Research Article

Are laboratories useful fiction? A comparison of Norwegian and Australian undergraduate nursing skills laboratories

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Abstract
Drawing on the findings from studies in Australia and Norway that explored the use of laboratories in the preparation of nursing students for entry to practice, this article identifies the pedagogical challenges for the undergraduate education of nurses. The findings from both countries are compared and, in spite of distinct differences in the level of financial investment, there are striking similarities between the ways in which laboratories are used in the two countries. The laboratories were designed to predominately represent acute care hospital environments. The participants demonstrated a high level of commitment and strongly held beliefs in the laboratory as a safe place to facilitate self-paced learning and as an environment where students can practice until they become competent and confident. However, at the same time, there was a striking lack of evidence to support these views. The participants in both countries reported a common approach to instruction: a process of teacher demonstration, followed by student repetition and practice. Variability in students’ motivation also was reported and the participants especially expressed concern for those students with a low level of interest in the basic skills associated with personal care. The possibilities and limitations of using skill laboratories as part of the practical preparation for nursing are discussed, using the metaphor of laboratories as “fiction”.

Key words case study, Australia, Norway, nurse education, pedagogy, skill laboratories.

INTRODUCTION

A critical factor in achieving a competent and responsive nursing workforce is the quality and effectiveness of the undergraduate preparation for entry into the profession. Clinical preparation for practice is a vital part of undergraduate education in nursing. A number of recent reports (Norwegian Ministry of Education, 1999; UKCC, 1999; Heath, 2002) acknowledge the essential importance of the clinical training of nurses, as well as other health professionals, within a context of decreasing access to meaningful workplace experience for students. The decreased availability of experience in clinical settings has led to a growing interest in skill laboratories as part of students’ practical preparation. However, there is little consensus or empirical evidence to guide teaching and learning in laboratories (Wellard et al., 2007; 2009).

This article explores the use of laboratories to simulate the aspects of clinical learning identified through comparisons of our recent work (Wellard et al., 2007; 2009) in both Australia and Norway. By highlighting distinctive aspects of current pedagogical practices in laboratories and their potential impact on student learning, possible directions for the enhancement of student preparation for entry into practice are discussed.

Background
A central pedagogical problem in the education of professional nurses is that students not only need to learn specific disciplinary knowledge, they also need to learn how to use their understanding of that knowledge to engage in practice. Nurses, like other health professionals, cannot simply rely on algorithms to guide practice. Rather, they need to exercise judgment within practical contexts in which there are considerable uncertainty and constant change. Although there is a broad acceptance that the education of health professionals is difficult, there remains little consensus on the pedagogies that can effectively support the preparation of nurses for their professional roles. Nurse education also has been confounded by competing political agendas (Heath, 2002). Prospective employers seek graduates who are “work ready” (Chang & Daly, 2007), yet simultaneously there is reduced public investment in educational infrastructure (Mecrabeau, 2006). The global shortage of health-care professionals has
led governments to provide high levels of financial support to recruit, train, and retain the medical workforce, but the same scale of investment has not occurred for the nursing workforce (Farrell et al., 2002).

Preparation for entry to practice is important and must include clinical skill development, but the question remains as to how that development is best accomplished. Although there is a substantial amount of literature that discusses when and where clinical preparation should take place (Bjork, 1999; Hilton & Pollard, 2004; Su, 2005), there remains little consensus or evidence of which pedagogical approaches can facilitate the development of students’ nursing knowledge and transfer of that knowledge to clinical practice. The financial costs associated with clinical preparation are high, whichever form that preparation takes. The literature is scant on what proportion of preregistration programs emphasize clinical skill development, although the minimum levels of practicum are specified in most countries by registering authorities. The practicum has been clearly identified as a key aspect of preparation, but access to suitable clinical environments is increasingly limited.

