Benefits of providing an acute simulated learning environment to speech pathology students: An exploratory study

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Abstract

Introduction: Technology-enhanced simulation is being increasingly identified as a viable option for developing clinical experience and competency across all allied health disciplines. The need for simulation is being driven by increasing student numbers, reduced client hospital stays and reduced clinical educator availability. However, simulation is rarely used in existing speech pathology programmes in Australia. This study aimed to explore the impact of simulation on speech pathology students' knowledge, experience, confidence and behaviour change when conducting a repeated initial consultation in a simulated acute-care environment.

Methods: Twelve speech pathology students enrolled in the third year of a 4-year undergraduate programme took part in this embedded mixed-methods study. The study comprised two half-day simulated learning workshops, with workshops consisting of participation in one of three clinical scenarios in a simulated acute hospital setting. Students' perceptions of their knowledge, experience and confidence were measured prior to and following the simulated experience, in addition to their actual performance being rated. Outcome measures used in this study included the Participant Perception Indicator (PPI), an observer checklist, the Satisfaction with Simulation Experience Scale (SSES) and qualitative feedback.

Results: Statistically significant increases in students' self-reported levels of knowledge, experience and confidence related to acute-care speech pathology practice were captured using the PPI. Positive behaviour change was recorded through repeated practice of the simulation scenario, and all students reported that the simulated learning experience was highly valued.

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Conclusion: Findings from this pilot study provide important insights into the benefits of simulated learning for speech pathology students, especially within the context of an acute-care setting.

Keywords: acute care; simulated learning; speech pathology; technology-enhanced simulation; allied health.

Introduction

Simulated learning is increasingly being promoted as a viable option in the teaching and learning of students in the health professions (Hill, Davidson, & Theodoros, 2010). The need to explore the use of simulation-based teaching, particularly in hospital-based settings, has been fuelled by increasing student numbers, reduced length of inpatient stay and reduced availability of clinical educators (Blackstock et al., 2013; Briffa & Porter, 2013; Hill et al., 2010; Paskins & Peile, 2010).

Simulation is defined as "a technique to replace or amplify real experience with guided experience, often immersive in nature, that evoke or replicate aspects of the real world in a fully interactive fashion" (Gaba, 2007, p. 126). Simulation may refer to a person, device (e.g., manikin) or set of conditions that attempt to present an educational experience. During simulation, the learner is expected to respond to the experience as they would in the real world. Simulation has been shown to have a number of benefits including: the provision of a safe learning environment (e.g., Issenberg & Scalese, 2007), exposure to a wide range of clinical experiences (e.g., Alinier, 2007) and the allowance for individualised learning experiences (e.g., Issenberg & Scalese, 2007). In addition, simulation provides opportunity for students to gain feedback from multiple sources, including the simulated patients (Becker, Rose, Berg, Park, & Shatzer, 2006) and to repetitively practise clinical skills in a safe learning environment, without risking patient safety (Ziv et al., 2006). Further, when appropriately designed, simulation has been shown to be effective in developing or enhancing students' critical thinking, communication, self-monitoring and decision-making skills (Herge et al., 2013). Hence, there are many benefits to incorporating simulated learning into the pre-professional training of health students.

Despite the benefits of simulation-based learning experiences, until recently (e.g., the national speech pathology simulation project —see Hill et al., 2016), simulation has not been widely used in existing speech pathology programmes in Australia. According to a survey conducted in 2010 across 10 Australian universities offering speech pathology programmes, only four universities reported the use of simulation-based learning experiences within clinical education (MacBean, Theodoros, Davidson, & Hill, 2013). These simulation experiences involved the use of standardised patients, part-task trainers, low-fidelity manikins and environmental simulators. The simulation experiences were valued highly by academic staff, who reported that student involvement in simulated learning led to increased clinical skills, opportunities for interprofessional learning, richer observational experience and additional exposure to specialised areas of speech pathology practice, such as acute-care environments—the latter being of particular relevance to the current study.

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Speech pathology service delivery in the acute-care hospital environment has changed dramatically over the last 20 years, with speech pathologists managing both patients with dysphagia as well as patients with acquired communication disorders (McCooey-O'Halloran, Worrall, & Hickson, 2004). In addition to these areas of practice, speech pathologists working in an acute-care environment require skills, for example, in supporting patients and families during times of crisis, providing information that has an immediate effect on patient care and observing the effects of illness on patient functioning (Johnson & Jacobson, 2007). Given the complex nature of this environment, it is not surprising that speech pathology students may be apprehensive about clinical placements in this setting.

