**Featured Article**

**Human Patient Simulation Manikins and Information Communication Technology Use in Australian Schools of Nursing: A Cross-Sectional Survey**

Carol Arthur, BN*, Ashley Kable, PhD, Tracy Levett-Jones, PhD

*School of Nursing and Midwifery, University of Newcastle, Callaghan 2308, New South Wales, Australia*

**KEYWORDS**

simulation; nursing education; manikins; clinical reasoning; information communication technology

**Abstract**

**Background:** Shortage of suitable quality placements for undergraduate nursing students’ clinical experience has motivated Australian schools of nursing to consider alternatives to traditional clinical placements. Human patient simulation manikins and information communication technologies may have the potential to facilitate the development of nursing students’ clinical competence within a laboratory environment.

**Method:** A cross-sectional survey of Australian schools of nursing was undertaken to explore the use and types of simulation and information communication technologies and the pedagogical principles underpinning their use.

**Results:** This report profiles the facilities, staffing, teaching strategies, and underpinning pedagogical principles currently employed. Survey results show substantial variations in simulation and information communication technology resources and teaching strategies in current use.

**Conclusion:** Additional funding and staff training opportunities will be required to ensure adequate facilities and staffing are available to support quality use of these technologies.

Cite this article:


© 2011 International Nursing Association for Clinical Simulation and Learning. Published by Elsevier Inc. All rights reserved.

**Introduction**

Human patient simulation manikins (HPSMs) and information communication technology (ICT) are important innovations in the education of nursing students. The ongoing challenge of sourcing sufficient quality clinical placements for increasing numbers of undergraduate nursing students, as well as the need to improve students’ clinical reasoning skills and overall competence, has created a perception among many nurse educators that these technologies will be crucial to the future of nursing...
educational. This article describes a cross-sectional survey conducted of Australian schools of nursing to examine the current use of HPSMs and ICT in clinical laboratories and the pedagogical principles underpinning their use.

### Background

Since the transfer of nursing education in Australia from hospitals to universities, it has become apparent that students face challenges in transferring their academic preparation to competence and confidence in the clinical setting. Advancements in scientific and nursing knowledge and the expansion of the role of the nurse into more specialized and highly technical areas have increased educational requirements. At the same time, reductions in patients’ length of stay, increased patient acuity, and nursing shortages have resulted in clinical learning environments that are varied and unpredictable in quality (Levett-Jones, 2007; Levett-Jones & Bourgeois, 2007). These factors have exacerbated the challenge of providing adequate clinical learning experiences for increasing numbers of students.

Against this background, the importance of students’ clinical laboratory learning experiences has become increasingly significant. Clinical laboratories have traditionally provided students with a safe environment where they can practice their skills under supervision (Jeffries, 2007). However, competent nursing requires more than psychomotor skills. Recent research has highlighted the importance of critical thinking and problem-solving capabilities in enabling effective clinical decision making (Levett-Jones et al., 2010). Nurses with effective clinical reasoning skills have been shown to have a positive effect on patient outcomes (Aiken, Clarke, Cheung, Sloane, & Silber, 2003).

However, current educational approaches may not always facilitate the development of adequate reasoning skills. A recent report from the New South Wales Health (2006) Patient Safety and Clinical Quality Programme identified poor clinical reasoning by graduate nurses as a contributing factor in adverse patient incidents. These results are similar to those obtained by del Bueno (2005), who demonstrated that 70% of graduate nurses in the United States scored at an unsafe level in clinical reasoning skills as assessed by the Performance Based Development System. The role of simulation in providing reality-based scenario situations that allow students to practice clinical decision making in a safe environment that will not lead to patient harm is seen by some as crucial (Jeffries, 2007). Clinical reasoning and patient outcomes have also been linked to the ability to use ICT and to incorporate best practice information into critical thinking and decision making through access to best practice Web sites, databases, and clinical decision making tools (Goldsworthy, Lawrence, & Goodman, 2006; Staggers, Gassett, & Curran, 2001); however, many nursing students are still not confident about using ICT (Hegney et al., 2007).

