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Featured Article

Transfer of Learning From University-Based Simulation Experiences to Nursing Students' Future Clinical Practice: An Exploratory Study

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KEYWORDS

simulation;
transfer;
nursing student;
graduate nurse;
patient outcomes

Abstract

Background: Despite increasing use of simulation in nursing education, there is limited understanding of how simulation experiences influence students' future practice. The aim of this study was to explore recently graduated registered nurses' perceptions of how their learning from undergraduate university-based simulation experiences informed their current practice and the factors that facilitated or inhibited this transfer of learning.

Methods: The study used an exploratory design framed by a qualitative descriptive methodology. Six nurses who had completed 3 to 12 months of clinical practice after graduation participated in semi-structured interviews which were thematically analysed.

Results: The importance of accepting responsibility, interprofessional communication, leadership skills, and promoting patient safety emerged as recurring themes.

Conclusions: This study provided new insights into the transfer of learning from university-based simulation experiences to students' practice after graduation. Further research with other groups of learners and larger sample sizes will be valuable in taking this work forward.

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Simulation-based learning (SBL) has become a ubiquitous teaching approach in many Bachelor of Nursing (BN) programs. One of the main aims of SBL is to prepare students for professional practice and, ultimately, to positively impact

patient outcomes. However, despite a body of research attesting to the effectiveness of SBL for enhancing students' technical and nontechnical skills (Lapkin, Levett-Jones, Bellchambers, & Fernandez, 2010), there is limited evidence of transfer of these skills to students' clinical practice after graduation (Maginnis & Croxon, 2010; Seaton, Levett-Jones, Cant, Cooper, Kelly, et al., 2019). Although it is reasonable to assume that skill transfer does occur, further evidence supporting this assumption is required.

The study outlined in this article sought to explore the perceptions of registered nurses to identify how the technical and nontechnical skills they acquired in undergraduate SBL sessions influenced their current clinical practice.

Background

BN programs are designed to equip undergraduate students with the skills, knowledge, and professional attributes they will require to practice safely and competently as registered

nurses. To this end, there has been an exponential increase in the use of SBL over the last decade, driven by both the need to improve the quality and safety of health care and by the recognition of the limitations of clinical placements (Hayden, Smiley, Alexander, Kardong-Edgren, & Jeffries, 2014; Seaton et al., 2019).

Ideally clinical placements should provide opportunities for the development of students' technical and nontechnical skills within authentic settings (Berragan, 2011). However, the often unpredictable and dynamic nature of clinical environments, along with increased patient acuity and decreased numbers of registered nurses, can negatively impact student learning and result in missed opportunities to consolidate skills and knowledge (Fisher & King, 2013). In addition, in many countries, student numbers have increased while at the same time the availability of clinical placements has declined (Seaton et al., 2019). Thus, SBL has increasingly been viewed as a solution to overcome the impasse between reduced clinical placement capacity and the ethical mandate to provide authentic learning experiences for BN students. Consequently, SBL is being used to augment, and in some contexts, even replace, a component of students' clinical placement hours (Hayden et al., 2014).

SBL sessions are designed to provide immersive learning experiences that expose students to unfolding "real-life" clinical situations within a safe environment (Gabba, 2004). Over the last decade, simulation modalities have increased in sophistication (Fisher & King, 2013; Ross, 2012) and expanded to include not only manikins and standardised patients but also a wide range of creative approaches such as Mask Ed (McAllister, Reid Searl, & Davis, 2013b), simulated wards (McAllister, Levett-Jones, et al., 2013a), 3D simulations (Everson et al., 2015), point-of-view empathy simulations (Levett-Jones, Lapkin, Govind, Pich, Hoffman, et al., 2017), and serious games (Clarke, Andersen, & Loth, 2017), to name just a few. SBL offers opportunities to clarify queries (Palominos Letelier, Levett-Jones, Power, & Martinez-Maldonado, 2019) and undertake repetitious practice (Longworth, 2013), within safe and controlled environments. The degree of situational and psychological fidelity in simulations can have a profound impact on students, evoking emotional responses similar to those experienced in clinical settings (Brady, Bogossian, & Gibbons, 2015).