In order to develop competence as a speech pathologist, clinical education programmes in Australia focus on the integration of three underlying attributes: knowledge, skills and confidence (McAllister, Lincoln, Ferguson, & McAllister, 2011). Given that not all students have an opportunity to gain clinical experience and to develop competence within an acute-care setting, further training and support in this specific model of care is required. Therefore, this study aimed to explore the impact of technology-enhanced simulation (i.e., context immersion and manikin-based simulation) on speech pathology students':

1. self-perceptions of knowledge, experience and confidence when interacting in an acute-care setting
2. behaviour when conducting an initial speech pathology consultation in an acute care setting
3. satisfaction with the simulated-learning experience.

Method

Participants

Twelve students enrolled in their third year of a 4-year undergraduate speech pathology programme participated in the study. Participants ranged in age from 19 to 35 years (M = 22.4 years; SD = 4.51 years). All participants were female, reflective of the speech pathology workforce, which is predominately female (HWA, 2014). Only one of the 12 participants reported having prior experience in an acute-care setting (i.e., completed an observational placement in her first year of the speech pathology programme). The researchers in this study were known to the students via large cohort teaching but had not worked individually with the students and had not been directly involved in the students' clinical placements prior to their participation in this research.

Study design

This study used an embedded mixed-methods design, whereby a qualitative strand was embedded into a predominantly quantitative design (Creswell & Plano Clark, 2011). The quantitative design adhered to a single-sample, pre-post research design. A qualitative descriptive design (Sandelowski, 2000) was employed for the qualitative strand.

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Procedure

Ethical clearance for this study was obtained through the University of Queensland's Behavioural and Social Sciences Ethical Review Committee. Participants were invited to take part in this study via a group email to the entire cohort of third-year speech pathology students from an administration officer not involved in the study. The first 12 students who contacted the researchers and agreed to participate were invited to take part in the study. Participation in the study was voluntary, and student performance was not formally assessed, although extensive clinical feedback was provided. Students were advised that they were free to withdraw from the study at any time.

Students agreed to participate in two half-day simulated learning workshops at a collaborative learning centre. Facilities at the collaborative learning centre included tutorial rooms, an open learning area and a dedicated clinical simulation room. The clinical simulation room consisted of a standard hospital bed equipped with monitors, simulated oxygen supply and the usual supplies found on an acute-care hospital ward.

The workshops consisted of participation in one of three speech pathology clinical scenarios in the simulated acute hospital setting. These three cases were:

1. a female patient aged 17 years who had sustained a traumatic brain injury (TBI)
2. a female patient aged 68 years who had experienced a stroke
3. a newborn baby diagnosed with a hearing loss.

In the first two case studies, a Laerdal SimMan 3G was used to simulate the patient (a wireless life-size patient manikin that can breathe with normal and abnormal breath sounds and produce heart sounds, palpable pulses and chest movements). It was connected to a monitor that displayed clinical parameters such as oxygen saturation, pulse rate and blood pressure. These parameters were controlled by a personal computer. Although SimMan is capable of talking with pre-recorded sounds and speech, for the purposes of this study, the research team provided the voice for the patients via microphone and in-built speaker. For the third scenario, an infant manikin was used to simulate a newborn baby, with sound effects used to simulate crying.

The 12 students were divided into six groups of two students. Groups 1, 2 and 3 participated in the workshop for two consecutive mornings, and Groups 4, 5 and 6 participated in the workshop for two consecutive afternoons (i.e., six students participated in the morning workshop, and six students participated in the afternoon workshop). Each group was assigned to one of the three case studies. In addition, students in each group were assigned the role of either the speech pathologist or family member of the patient. The assigned family member roles were: mother of the 17-year-old patient who had sustained a TBI, sister of the patient who had experienced a stroke and mother of the newborn baby. Female family member roles were used as all student participants were female. Following the designation of roles, each pair of students participated in a simulation of the allocated case scenario, which lasted a maximum of 10 minutes. The four students who were not directly involved in the scenario observed the simulation via live video and audio streaming.

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A debriefing session was completed following participation in the scenario. This involved providing each student pair with 15 minutes to self-reflect. Students were provided with the following questions to guide their reflection:

1. What went well during the scenario?
2. Is there anything you would change?
3. Was there any aspect/s that you did not feel confident with?
4. How did you feel during the scenario?
5. What were the key issues in the scenario?
6. Is there any additional information you would like to know in preparation for the next simulation?