There is an embedded assumption in most of the relevant literature that skill laboratories or practice classrooms are an important component in clinical skill preparation (Godden & Forsyth, 2000; Scott, 2001; Hilton & Pollard, 2004). These on-campus facilities aim to simulate health-care settings and allow students to rehearse clinical skills, surrounded by the artifacts of clinical environments. There is an increasing emphasis on simulation to support clinical learning, particularly in medical education (Bradley & Postlethwaite, 2003; Maran & Glavin, 2003) and interprofessional learning (Ker et al., 2003). Contemporary simulation can range from low to high technological techniques (Alinier, 2007), but a predominant emphasis in recent publications about clinical skill development focuses on intermediate-to-high fidelity patient simulation (e.g. Jeffries, 2000; Jeffries et al., 2003). There is evidence of the effectiveness of technological simulation techniques (Alinier, 2003; Peteani, 2004), but this predominantly relates to its use in undergraduate medical education and professional development for registered health practitioners. There is less evidence of how simulation can be used with best effect in preregistration education, nor how the difficulties of high-fidelity simulation can be addressed. These difficulties include a need for small student groups, faculty member training, specialist physical settings, technological support, and a continual investment in upgrades to keep pace with both technological and clinical innovation (Alinier, 2007).

The exploration of teaching and learning in laboratories also requires theoretical considerations about learning. Sfard (1998) presented an overview of the competing trends in conceptualizing learning and argued that the use of metaphors assists in understanding competing theoretical approaches to learning. The two metaphors for learning that she introduced are the “acquisition” metaphor and the “participation” metaphor. Learning is typically conceived as the acquisition and accumulation of knowledge and skills. The concept of teaching and learning as acquisition is so strongly entrenched that we would probably not be aware of its existence if it were not for the participation metaphor that became apparent in the 1990s. The metaphor of acquisition implies an end point to the learning process, while the participation metaphor implies that learning activities are ongoing and never can be considered separately from the context within which they take place. The learning context is “. . . rich and multifarious, and its importance is pronounced by talk about situatedness, contextuality, cultural embeddedness, and social mediation” (Sfard, 1998: 6). The participation-oriented understanding of learning has become preferred to the acquisition-oriented ways of learning, which are now considered to be outdated. However, Sfard argued that these two basic metaphors for learning should be combined because each of them has something to offer that the other cannot provide. Therefore, researchers and teachers should try to use both metaphors. Inspired by these two metaphors, we explore both the construction of undergraduate nursing laboratories as the context for participation in learning, as well as the acquisition of skills and knowledge occurring within this context.

Given the current challenges in the preparation of nurses for practice and the rise in interest in laboratory teaching and learning, we investigated the current practices in both Norway and Australia. The overall aim of our research was to explore the ways in which clinical laboratories are constructed in undergraduate nursing preregistration degrees. The specific objectives included the identification of the scope and foci of laboratories, the pedagogical approaches used in laboratories, and the relationships between clinical learning and the theoretical components of the programs.

METHODS

The article reports on the findings drawn from two related studies that used a collective case study design (Stake, 1995; 2006; Yin, 2009) in order to explore clinical laboratory teaching and learning in undergraduate nursing degrees in Australia and Norway; they have been reported in detail separately (Wellard et al., 2007; 2009). Ethical approval from the Human Research Ethics Committee at University of Ballarat, Ballarat, Australia, was obtained for each study and measures to protect privacy and to maintain confidentiality were put in place. In each country, nursing faculty members were invited to contribute to the study after consent was obtained from the Head of their school of nursing and the data were collected through group and individual interviews, a review of curriculum documentation, and viewing the facilities on site visits.

Eight schools of nursing participated in Australia and two schools of nursing participated in Norway. Triangulation of the data sources was used in both countries, using observation, document review, and group and individual interviews. The data that were produced through discussions with faculty members focused on the main aim of the case studies; namely, how and why laboratories are used in the undergraduate preparation of students. The participants were asked about the range and foci of laboratory sessions used in the Bachelor of Nursing program, their perception of the strengths of the particular laboratory program, and any
barriers they perceived in delivering an optimal laboratory program. Documents were used, as recommended by Yin and Davis (2006), to corroborate and augment the information from the interviews. Curriculum documentation was reviewed and the researchers studied a sample of textbooks from the student reading lists. Observation of the laboratories, both before and during teaching sessions, provided a further source of data about how the laboratories were used.