Simulation in health care education has been defined as an attempt “to replicate some or nearly all of the essential aspects of a clinical situation so that the situation may be more readily understood and managed when it occurs for real in clinical practice” (Morton, 1995, p. 76). The term fidelity refers to the degree of reality achieved in a simulation (Jeffries, 2007, p. 3). Although low-fidelity HPSMs have been used in nursing education laboratories for many years, the newer medium- and high-fidelity manikins are increasingly seen as valuable tools for the development and testing of higher order clinical thinking and clinical competence (Jeffries, 2007). There is no clear agreement in the literature about the factors that are most critical to definitions of the level of fidelity (Lampotang, 2008). After a review of international literature (Laschinger et al., 2008; Leigh, 2008; Ravert, 2002) and the National League for Nursing Simulation Innovation Resource Center Web site (http://sirc.nln.org), the following definitions of manikin fidelity level were adopted for this study; care was also taken to keep definitions as consistent as possible with previous Australian studies (McKenna, French, Newton, Cross, & Carbonnel, 2007):

- **Low-fidelity HPSMs** include simple task trainers such as intravenous arms and resuscitation torsos and anatomically correct full-body static manikins that replicate the external anatomy and joint movement of humans but have no interactive capacity.
- **Medium-fidelity HPSMs** are full-body manikins that have embedded software that is controlled by an external, handheld device. They have the capacity to have set breath sounds, heart sounds, and pulse and blood pressure, and they are also capable of coughing, moaning, or producing basic verbal communication. An example is Laerdal’s MegaCode Kelly® with VitalSim® capability.
- **High-fidelity HPSMs** are more realistic and have embedded software that can be remotely controlled by computer to allow for individualised, programmed scenarios, real-time interactions, and cue response. High-fidelity HPSMs allow the operator to set physiological parameters and respond to students’ interventions with changes in voice, heart rate, blood pressure, and other physiological signs. Examples include Laerdal 3GSimMan® and METI® manikins.
To provide quality teaching and learning outcomes, the design of simulation activities based on strong pedagogical principles is crucial. A variety of theories, models, and frameworks have been developed as a structural basis for simulation activities. Pivotal theories identified by O’Donnell and Goode that have influenced the development of simulation include Benner’s *From Novice to Expert*, Kolb’s (1984) model of learning styles, and models of situated and experiential learning (O’Donnell & Goode, 2008). As a result of a partnered project with Laerdal Medical Corporation and the National League for Nursing, Jeffries (2007) devised a simulation design framework integrating the following key educational principles: active learning, diverse learning styles, collaboration, and high expectations. In addition, Jeffries’ model identifies five key simulation design features that should be addressed when one is developing a simulation: clear objectives, adequate student support, embedded complexity and problem solving, fidelity, and debriefing using reflection (Jeffries, 2005).

The extent of use of HPSMs and ICT and the educational quality of this use in Australian schools of nursing are largely unknown. A study commissioned by the Victorian Department of Health explored the potential use of simulation across Victorian educational institutions and health care organizations (McKenna et al., 2007). This study concluded that there was extensive and growing use of simulation in nursing schools in the state of Victoria. A range of different levels of simulation were identified, with the availability of resources being a major influencing factor. This finding is supported in the literature, with time, space, cost, and lack of technical expertise and sufficient training for staff identified as factors that may affect the effective use of high-fidelity HPSMs (Jeffries, 2007). However, no studies of the extent and types of simulation or of the underlying pedagogical principles used in nursing education have been conducted on a national level. Similarly, information regarding the extent and effectiveness of the use of ICT in clinical laboratories throughout Australia is very limited, with no major studies in this area identified.

**Study Aims**

A large, funded project is being undertaken to examine the conditions under which HPSMs and ICT have a positive impact on nursing students’ clinical reasoning and to develop quality indicators to guide implementation. As an initial part of this project, the cross-sectional survey reported in this article aimed to explore the use and types of HPSMs and ICT currently employed in Australian undergraduate nursing programs and to identify the pedagogical principles that underpin their use in clinical laboratories.