Although there has been significant growth in the use of SBL, most research has focused on the "low-hanging fruit" of learner satisfaction, attitudes, confidence, and knowledge acquisition (Adamsom, Kardon-Edgren & Willhaus, 2012). Few studies have explored issues such as transfer to practice or behavioural change (Seaton et al., 2019). In addition, although some studies have examined the transferability of skills from simulation to clinical practice (e.g., Kirkman, 2013; Lasater, Johnson, Ravert, & Rink, 2014; Meyer et al., 2014), the focus has not been on the transfer of technical and nontechnical skills from undergraduate university-based SBL sessions to the student's future clinical practice. Thus, there is a need for an in-depth exploration of how SBL influences practice after graduation.

Aim of the Study

The aim of the study outlined in this article was to explore recently graduated registered nurses' perceptions of how their learning from undergraduate university-based simulation experiences informed their current practice and the factors that facilitated or inhibited this transfer of learning.

Research Design

An exploratory research design offered the "blueprint" for the study. Because little research had been undertaken in this area, a qualitative descriptive methodology was considered appropriate to frame the study (Merriam, 2009). As a small naturalistic enquiry, the purpose of the research was to elicit participants' insights and perceptions with data that were rich and thick in detail (Berg & Lune, 2012).

Key Points

- Learning from university-based simulation experiences is transferable to new graduate nurses' future clinical practice.
- Examples of the types of skills transferred from simulations to clinical practice include patient assessment, recognition and management of the deteriorating patient, interprofessional communication, critical thinking, and assertiveness.
- The frequency of exposure to simulation experiences may influence transfer to practice.

Theoretical Framework

The framework that informed this study was the Ellis' (1965) transfer of learning theory, whereby transfer is described as the application of skills and knowledge learned in one situation to another situation or when the effects of previous learning influence the performance of a later activity.

Ethical Considerations

After ethics approval and before signing the consent form, potential participants were provided with an information statement. Confidentiality was maintained throughout the study, and pseudonyms were used to ensure participant anonymity. Data collection was undertaken in 2015 and 2016.

Participant Recruitment

The study was advertised by nurse educators who were not involved in the study, and participants were recruited using a "passive" snowballing method (Merriam, 2009). Graduates from BN programs who had at least three months and no more than 12 months of clinical experience as a registered nurse were invited to participate in the study. Potential participants were advised to contact the researcher by email if they wished to participate in the study.

Data Collection

For consistency, one researcher conducted the in-depth interviews. Questions were predetermined, open-ended, and exploratory. This questioning style sought to encourage

participants to lead the conversation as they described their experiences, thoughts, perspectives, and reactions (Anderson, 2010). Interviews were audio-recorded and transcribed verbatim by the researcher, thus enhancing the dependability and credibility of the analysis (Berg & Lune, 2012).

Data Analysis

Thematic analysis of the narrative data explored experiences through the lens of the participants (Berg & Lune, 2012). This approach seeks to identify trends and narrative patterns to develop themes. The researchers sought to understand the social reality as perceived by the participants by immersion and submersion in the data and comprehending, synthesising, theorising, and reconstructing identified themes (Anderson, 2010). After printing the transcripts of each interview, themes were inductively identified, coded, and collated by two of the authors. As emergent ideas and inferences were discovered, they were discussed and audited against interview data to substantiate accurate representations of the participants' narratives (Merriam, 2009).

Findings

Six registered nurses who had recently graduated from BN programs in three Australian universities participated in the study; all were female, and their ages ranged from 22 to 40 years. The participants had undertaken their last simulation as a BN student 12 to 15 months before the study and they were employed in by one semimetropolitan health care service. Participants had an average of seven months' clinical experience as a registered nurse across a variety of general and specialist medical, surgical, mental health disciplines.

Table Interview Questions and Emergent Themes

Interview Question	Emergent Themes
1. What did you learn from your undergraduate simulation experiences that you have been able to apply in your current clinical practice?	Accepting responsibility ... <i>'Stepping up as a professional.'</i> The importance of communication ... <i>'It's just so obvious I suppose.'</i> Confidence in leading others ... <i>'I had to take the reins.'</i> Critical thinking ... <i>'Oh! Ok I get it.'</i>
2. Can you tell me about any clinical situations where you have been able to apply what you learned from the simulations to your current practice as a registered nurse?	Patient safety ... <i>'Avoiding catastrophe'</i>
3. What factors enhanced your ability to apply your learning from simulations to your current clinical practice?	A safe learning experience ... <i>'It was ok to make silly mistakes!'</i>
4. What factors have limited your ability to apply your learning from simulations to your current clinical practice?	Overconfidence ... <i>'Thinking I know.'</i> Knowledge and skill degradation ... <i>'A distant memory.'</i>

In response to the four questions asked of the participants, eight key themes emerged (see [Table](#)).