The interviews were audio-taped with the permission of the participants and were later transcribed to facilitate analysis. In the Norwegian study, both English and Norwegian were spoken during the field work, with the Norwegian investigator translating the parts of the discussions where the participants found it difficult to express their ideas in English. A cross-case analysis (Stake, 2006) was conducted to compare the findings from the individual studies undertaken in each country. At the individual country level and in the cross-case comparison, the analysis of the data was thematic and involved each of the investigators identifying their own schema of themes through reading the field notes and listening to the audiotapes. Subsequently, the findings were shared and similarities and differences in the analyses were noted (Kvale & Brinkmann, 2009). Any area of disagreement required a re-examination of the data as a team and further discussion until agreement on the analysis was reached.

**FINDINGS**

The education systems in Norway and Australia differ, but there are considerable similarities as both countries prepare nurses for registration via 3 year degree programs. In undertaking the two research studies, we noted some differences in the ways that laboratories are used in preregistration programs, but more striking was the number of similarities and challenges for the future of preparation for nursing practice.

**What was different?**

An immediate and visible difference between the Norwegian and Australian settings was the higher level of financial support available in Norway to support laboratory learning, which was initially visible in the relatively recent capital investment in purpose-built laboratories. These spaces contained more current hospital equipment than their Australian counterparts and were a more accurate facsimile of the contemporary ward environments of Norwegian hospitals. For example, each of the Norwegian laboratories had a dedicated medication room that contained a large range of oral and injectable medications in appropriate packaging and that were stored similarly to current clinical settings. In the Australian laboratories, in contrast, faculty members reported significant barriers to producing accurate simulation due to the constraints placed on them by occupational health and safety regulations, which in many settings had resulted in the prohibition of taking blood samples, including self-administered blood glucose testing. The use of facsimile medications and oxygen also were noted as problematic. The participants reported that the potential risks of harm to the students were assessed as greater than the benefits for student learning.

The Norwegian schools of nursing also had greater access to online computer-based resources in the laboratories. This facilitated easy access by the students to *Praktiske Prosedyrer Sykepleietjenesten* or “Practical Nursing Procedures” (PPS) (Akrebe Publishing House, 2008), a commercially published online database of documented and quality-assured skills in nursing that was adopted for use in Norwegian schools of nursing in 2006. The Norwegian participants reported that the introduction of PPS has assisted students to be better prepared for laboratory sessions and that students are encouraged to access PPS online for clarification during laboratory class time.

**Striking similarities and challenges**

In spite of considerable differences noted in resource allocation and facilities between the two countries, there were striking similarities in the teaching and learning approaches of the laboratories in Norway and Australia.

Faculty members in both countries demonstrated a high level of commitment to laboratory learning and described strongly held beliefs in clinical laboratories as highly valuable in preparing students for entry into practice. However, the faculty members in both countries were unable to offer support for their approach to teaching and learning, other than to offer their own personal experiences and the traditions established in their institution. Evaluations of the pedagogical strategies employed in laboratory learning were limited to student feedback through student satisfaction surveys at the end of the semester. These were frequently part of an integrated evaluation of classroom and laboratory experiences, rather than specific to laboratory learning.

The participants in both countries recounted a common approach to laboratory instruction, which is based on the assumption that laboratories provide a “safe” place for students to practice. Laboratory learning is structured on a process of teacher demonstration, followed by student repetition and practice until the students become confident and “competent”. The faculty members reported that, ideally, this facilitates self-paced learning. The students were encouraged to use laboratories in their own time to assist their learning; however, it was reported that the students in both countries infrequently took advantage of this opportunity. Additional teaching strategies included case-based scenarios and the use of skill challenges and tests.