**Method**

A cross-sectional survey was used to investigate the scope of current educational practices in an area in which limited information was available. Cross-sectional surveys are a research method recommended for the collection of data that are descriptive of a situation at a given time (Schneider, Whitehead, & Elliot, 2007). A Web-based format was chosen to facilitate ease of response.

A literature review and consultation with an expert panel were used to design the questions in the survey. Panel members were Australian academics known to have interest and expertise in HPSMs, ICT, and clinical reasoning. In all, 98 questions were included, within the following sections:

- details about school size and infrastructure, staffing of clinical laboratories, and roles of staff
- types and levels of simulation used
- pedagogical principles and practices
- use of simulation for assessment
- use of ICT in clinical laboratories
- evaluation and research

Both open and closed questions were used to gather data. Face and content validity were confirmed by testing and review by the project team and panel members. Ethics approval was obtained from the University of Newcastle Human Research Ethics Committee. Issues of consent and privacy were addressed by a step-through process of online information statement provision followed by online consent before participants could access the survey.

The survey was conducted in April and May 2009. Heads of schools from all nursing schools in Australia were invited to participate in the survey themselves or to forward the survey to the most appropriate member of staff. From the 32 nursing schools invited to participate, 24 responses were received, giving a response rate of 75%. Responses were received from all states of Australia. The data obtained were electronically transferred to an Excel spreadsheet for analysis. Text responses to open-ended questions and comments were analyzed thematically. Pedagogical principles underpinning simulation activities were analyzed using the key design characteristics identified in Jeffries’ (2007) evaluation framework. These included the provision of clear objectives, adequate student support, embedded complexity and problem solving, fidelity, and debriefing using reflection.

**Results**

**Clinical Laboratory Facilities**

The number of students at participating schools of nursing ranged from 170 to 5,100, with a median of 1,137. Many schools had multiple campuses, often distributed over wide geographical areas. The number of campuses per school varied from 1 to 5, with a median of 3.5. The number of clinical laboratories available in each school ranged from 2 to 16. It is interesting that the number of laboratories...
available was not related directly to the number of students (see Figure 1). These variations could not be explained by any single factor, such as number of campuses or individual laboratory or class sizes, which also showed marked variations. Clinical laboratories varied in size from 4 to 30 beds, with a median of 6 beds. Class sizes (numbers of students) within these laboratories also varied considerably, from 12 to 30, with a median of 20. There was no obvious relationship between the number of students in a class and the number of beds available in the clinical laboratory.

These data demonstrate that there are substantial variations among the clinical learning facilities available within schools of nursing across Australia, in terms of basic infrastructure. This is important when considering the resources required to incorporate high-fidelity simulation into a teaching program. Many schools would require additional laboratory space or the provision of purpose-built facilities. Of the schools that indicated that they currently use medium- or high-fidelity simulation ($n = 22$), only 45% had access to a purpose-built laboratory, indicating the use of temporary arrangements in existing premises or in alternative locations.

Types of HPSMs Used and Extent of Use for Teaching and Assessment

A range of HPSMs and equipment were used in participating schools. Of the 22 schools who answered this question, 91% reported use of part task trainers; 95% used low-fidelity manikins, 86% used medium-fidelity manikins, and 45% were using high-fidelity manikins at the time of the survey. It should be noted that of the 23 schools who answered this question, 74% stated that they used some form of role-playing as a form of simulation, with 61% using student role play, 57% using staff as actors, and 17% using standardized patients (actors). Cost was reported as a limiting factor in the use of standardized patients. The pattern of use of the different simulation modalities in teaching was varied, suggesting that simulation may not always be used to its full potential. Table 1 shows the pattern of simulation use targeting specific learning objectives or clinical skills identified by participants.

The high use of low-fidelity manikins, which have no capacity to respond verbally or show physiological signs, to teach therapeutic communication and patient assessment skills is a suboptimal teaching strategy when other forms of HPSMs are available. Medium-fidelity manikins are not being used to their full potential, it would seem, being used to teach basic physical assessment skills such as auscultation of heart and lung sounds rather than clinical reasoning skills and teamwork. It is interesting to note that computer-assisted simulation was identified infrequently as a method of teaching clinical reasoning.