The students were then provided with an opportunity to share these reflections with their peers and researchers. Subsequent to the debriefing session, students received both peer feedback and feedback from the research team regarding communication, clinical processes and environmental modifications. Each pair of students was then given the opportunity to view the video recording of their scenario overnight before acting out the same scenario, in the same role, the following day. Repetitive practice has been recognised as a key feature that promotes effective learning in simulations used in medical education (Issenberg, McGaghie, Petrusa, Gordan, & Scalese, 2005); as such, this simulation experience was purposefully designed to provide speech pathology students with an opportunity for simulation repetition.

Data collection tools

Prior to, and following, participation in the simulated learning experience, students completed the Participant Perception Indicator (PPI) (Berger & Carlson, 1988). The PPI is composed of three dimensions to measure participants' cognitive, behavioural and affective responses. In line with the *Australian Speech-Language Pathology Competency Framework* (McAllister et al., 2011) for the development of competence in speech pathology, the PPI was used to measure students' knowledge (cognitive dimension), experience (behavioural dimension) and confidence (affective dimension) across 16 aspects of speech pathology management in acute care (see Table 1). Students were asked to respond to each of the 16 statements on a 5-point Likert scale, with 1 indicating low knowledge, experience and confidence and 5 indicating high knowledge, experience and confidence. The three separate dimensions were designed to assess student perceptions of how much they were learning, how much experience they were gaining and their confidence in doing tasks required of them in the experience.

During the simulation scenarios, the research team completed a purpose-designed observer checklist to guide the group feedback and to identify change in student performance from Day 1 to Day 2. The observer checklist consisted of 14 items that represented the clinical steps required in each scenario, and its development was based on the relevant clinical experience of the research team. These items are listed in Table 2. The observer checklist was used independently by two of the three researchers to rate the simulation. To improve the reliability of this checklist, any disagreement between

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the researchers as to whether or not the desired behaviours were displayed by the students was resolved by discussion until consensus was reached. In order to minimise the possible influence of Day 1 researcher ratings on the ratings provided on Day 2, the researchers did not have access to the ratings from the previous day. Furthermore, at least one of the ratings on Day 2 was provided by a researcher who had not been involved in the Day 1 ratings.

Following participation in the simulated learning experience (i.e., end of Day 2), students completed the Satisfaction with Simulation Experience Scale (SSES) (Levett-Jones et al., 2011). The SSES is an 18-item scale that measures students' satisfaction with simulation. Participants rated their level of agreement with each item on a 5-point Likert scale (1 = strongly disagree to 5 = strongly agree). The SSES has good psychometric properties, with adequate internal consistency and construct validity (Williams & Dousek, 2012).

In addition, students were asked to provide written comments regarding what they liked and disliked about the simulation experience.

Data analysis

Descriptive statistics were used to report the medians and ranges of students' responses on the SSES statements and PPI ratings. The non-parametric related samples Wilcoxon signed-ranks test was used to test for significant differences between pre- and post-workshop PPI ratings, using a significance level of $p = < 0.05$. All statistical analyses were carried out using the Statistical Package for the Social Sciences (SPSS), Version 22.0 for Windows.

Student comments about what they liked and disliked about the simulation experience were analysed using qualitative content analysis. Meaning units were identified within each of the students' written comments. Meaning units are defined as "words or statements that relate to the same central meaning" (Graneheim & Lundman, 2004, p. 106). The meaning units were then condensed into codes, and related codes were grouped into subcategories and categories (Graneheim & Lundman, 2004). To increase the rigour of data analysis, coding was initially conducted by the first author (TR) and subsequently examined by the third author (NS) to ensure consistency in interpretation. No discrepancies in coding arose during this process.

Results

Students' perceptions of their knowledge, experience and confidence

Students' reported knowledge, experience and confidence levels prior to and immediately after the workshops are shown in Table 1. All students reported higher levels of knowledge, experience, and confidence on all 16 behaviours measured by the PPI following the simulation experience, with statistically significant differences between pre- and post- workshop PPI ratings found for all items except one. No significant difference was identified between students pre- and post- knowledge ratings regarding the function of an ECG machine (i.e., Item 5 on the PPI).