Interview Question 1: What did you learn from your undergraduate simulation experiences that you have been able to apply in your current clinical practice?

Accepting responsibility ... “Stepping up as a professional”

The participants provided unique insights into how their undergraduate SBL experiences helped them prepare for their future practice by allowing them to assume independent responsibility for patient care, make decisions in response to complex and challenging scenarios, and begin to imagine themselves in the role of a registered nurse:

In simulations you had to learn to deal with the unknown and step up as a professional. You never knew what you were going to get ... and there was no one to show you what to do. You had to go into the simulation and just say, “Okay I can do this!” (Mel)

We didn’t have a senior staff member [in the simulation], so one of us had to make the decision, back it up and hope for the best. (Tina)

If you just jumped into the actual clinical environment ‘cold turkey’ you’d go “what am I doing?”. So, getting accustomed to all the noises and alarms going all at once was a valuable part of the sim. It was good to be able to then confabulate the experience a bit further and really picture yourself [as a registered nurse] in the clinical setting. (Kim)

The importance of communication ... “It’s just so obvious I suppose”

Many of the participants described how the communication skills learned in SBL were relevant to their current practice:

The whole communication thing has been a huge skill that I learnt from simulation ... you don’t realise at the time what a massive skill that’s going to be for you in the future. (Tina)

The thing that came up all the time in simulation was the importance of communication ... now it’s just so obvious I suppose. (Lisa)

SBL provided a number of opportunities to identify how poor clinical communication increases the risk of adverse events and the importance of this nontechnical skill for safe clinical practice:

You’re put on the spot and you can see how important communication is so that mistakes don’t happen or so everyone’s on the same page and doing the same thing. (Lisa)

Learning communication skills in the simulations and how to approach doctors properly means that now I find it easier to question a particular order, or ask, “do we need to do this?” (Tina)

The use of communication tools such as ISBAR (Identify, Situation, Background, Assessment and Recommendation) during simulation highlighted the benefits of a systematic approach to communication in relaying key clinical information to other members of the health care team:

I the simulation I remember calling the ‘doctor’ [the educator on the phone], trying to use ISBAR. He said “go and do this and then call me back”. I learned that you need to make sure you have all the information before you call them.” (Mel)

Although some of the participants described having to collaborate and communicate with different students in simulations as challenging and stressful, they nevertheless could identify parallels with their future practice:

Communicating with someone that you didn’t know and didn’t know their level of skill made it really difficult. You just get chucked in there and you’re under pressure ... I think that was the aim though as that is what you get in real life practice. (Meg)

Confidence in leading others ... “I had to take the reins”

A recurring theme was the enhanced confidence and leadership skills participants gained from SBL. A number described how their initial fears and apprehension gave way to courage, particularly when they had to speak up for patient safety.

I knew going into the simulation that I had to take the reins to some degree, and I think that was a big thing for me to be able to stand there and say, “I think this is wrong or I think we need to act now.” (Tina)

I definitely was able to, through simulation, identify early on that I felt comfortable leading groups and directing tasks and activities. (Kim)

The SBL experiences caused some participants to reflect on the importance of leadership and the related need to be clinically competent:

I wondered if those taking charge in the simulation were the most clinically competent or was it just because they were in front of an audience. (Lisa)

Critical thinking ... “Oh! ok I get it.”

Many of the participants described how the simulations they had been involved in as an undergraduate student enhanced their critical thinking skills, particularly when undertaking patient assessments:

Doing the head-to-toe assessment in the simulation, I was focused on the heart and I remember one of the doctor's questions was "do they have any leg oedema"? I hadn't even looked at the patient's legs because I was focused on the heart ... I'm thinking oxygen, blood pressure, heart rate ... I didn't think about fluid overload and how that's going to affect the legs and that it is a clinical sign that there could be heart failure. (Tina)

A number of the participants recalled learning about practical application of the "clinical reasoning cycle" and were often genuinely surprised when they bridged the theory-practice gap:

Until the educator was going through it in the debrief, we didn't realise that we had actually applied the clinical reasoning cycle during the simulation ... it was like "I can do it!" (Meg)

The educator said we had actually achieved every step of the clinical reasoning cycle just by doing what we normally do, so that was one of those times when I realised Oh! Ok I get this" (Chloe)

Interview Question 2: Can you tell me about any clinical situations where you have been able to apply what you learned from the simulations to your current practice as a registered nurse?