The laboratories in both countries were designed to predominately represent acute care hospital environments, with an emphasis on creating familiarity with the type of equipment likely to be encountered in practice. There was a range of fidelity in the simulations used, although the majority of laboratory learning used low-fidelity techniques. Only one of the schools in Norway had a patient simulator (SimMan; Laerdal, Stavanger, Norway) at the time of the data collection. Several of the Australian sites were anticipating the introduction of similar simulation mannequins in the near future. The use of actors as “standardized patients” was minimal, with several Australian participants reporting that the cost of hiring actors was prohibitive and resulted in the abandonment of their use. These limitations in the levels of...
The focus of laboratory learning in both countries was procedural. The participants at all the sites relayed a consensus among the staff members who taught in the laboratories about the range of procedures that the students needed to know prior to clinical placement and in particular year levels. Some schools attempted to sequence the laboratory sessions to follow related theoretical classes and they were partially successful. However, most of the participants reported difficulty in achieving a high level of sequencing due to constraints in timetabling and resources. The two Norwegian schools had developed different approaches to sequencing. The first school only offered its laboratory learning program in the first and third semesters of the six-semester program and required that the students pass a clinical skill test before they could progress in the program. The second school had developed a level of integration with the clinical practicum that the students undertook, requiring them to return to campus during the clinical practicum to update and extend their skills.

The participants in both countries reported that the variability of students’ preparation and engagement in the laboratory learning program was a major challenge. The students’ level of motivation for learning the basic skills associated with personal care was low, but as they progressed to more technologically challenging tasks, their motivation increased. The students also were reported as less motivated to undertake prereading about the procedure; they wanted to practice procedures either on each other or on a mannequin. Although this eagerness to practice was seen among the teachers as positive, it was acknowledged as a problem for motivating students to engage in deeper learning of the knowledge embedded in the skills.

**DISCUSSION**

The findings from a comparison of the ways that undergraduate nursing skill laboratories are constructed and used in Australia and Norway highlight the characteristics of nursing skill laboratories. There are distinct differences concerning the level of financial investment, the operation of occupational health and safety rules, and the ways of organizing teaching and learning. These differences are assumed to be related to complex cultural and historical factors concerning nurse education as part of the higher educational system. A further analysis of these factors is outside the scope of this article.

The similarities of the findings, in spite of distinct differences, are striking. In both countries, an inspiring engagement among teachers and a strong belief in the usefulness of laboratory teaching and learning was found. Yet, there was an obvious lack of evidence to support their belief and the teachers’ practice was based mainly on tradition and their own experiences or what might be called a “personal curriculum”. This is similar to the findings in a study of clinical teachers in Australia that reported their teaching practice as guided by a “personal” or “private” curriculum (McKenna, 2004). McKenna distinguished her findings from Philip Jackson’s (1968) famous expression, “hidden curriculum”, because the personal curricula were openly held, rather than hidden. There was unity in the views that were expressed by the teachers across both countries, suggesting strong collective aspects in personal curriculum. The teachers had a common understanding of why laboratories were useful and how nursing skills should be taught in them. Although there was a lack of evidence, there was also ignorance about how the faculty members’ personal curriculum related (or not) to the official curriculum of the Bachelor of Nursing degree.

**Laboratories as construction**

In addition to strong teacher engagement and personal curricula, other questions emerged from this research about the construction and use of laboratories. The participants in both countries reported experiencing limitations when teaching in the laboratories because of the use of “unreal” patients, while acknowledging that practicing on “fake” patients offered students a safe environment in which they could fail without dangerous consequences. Laboratories are constructions and, in both the Australian and Norwegian cases studied, were replicas of hospital ward settings or, as expressed by Gough (1998), “fiction”. Gough argued that high school science laboratories are “dangerous fictions” that misrepresent science practices through stereotyped and decontextualized rituals and where teachers exert control over which views of science are privileged. Gough’s approach to theorizing high school science laboratories as “theatres of representation” is equally applicable to the nursing skill laboratories represented in these case studies. Laboratories cannot replace the “real” world of practice but, equally, representing them as key in learning the skills of practice is problematic if they provide a stereotyped view of nursing and minimize complexity.

The two metaphors (acquisition and participation) for learning, introduced by Sfard (1998), and the danger in choosing only one of them addresses the importance of integrating the context where teaching and learning are taking place with what is learned. A laboratory will never be equivalent to a fellowship of nurses, health personnel, and patients. The embeddedness and social mediation is different in a laboratory with student nurses and teachers as actors. This is not to argue against the use of laboratories, but to acknowledge that laboratories are markedly different from clinical settings and the value of learning is strictly related to the context.