A high level of simulation was used for student assessment, with 62% of the 21 schools that responded to this question using some form of simulation as an assessment strategy. Simulation was used for both formative and summative assessments, and a range of methods were used to grade students in simulation activities. The most common methods were predetermined marking criteria, Australian Nursing and Midwifery Council (2005) National Competency Standards for the Registered Nurse, Objective Structured Clinical Examinations, and skills checklists. Simulation was also identified as a strategy for remediation and retesting following unsatisfactory clinical performance.

Few participants viewed simulation as a viable alternative to clinical placements. Only 9% of participants stated that simulation was currently used to replace clinical hours, and this use of simulation was for additional remediation only. Australian state nursing registration bodies do not allow simulation to be substituted for mandatory clinical placement hours. However, 57% of participants stated that they would consider replacing some clinical placement hours with simulation. Issues influencing this view included...
difficulty finding enough suitable clinical placements, the quality of the learning environment in some clinical placements, adequacy of facilities and resources for simulation programs, philosophical stance as to whether simulation should replace or supplement clinical placement, and the requirements of the registration body, including potential changes due to 2010 nationalization of nursing registration.

Clinical Laboratory Staffing and Staff Responsibilities for Simulation and Technology

The participating schools of nursing varied in the staffing provided to support clinical laboratories and the roles assigned to various staff members in relation to simulation and technology. Although 83% of schools used at least some full-time academic staff for teaching in clinical laboratories, 75% employed some casual laboratory teaching staff, and 17% of schools had all clinical laboratories staffed by casual staff. In the Australian context, casual clinical laboratory teachers are usually nurse clinicians with less postgraduate academic qualification than full-time academic faculty have. These casually employed staff teach for a small number of hours at an hourly remuneration rate. Although the employment of casual staff may have some advantages in terms of currency of clinical practice, there are implications for the quality and consistency of teaching and of training in the use of new technologies associated with simulation. Participants commented that casual staff may not “have the skills to support” simulation. Although specific details of training available for casual staff were not obtained from the survey data, it is likely that limitation of training opportunities identified by participants would severely restrict access for those employed for a limited number of hours. In addition to teaching staff, 92% of schools have an appointed laboratory manager, with 54% of those being identified as someone in an administrative position and 29% as an academic staff member. Laboratory technical support staff numbers ranged from 0 to 10, with a median of 1.25.

Staffing responsibilities are an important factor in the effective use of medium- and high-fidelity simulation. Participants identified staff-related factors as constraints to effective implementation of simulation more often than any other factors (including availability of manikins, equipment, space, scenarios, or implementation frameworks). The two highest-ranking constraints were level of staff training in simulation and ICT (identified by 18 respondents), and adequate time for development and implementation within the academic workload (identified by 17 respondents). Important staffing-related issues included staff numbers, training, time, availability of designated simulation staff, and technical support. Considering this, the patterns of workload responsibility assigned to various staff members are of particular interest. Preparation of the laboratory and maintenance of the manikins were most commonly assigned to the laboratory technicians. Only 50% of respondents had ICT technical support. Academic staff members were strongly involved in writing scenarios and running simulation sessions. The most role variation occurred in the programming of computer software (see Table 2). The need for a “dedicated member of staff who adopts manikin programming and use as part of their workload” was identified.

Pedagogical Principles, Processes, and Frameworks for Medium- and High-Fidelity Simulations

Several of the key simulation design characteristics identified by Jeffries (2007) were identified in the survey. Some 83% of the 23 participants who answered this question stated that their simulation sessions had written objectives and that these objectives were embedded in or aligned to specific course or subject outcomes and documented curriculum objectives (refer to Table 1 for the categories of objectives identified).

Lectures, tutorials, written and computer-based learning packages, and psychomotor and communication skills training were identified by participants as preparation for the simulation experience. Of the 22 participants who responded to this question, 95% stated they provided some form of briefing prior to the simulation.