Patient safety ... "Avoiding catastrophe"

Many of the participants recalled key lessons from their SBL experiences, especially when their memory was triggered by situations or circumstances encountered in professional practice. They frequently commented on how the simulations had allowed them to make sense of a complex situation in their current practice by "piecing things together":

It was exciting because I was able to go "My God it's 'Cyril' [a simulated patient] all over again' ... I know what's going on". I was able to speak to the doctor, and say "Yes, this is fluid overload". It's nice when you can piece things together. I can now see how the simulations relate to real life ... this stuff does happen. In effect simulation can help to save a life because it allows you to pick up the clues and escalate care. (Mel)

Cyril's burnt into my mind. I will never forget 'Cyril' [a simulated patient]. I often think now when somebody is dehydrated or appears overhydrated, what's happening with the electrolytes? Particularly on the surgical ward when we give all the bowel preps, I'm thinking of 'Cyril', thinking we nearly killed him in the simulation because we gave him all the bowel prep, dehydrated him, and then

overhydrated him again ... So there's some things I took away from those simulations that will just always be with me. (Tina)

Looking back at the holistic thing, I now think that's so obvious, why didn't I do that in the simulation? So now [in practice] I look at the urine output, the blood pressure, the SAGO chart and see what's trending ... then call the doctor using ISBAR. (Meg)

The participants recounted many experiences where the knowledge and skills gained from their SBL sessions had helped them to recognise and manage critical patient situations:

At work I always make sure that I do all the checks properly... and I found I was quite fluent even just starting my new grad program, because I had done that in simulations. I did come across a transfusion reaction. I felt pretty confident in knowing what I had to do, like stop the transfusion and escalate care. I may not have been so quick to jump in if I hadn't done that simulation. (Chloe)

It's not always about watching the yellow and red spots on your chart, it's about tracking the baseline. The patient doesn't have to go outside the 'flags' for something to be wrong. That's one of the biggest things I've taken from simulation and used in the 'real world' and I know that if I think something is wrong there is a good chance there is. So, I've caught things that could have been catastrophic. (Tina)

Interview Question 3: What factors enhanced your ability to apply your learning from simulations to your current clinical practice?

A safe learning experience ... It was ok to make silly mistakes!

The safe and supportive learning environment that most of the participants encountered in SBL was a key feature that facilitated learning and later transfer to practice. These types of experiences allowed students to ask questions, clarify and correct their practice, and were described as conducive to the development of confidence for future practice:

It was knowing that whatever happened it was confidential, it was going to be safe. (Chloe)

The thing that made me feel comfortable in simulation was knowing that we were all learning and all in the same boat ... so it was ok to make silly mistakes! (Lisa)

The beginning simulations were at a slower pace than in clinical ... that was the best thing. It was not [clicking fingers] ... it was at the pace we needed to learn and think so it was good. (Kim)

It was good being able to have a dummy run ... it's all exposure isn't it? (Mel)

Simulation just gave me the chance to practice and that resulted in building confidence. Those experiences helped me deal with the fear of being responsible for patient care. (Meg)

Interview Question 4: What factors have limited your ability to apply your learning from simulations to your current clinical practice?

Overconfidence ... “Thinking I Know”

Some of the participants described how, on completion of a simulation, they had an inflated level of confidence that sometimes lead to unrealistic perceptions of their abilities and overconfidence when they commenced their new graduate programs:

University simulations may have even created unrealistic ideas in my brain of what I could achieve... I almost had to take a step back this year and slow down ... and remember that I am a new grad nurse. (Kim)

The participants discussed how simulations sometimes caused them to think in concrete ways whereby they found the fluid and dynamic nature of clinical practice confusing and confronting, which hindered their current performance and their confidence:

A patient had a systolic blood pressure of 80 ...I went into a complete panic. The senior nurse was like “yeah, that's alright!” and I'm like “How is this alright? this is not alright! Why is this ok!?” That's when I learnt that not every clinical scenario is textbook. You leave simulation thinking this is what you need to do, and these are your clear cut boundaries. But they were off-putting when I came into the ‘real world’, because you leave simulation thinking you know ... (Tina)

Knowledge and skill degradation ... “A distant memory”

Many participants struggled to recall details of their SBL experiences as considerable time had passed since their last encounter. Some related this to the limited frequency of exposure to simulation:

There were definitely not enough simulations! I think if there had been more, and for longer periods, it would give you a chance to drill it into your head and transfer your learning to practice ... only doing one simulation a semester you just forget. (Chloe)

I wish I could remember more of the simulations, but it was such a long time ago. (Mel)

A lot of my learning from simulation has transferred into the real world, but some of it is a distant memory. (Tina)

Discussion

Improving the quality and safety of health care is the ultimate purpose of simulation (Seaton et al., 2019), with SBL sessions designed to develop the technical and nontechnical skills that are essential for safe clinical practice (Bland, Topping and Tobbell, 2014). However, to date, there is limited empirical evidence and few robust studies that have explored the transfer of learning from university SBL experiences to new graduate nurses' clinical practice and ultimately patient outcomes (Seaton et al., 2019). This is one of the first studies to explore the transfer of skills from university-based SBL to clinical practice after graduation, with most previous research being limited to students' experiences rather than graduates' perceptions (Maginnis & Croxon, 2010).

The findings from this study have shed light on the impact of SBL experiences on newly graduated nurses' clinical performance and the potential for these simulations to impact patient outcomes. The participants' evocative accounts illustrated how SBL can enhance both technical and nontechnical skills, for example, patient assessment, recognition, and management of the deteriorating patient, inter-professional communication, critical thinking, and assertiveness, each of which are critical to safe and effective clinical practice. When SBL experiences had involved potential “harm” to simulated patients, the participants were often able to recall key details, as well as how the experience made them feel both during and after the event. The lessons learned from these experiences appeared to motivate participants and led to a determination to apply their skills in future practice. The participants also described behaviours and attitudes such as attention to detail, noticing, and anticipating changes in the patients' condition, which they attributed to their undergraduate SBL experiences.

For many of the participants, SBL provided a lens through which the world of practice could be viewed from a safe distance. It was a catalyst for learning and a motivation for improved practice. The participants' stories illustrated how they transferred “lessons learnt” from their undergraduate SBL experiences into their practice as a registered nurse, and their accounts also gave insights into the impact of simulation sessions on their evolving professional identity.

Although frequent exposure to SBL was identified by some of the participants as beneficial to their practice, infrequent SBL opportunities seemed to limit their ability to recall the event, and according to the participants, this diminished their ability to transfer their learning to practice. This finding is consistent with previous research identifying

that, over time, knowledge degradation from SBL may occur, which can inhibit transfer of knowledge and skills to practice (Longworth, 2013).

It is important to note that for some of the participants, there was a disconnect between simulations, the diverse and rapidly changing nature of clinical practice, and individual patient needs. Consequently, rigid application of the learning from simulation to the “real world” of practice sometimes caused consternation and confusion and undermined their confidence. For educators, this is an important point and speaks to the need to ensure that participants leave SBL sessions clearly understanding that there is no real “standardised patient,” that each person’s unique needs should drive nurse’s responses, and that learning from simulation must be applied appropriately rather than rigidly (Maginnis and Croxon (2010).

This study has highlighted the impact of undergraduate SBL experiences on students’ future practice as registered nurses and potentially patient outcomes. Arguably, SBL is an essential teaching and learning technique that has the capacity to enhance quality and safety in health care with the full potential yet to be realised (Berragan, 2011). There are unceasing demands for graduates to be able to “hit the ground running” with the technical and nontechnical skills needed to effectively manage in complex and challenging clinical contexts (Hayden et al., 2014; Meyer et al., 2014). The findings from this study, admittedly based on the perspectives of a relatively small sample of graduates, suggest that SBL sessions may be an effective strategy to help achieve this objective.

Limitations

The small purposeful sample in this study, although appropriate for a qualitative naturalistic design, does have some inherent limitations. Thus, the study findings cannot be assumed to be necessarily transferable to other contexts or cohorts. In addition, the findings should be interpreted with a degree of caution as the participants were graduates from three different Australian universities, and it is likely that they had variable frequency and quality of SBL sessions. Further research with other groups of learners, larger sample sizes, and perhaps quantitative approaches, will be valuable in taking this work forward.

Conclusion

SBL remains a prominent approach for preparing nursing students for entry into professional practice. Proponents of simulation continue to advocate for enhanced use of SBL in undergraduate programs often despite, rather than in light of, definitive empirical evidence of effectiveness. This study has provided new insights and encouraging findings into how university-based SBL influences nurses’ clinical practice after graduation.

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