Gough’s (1998) argument, that laboratories minimize complexity, together with Sfard’s (1998) metaphors for learning, reinforces the importance of participation for learning. Laboratories, as described by the participants in this research, are helpful for acquisition to a limited extent. Laboratories can provide some basic instruction and familiarization with
psychomotor techniques; for example, learning how to hold a syringe, what it looks like, and how to give an injection to a practice device. However, there is a significant difference between giving a practice device an injection and giving a patient an injection. What you cannot learn in the laboratory is the complexity associated with injections in an older fragile man (e.g. poor skin integrity, limited musculature). Nursing skills are not merely technical, they are situated and relational. By linking the complexity argument with the participation metaphor for learning, it becomes apparent that learning in laboratories is limited and the importance of learning in the complexity of the “real” world becomes central. There are two elements that are important in the learning that arises from participation in complex learning situations: engaging in the learning to differentiate between different patient contexts and learning to participate in the fellowship of nurses.

Privileging practical skills and hospital practice

The dominance of teaching and learning practical skills was a significant finding in the case studies. Generally, the amount of time spent in laboratories was reported as dominated by teacher activity. The teachers reviewed the relevant contextual information, demonstrated skills, and provided the opportunity for students to practice the same skill themselves. The participants gave a clear impression that laboratories were especially suitable for practicing skills and to develop dexterity. However, the teachers’ discussion about how to undertake specific practices dominated the amount of time allocated and then the students tried to copy the instructions. There was a mechanistic approach to teaching and learning evident in the teachers’ accounts. The dominance of this approach to teaching in laboratories raises the question of whether other pedagogical strategies also could be used in laboratories.

Every example that was used by the teachers in both countries related to laboratories as facsimiles of hospitals. There are a few reports of nursing undergraduate communication skill laboratories for developing students’ skill in working with people with mental health problems (Edward et al., 2007). None of the schools studied used these types of laboratories and the literature also seems to be dominated by the hospital as the model for undergraduate nurse education; hence, laboratory teaching and learning reinforces an acute care approach to nursing, with a focus on medicalized treatment. There is a shortage of nurses in home care, community-based care, and rural care; thus, a legitimate question is whether or not laboratories undermine students’ motivation for and competence to work in areas outside hospitals. Nursing as a discipline has proven and argued how nurses can contribute to the well-being of persons who are in need of support, treatment, and care. Nursing has argued its close relationship with medicine, but also, its independent role in the health-care system. One might ask whether the hospital, as a model for laboratory learning, is best suited to the learning needs of preregistration nursing students.

CONCLUSION: SWIMMING WITHOUT WATER?

In describing and comparing pedagogical practices in skill laboratories in both Australia and Norway, striking similarities in the ways that laboratory teaching and learning are practiced and argued for were identified. The similarities have inspired us to question aspects of teaching practice and the ways in which laboratories are used in undergraduate nurse education.

There is a need to review the role that laboratories can play in the development of students for entry into practice. The comparison of the findings from Australia and Norway revealed that faculty members had a high degree of motivation and trust in the contribution that laboratories have in developing students, but these same faculty members had a lack of evidence to support their pedagogical approach. The personal curricula of the faculty members were clearly influential in how the laboratories were constructed in the various schools of nursing in the studies. Also, there was an overemphasis on hospital practice, whereas other spheres of practice were seldom represented in the laboratories.

Drawing on the work of Gough (1998) and Sfard (1998), the dangers of reducing complexity in learning and the need for participation in learning are identified as critical to developing nurses for practice. Arguably, the need for participation with real patients and participation in the fellowship of nurses must be linked to the learning that is staged in laboratories. The fellowship of nurses is vastly different from a fellowship of students, where expertise and culture influence the ways that nurses practice.

Laboratories are important and, within the limited “real” world resources available, will remain a key tool in the learning experiences of undergraduate nurses. What is needed, however, is the development of pedagogical strategies that are mindful of these limitations. There is a need for research on how to link teaching and learning in the lecture theatres with skill laboratories and clinical sites. These three separated, but inter-related, classrooms need to be seen as a whole and the transfer of knowledge between these three areas needs to be researched. There is a lack of knowledge about how students can benefit from gaining knowledge as they move between these three different areas for preparation to become nurses.

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