsibility, initiative and decision making, thereby promoting higher-order thinking that helps students develop rich and complex knowledge structures. Such behavioural and cognitive skills are essential for working in the increasingly complex healthcare environment and foster the development of skills for lifelong learning.

A number of opportunities for future flexible learning initiatives are now apparent due to recent developments, such as Web 2.0 technologies. These technologies can also impact on health care delivery. For example, dispersed and rural health providers who work in relative isolation from their peers and experts could link via collaborative information and communication technologies. International examples in telemedicine abound, yet in New Zealand such initiatives are not yet commonplace. Web based communication spaces and repositories enhance the sharing of knowledge and expertise that would benefit the health professionals in their education, ongoing professional development, and additionally in their practice. However, the ability to take full advantage of these technologies is dependent upon nationally available, consistent, fast broadband access to the Internet. These factors already impact on students' ability to access web-based learning materials. In clinical practice, where safe decision making is based on completeness and clarity of information, then collaborative work requires ready connection to other health professionals and health information, including large digital files, such as x-rays and scans.

## **6. Conclusions**

Access to flexible learning is multifaceted and one of its acknowledged benefits is that it facilitates physical access to learning resources. In the present study the introduction of flexible learning allowed working mothers, nurses working shifts, nurses living at geographical locations far from the university, all to access postgraduate study. This access can be mediated via technology thereby removing the barriers of physical proximity. However if, for example, learning materials are web-based, then fast and reliable Internet access is required. Access also requires the necessary skills to use the technology and educationally can be aided by a learning design that makes the resources easier to find. In developing flexible learning that relies on technology that is truly accessible, it must be kept in mind that not all students have access to the same technology or similar specification standards of technology.

The future ubiquitous use of technology in all aspects of our lives is likely to lead to a greater acceptance, confidence and expectation of further use of technology. This trend highlights the importance of lifelong learning and information literacy as core skills for nurses, and indeed all health professionals, so they are prepared for whatever the future holds. The skills and competence to use technology are equally matched by the need for the cognitive skills such as critical thinking and problem solving, along with the social skills of working collaboratively. The future is likely to have technology increasingly mediate the application of these cognitive and social skills.

Higher nursing education that provides for lifelong learning and career development needs to include critical thinking ability, communication skills, and information literacy [28, 29]. Resulting in part from the information explosion and increased access to information through the Internet, there is less emphasis on what students need to learn as a finite body of knowledge and more on the process of learning [30]. Learning based on experience gained with educational use of technology can then be transferable to the professional and personal context and the nurse would be better equipped for lifelong learning as discerning users of information.

We end where we began, by addressing the growing role of nursing in improving the provision of health and disability services across the continuum of care. In the view of the Ministry of Health: "With technological innovation and reorientation of the sector, traditional roles have begun to blur, new occupations have begun to emerge and multidisciplinary teamwork has started to become the norm" [3, p. 6]. The new roles emerging in nursing, such as that of the Nurse Practitioner, are part of a trend towards professionalisation, increased responsibility and the subsequent need for education to prepare for these roles [29]. Looking now to the future, a challenge in the development of such new roles is the collection of evidence on how the nursing contribution can be recognised and measured. Evidence can include improved health outcomes, reduced or shortened admission rates, and patient satisfaction, and technology is a tool to support this. As Norma Lang, Former Dean of the University of Pennsylvania explains "If you can't name it, you can't control it, finance it, research it, teach it or put it into public policy" [31, p. 507]. Graduates of programmes that have incorporated technology and flexible learning into course delivery, who have gained skills related to information literacy and life-long learning are well positioned to document and interpret the evidence needed.

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