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Table 1
Pre- and Post-Simulation Participant Perception Indicator (PPI) Student Ratings

	Knowledge				Experience				Confidence			
	Mdn (range)				*Mdn* (range)				*Mdn* (range)			
	pre	post	*z*	*p*	pre	post	*z*	*p*	pre	post	*z*	*p*
1. Understand what oxygen saturation levels means	2.00 (1–4)	4.00 (4–5)	2.980	.003	1.00 (1–2)	4.00 (2–5)	3.114	.002	1.00 (1–3)	4.00 (3–5)	3.169	.002
2. Understand what normal oxygen saturation levels are	1.00 (1–3)	4.50 (4–5)	3.086	.002	1.00 (1–1)	4.00 (2–5)	2.961	.003	1.00 (1–1)	4.00 (3–5)	2.980	.003
3. Know how to put on a pulse oximeter	1.00 (1–4)	4.00 (4–5)	3.165	.002	1.00 (1–4)	3.50 (1–5)	2.831	.005	1.00 (1–4)	4.00 (2–5)	3.130	.002
4. Know how to put nasal prongs on a patient	1.00 (1–4)	5.00 (4–5)	3.108	.002	1.00 (1–3)	4.00 (2–5)	3.082	.002	1.00 (1–3)	4.00 (2–5)	3.108	.002
5. Know what an ECG does	3.00 (1–5)	3.50 (2–5)	.966	.334	1.50 (1–5)	2.00 (1–4)	2.309	.021	2.00 (1–3)	3.00 (2–4)	2.739	.006
6. Know how to adjust a hospital bed/crib	3.00 (1–5)	5.00 (4–5)	2.714	.007	1.00 (1–5)	3.5 (2–5)	2.873	.004	2.50 (1–5)	4.00 (3–5)	2.831	.005
7. Understand when and how to push a patient's call assist button	3.00 (1–5)	5.00 (4–5)	2.672	.008	1.00 (1–5)	4.00 (2–5)	2.853	.004	2.00 (1–5)	4.00 (4–5)	2.821	.005
8. Know which parts of the environment require modification before assessing a patient in the acute-hospital setting	4.00 (3–5)	5.00 (4–5)	2.889	.004	1.00 (1–3)	5.00 (3–5)	3.108	.002	3.00 (1–3)	5.00 (3–5)	3.211	.001
9. Know how to explain the SLPs role in the acute-hospital setting to patients and family members	4.00 (1–5)	5.00 (4–5)	2.754	.006	1.50 (1–3)	4.00 (3–5)	3.134	.002	3.00 (1–4)	4.00 (3–5)	2.719	.007
10. Know how to explain to the patient and their family the difference between speech, language, cognition and swallowing	4.00 (2–5)	4.00 (3–5)	2.333	.020	2.00 (1–4)	4.00 (2–5)	2.885	.004	2.00 (1–4)	4.00 (3–5)	2.877	.004
11. Know what to do during the initial acute consult in the acute-hospital setting (i.e., after receiving a referral for a new patient)	3.00 (2–4)	4.00 (4–5)	2.850	.004	1.00 (1–3)	4.00 (2–5)	3.108	.002	2.00 (1–3)	4.00 (4–5)	3.093	.002
12. Know what resources you need during your first consult with adults and children in the acute-hospital setting	2.00 (1–4)	4.00 (3–5)	2.953	.003	1.00 (1–3)	4.00 (2–5)	3.111	.002	1.00 (1–3)	4.00 (3–5)	3.130	.002
13. Know how to appropriately modify your own communication with patients who have complex communication needs in the acute-hospital setting	3.50 (2–5)	4.50 (4–5)	2.585	.010	2.00 (1–3)	4.00 (2–5)	3.133	.002	3.00 (1–4)	4.00 (3–5)	2.972	.003

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14. Know how to appropriately modify your own communication with family members of patients who have complex communication needs in the acute-hospital setting	4.00 (2–5)	4.00 (4–5)	2.530	.011	1.50 (1–3)	4.00 (2–5)	2.961	.003	3.00 (1–4)	4.00 (3–5)	2.877	.004
15. Know key hygiene practices implemented in acute-care hospital settings	3.00 (1–5)	5.00 (3–5)	2.682	.007	2.00 (1–3)	4.50 (2–5)	2.971	.003	2.00 (1–5)	4.00 (3–5)	2.701	.007
16. Know where to seek additional information regarding patient care in the acute-care hospital setting	2.00 (1–4)	4.00 (4–5)	2.958	.003	1.00 (1–3)	4.00 (2–5)	3.082	.002	2.00 (1–3)	4.00 (3–5)	3.078	.002

Note:
Mdn = median
Pre = pre-simulation self-ratings on a 5-point Likert scale with 1 = low knowledge/experience/confidence and 5 = high knowledge/experience/confidence
Post = post-simulation self-ratings on a 5-point Likert scale

Behaviour change when conducting an initial acute SLP (speech language pathology) consultation

The number of behaviours rated using the observer checklist during the students' first and second attempt in the simulation scenario (i.e., Day 1 and Day 2) are reported in Tables 2 and 3. Table 2 presents the total number of times students demonstrated each of the behaviours, with the total behaviours increasing from 48 on the first attempt to 63 on the second attempt of the scenario. Table 3 presents the number of behaviours demonstrated by each student pair.