The level of support provided to students during the simulation varied, with only one participant indicating the use of fully immersive (real time and unassisted)
Simulations from the 1st year of the undergraduate program. Although beginning-level students usually require more guidance and support, during complex full-scale simulations facilitator discussion is likely to interrupt the flow of the scenario and reduce student independent problem solving (Waldner & Olson, 2007). Some 41% of respondents stated that they had a facilitator in the room, 9% used the “pause and discuss” technique (Hogan, Flannagan & Marshal, 2008), and 18% identified the level of immersion as “ad hoc”; 27% of participants stated that the level of support provided was variable, depending on the level of students’ experience.

The number of students actively involved in a simulation at one time ranged from 2 to 30, with a median of 4.5. Those who stated that they had very large numbers involved in a simulation were not explicit about the roles allocated to such large numbers. Some 68% of participants stated that there were other students present in the simulation room as observers. Numbers ranged from 2 to 21, with a median of 11. When observers were present, 50% of participants allocated them a specific role, and 64% reversed roles between active participants and observers during the simulation. Roles allocated to observers included evaluation of team performance and provision of critical feedback during debriefing. Some 27% of participants stated that they had facilities for students in another room to view the simulation through video link or one-way glass. Some research indicates that observers may gain significantly from simulation, particularly from the debriefing discussion, but that they may not gain as much as those actively involved in the simulation (Lasater, 2007b). Jeffries and Rizzolo (2006) found in a large, multisite study that when groups of four students participating in a simulation where assigned the roles of Nurse 1, Nurse 2, significant other, and observer, there was no significant difference in their knowledge gain, satisfaction, or self-confidence, but that students assigned as Nurse 1 and the significant other rated themselves higher on clinical judgment than did Nurse 2 or the observer (Jeffries & Rizzolo, 2006). These studies have significant implications for simulation design and the availability of sufficient resources to allow all students an opportunity to actively participate. However, more research is required.

Some 83% of participants stated that their simulation sessions became more complex and immersive as students progressed through the undergraduate program. Some participants commented that they focused in 1st year on basic skill acquisition with static manikins and on patient assessment, communication, and history taking. Most used role-playing for this, but immersive simulation for the development of communication skills was mentioned by 1 participant. In the 2nd year, students were introduced to more complex clinical skills and problem solving requirements, such as wound assessment and management. Simulation sessions for 3rd-year students often involved scenarios with deteriorating patients requiring real-time response and clinical reasoning, patient resuscitation, and multidisciplinary teamwork.

Some 27% stated that clinical reasoning, clinical decision making, or clinical judgment was not specifically addressed as a discrete topic in their undergraduate program. Of those that did teach clinical reasoning specifically, only 25% used a clinical reasoning model. Models of clinical reasoning reported were the nursing process, Tanner’s model of clinical judgment, and reflective practice.

Strategies employed to increase the fidelity of simulation, in addition to the actual manikin, included patient notes, x-ray and pathology results, patient identification and allergy bands, clothing, moulage, makeup, wigs, masks, hospital equipment, patient’s personal belongings, smells, and noises. Fidelity relating to the clinical realism of the scenarios was enhanced by the design of scenarios reflective of typical local practice situations, an activity
undertaken by 96% of the 23 participants who responded to this question.

In all, 82% of participants stated that students were engaged in postsimulation debriefing, which lasted between 10 and 60 minutes. Of those that debriefed students, 65% did so with one facilitator, the remainder with two, and 50% used video recording of the simulation as part of the debriefing. Of those that debriefed, 94% identified reflection on practice as a technique used, while comparison with predetermined best practice criteria, structured questions, and learning logs were less frequently used.

Less than half of the participants, 48%, indicated that they used a theoretical framework or model as a basis for their simulation teaching and learning. Theoretical frameworks and models mentioned included curriculum-based frameworks such as the nursing process or problem-based learning, nursing theories such as Benner’s (1984) novice-to-expert theory, models of clinical judgment such as Tanner’s (2005) and Lasater’s (2007a), experiential learning models, and Jeffries’ (2007) simulation framework.

Use of ICT in Clinical Laboratories

The use of ICT in clinical laboratories was low overall. Although 55% of participants stated that they had ICT available, the actual use of ICT as part of clinical laboratory activities was limited. Of those with ICT, 92% had only desktop computers available, and very few had laptops, personal digital assistants, or other forms of ICT provided. Of those who had some form of ICT available, 42% stated that the technology was used in conjunction with simulation activities. However, comments indicated that the use of ICT referred to computer control of the high-fidelity HPSMs in some instances, or to virtual reality computer programs or online discussion boards such as Blackboard. While this use of ICT is valuable, other ICT applications, including access to online information such as best practice guidelines, health service protocols, pharmacology information, or computer-based clinical decision support systems are more useful to inform practice at the point of care.

Those who had computers in the clinical laboratories had Internet access to library facilities and nursing journal databases. One school reported an electronic pharmacology program that it had found ineffective and planned to abandon. Another school reported electronic access to simulated patients’ test results during high-fidelity simulation, and two reported using a computer-based clinical decision support system. This low level of ICT use in laboratories appears inadequate to produce nurses competent in the use of point-of-care technology. Lack of space for computers and lack of staff with ICT literacy were mentioned as constraints. Several participants stated that new laboratories were being designed to include more ICT or that further use of ICT in laboratories was being developed.

Evaluation and Research

Evaluation of the effectiveness of simulation was undertaken by 77% of participants. Of those who evaluate outcomes \( (n=17) \), the most frequently used method was student satisfaction surveys (94%), followed by subjective staff input (82%) and outcomes of skills tests (47%). Smaller numbers of participants stated that they measured outcomes in relation to competency standards (35%), clinical reasoning (29%), knowledge acquisition (18%), and clinical performance (18%).

Of the participating schools, 45% were conducting or have conducted research related to the use of simulation. Areas of research included the use of simulation in enrolled nurse programs, evaluation of large-group simulation sessions, the impact of simulation on detection of patient deterioration, investigation of an evaluation framework for simulation, exploration of the potential use of simulation in Victoria, history-taking skills, video assessment of clinical skills, the effectiveness of Second Life as a virtual learning environment, and staff development needs.

Discussion

Overall survey results demonstrate that Australian schools of nursing are actively involved in and committed to the development of simulation, and to a lesser extent ICT. Recognized problems of access and quality of clinical placements have motivated universities to explore alternative ways to achieve quality educational outcomes. The National Workforce Taskforce (Australia’s Workforce Online, 2009) has identified an expected 4.3 million shortfall in health care worker numbers during the period from 2007 to 2017, related to the aging of the population, increases in chronic disease, and additional resources required by advances in health care technologies (Brook, 2009). Australian universities are being required to educate more nurses, which puts further pressure on clinical teaching facilities. Both simulation training and increased use of ICT are seen by the Health Workforce Taskforce as key strategies to effectively educate larger numbers of health care workers and improve the effectiveness and efficiency of the workforce. Significant amounts of government funding are becoming available for the development of simulation and ICT (Brook, 2009).

The results of this study indicate that the adequacy of facilities in nursing clinical laboratories is a crucial issue. Many nursing schools in Australia have large numbers of students, geographically isolated campuses, and large clinical laboratory class sizes. Access to high-fidelity manikins is limited. Facilities need to be developed that allow adequate space, manikins, supporting technology, and equipment. Consideration should be given to the most effective methods to integrate simulation into curricula and to the provision of these educational opportunities to all students.
It is also important to note that adequate staff and staff training were considered by the survey participants as the greatest constraining factor in the implementation of HPSMs and ICT. These findings are consistent with the literature, which identifies the need for significant financial and personal resources and the need for teaching staff to develop new skill sets for effective development and implementation of human patient simulation (O’Donnell & Goode, 2008). A study by Jones and Hegge (2008) concluded that all academic staff would need additional time and training in order to plan, implement, and evaluate simulation use in their courses. Thus, at a time when there is a stimulus to implement simulation and ICT into nursing curricula in Australia, it is vital to ensure that not only are physical resources and infrastructure available but also adequate staffing, training, and research so that quality teaching and learning outcomes are achieved.

Pedagogical principles suggest that the use of a theoretical framework to guide the implementation of simulation activities is critical to achieving effective learning (Guimond & Salas, 2009). Although limited in some respects, the results from this study indicate that while some have identified underlying pedagogical principles, few schools are using a suitable framework to guide the implementation of simulation activities.

From the perspective of Jeffries’ (2007) evaluation framework, the survey results indicate that the majority of schools have set objectives for their simulations, and support is provided to students through a variety of prelearning and briefing activities and through varying levels of facilitator support during the simulation activity. Levels of complexity and problem-solving requirements tended to increase as students progressed through their programs. Not all schools taught students clinical reasoning, and only a quarter of those that did so used a formalized model or clinical reasoning framework. The majority of participating schools provided postsimulation debriefing and appropriate strategies such as reflection and evaluation against best practice criteria.

True fidelity in simulation is subjective and exists “in the eye of the beholder” (Lampotang, 2008) and is thus difficult to gauge from a questionnaire. Achieving fidelity is dependent not only on the type of HPSMs but also the realism of the environment provided, the clinical authenticity of the scenario, and the skill of the person conducting the simulation and responding to students. Although less than half of the participants were using high-fidelity HPSMs at the time of the survey, a range of equipment, moulage, and scenario designs were being employed to achieve a degree of clinical realism.

High-fidelity simulation is a relatively new technology in nursing education. Research has yet to adequately demonstrate its impact on the development of students’ clinical reasoning (Lapkin, 2009) and whether skills and confidence gained in simulation laboratories transfer to improved clinical practice (Leigh, 2008). Further research is needed to guide nurse educators in the choice of the most appropriate teaching strategies and also to validate the current use of simulation as a form of competency assessment (Jeffries, 2007).

The incorporation of ICT into clinical laboratories and its use as part of a simulation scenario was reported to be poorly developed. Most clinical laboratories provided some computer facilities and often access to intranet or Internet capabilities. However, there was limited use of ICT to simulate point-of-care clinical systems and prepare students for the use of ICT in the clinical environment. There is scope for considerable development of technology and also integration into curriculum development to provide students with opportunities to access simulated electronic diagnostic reports and health records, as well as best practice literature and guidelines, and to use them to plan, deliver, and document at the point of care, (i.e., at the bedside) in simulated environments (Curran, Sheets, Kirkpatrick, & Bauldoff, 2007; Fauchald, 2008).

The main strengths of this study are its high response rates, scope, and evaluation of pedagogical principles used during simulation sessions. All university schools of nursing in Australia were invited to participate, and the response rate was 75%. Questions covered a broad range of issues, and responses provided a snapshot of the current use of HPSMs and ICT in Australia. Limitations and weaknesses of this study are those common to the survey methodology. Information gathered is limited to the questions asked and the accuracy of the information given. Only one person completed the survey for each institution, which may have limited access to information, although every effort was made to direct the survey to the most suitable person.

Conclusion

There is currently much discussion in Australia regarding the potential for simulation to replace some required clinical placement hours. Simulation is recognized as a partial replacement for clinical placement hours in many parts of the United States (Nehring & Lashley, 2004). In the United Kingdom, following recommendations from the Nursing and Midwifery Council (2007) Simulation and Practice Learning project, up to 300 clinical placement hours can be replaced with simulation (McCallum, 2006; Nursing and Midwifery Council, 2007). The increase in student numbers and the decrease in availability of quality clinical placements in Australia provide a strong argument for the replacement of some clinical placement hours with simulation activities. However, the current variations in levels and methods of simulation and ICT activities employed at different nursing schools contribute to the difficulty in clearly articulating registration body requirements. Nationalization of nurse registration in 2010 presents an opportunity for these issues to be explored further. Australian schools of nursing need to ensure that the
Acknowledgments

Support for this study has been provided by the Australian Learning and Teaching Council Ltd (ALTC), an initiative of the Australian Government Department of Education, Employment and Workplace Relations. The views expressed in this article do not necessarily reflect the views of the ALTC. The authors also wish to acknowledge the support of the ALTC project team and project reference group.

References