Of the 14 behaviours included on the observer checklist, students were observed to demonstrate an increased use of 10 of the 14 behaviours (71.4%) between their first and second attempt (see Table 2). However, it was also noted that the following five behaviours decreased in frequency or were observed less than or equal to 50% of the time on the second attempt:

1. checking to see if the patient was wearing, or could access, assistive communication devices
2. beginning patient management
3. assisting the patient/significant other to communicate while in hospital
4. providing a summary of the visit
5. outlining the next steps in the patient's care.

Of the six student pairs who took part in this project, all except one student pair (who enacted the baby case) showed an increase in the total number of behaviours they demonstrated across the two attempts (see Table 3).

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Table 2
Observer Checklist Reporting the Number of Clinical Steps Completed by Students in Each Scenario

The speech pathology student:	Attempt 1 (max = 6)	Attempt 2 (max = 6)
1. Read patients medical chart prior to taking part in simulation	3	6
2. Washed their hands prior to commencing initial assessment	3	6
3. Introduced self and profession prior to commencing assessment	3	5
4. Clearly acknowledged family member as part of the session	3	6
5. Explained the role of the speech pathologist	3	5
6. Explained why they were visiting the patient	3	4
7. Made modifications to the patient's room before commencing assessment (e.g., turned off TV)	4	5
8. Checked if patient was wearing or could access their assistive communication devices (e.g., hearing aid in, glasses) initially or shortly after commencing session	2	1
9. Took into account patients presenting medical condition in management during initial contact (e.g., placement of nasal prongs, aware of ECG)	4	6
10. Began management in terms of administering a case history/initial communication screen/some informal assessment	2	3
11. Assisted the patient's/family member's communication	4	3
12. Commenced education/counselling of patient/family member, e.g., provided information; invited questions	3	6
13. Summary of visit	5	3
14. Outlined next steps in patient management.	6	4
Total	48	63

Note: Behaviours highlighted either decreased in frequency on the second attempt of scenario or were observed less than or equal to 50% of the time on the second attempt.

Table 3
Total Number of Clinical Steps Completed by Students in Each Scenario Using the Observer Checklist

		Scenario Attempt 1		Scenario Attempt 2		
		Number	Percent	Number	Percent	Change
TBI Case	Pair 1	7/14	50%	11/14	79%	3+
	Pair 4	10/14	71%	11/14	79%	1+
Aphasia Case	Pair 2	6/14	43%	11/14	79%	5+
	Pair 5	8/14	57%	12/14	86%	4+
Baby Case	Pair 3	8/14	57%	8/14	57%	0
	Pair 6	9/14	64%	10/14	71%	1+

Students' satisfaction with the simulated-learning experience

Student responses on the SSES indicated an overwhelming satisfaction with the learning experience (see Table 4). All students strongly agreed that the simulation experience was a valuable learning experience. All students also strongly agreed that the simulation experience gave them an opportunity to reflect on, and discuss, their performance, and ask questions during the debriefing sessions.

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Table 4
Summary of Student Responses on the Satisfaction with Simulation Experience Scale (SSES)

	Median	Range
Debrief and reflection		
1. The facilitator provided constructive criticism during the debriefing	5	4–5
2. The facilitator summarised important issues during the debriefing	5	4–5
3. I had the opportunity to reflect on and discuss my performance during the debriefing	5	5
4. The debriefing provided an opportunity to ask questions	5	5
5. The facilitator provided feedback that helped me to develop my clinical reasoning skills	5	3–5
6. Reflecting on and discussing the simulation enhanced my learning	5	4–5
7. The facilitator's questions helped me learn	5	4–5
8. I received feedback during the debriefing that helped me to learn	5	4–5
9. The facilitator made me feel comfortable and at ease during the debriefing	5	4–5
Clinical reasoning		
10. The simulation developed my clinical reasoning skills	5	4–5
11. The simulation developed my clinical decision-making ability	5	3–5
12. The simulation enabled me to demonstrate my clinical-reasoning skills	5	3–5
13. The simulation helped me to recognise patient deterioration early	4	3–5
14. This was a valuable learning experience	5	5
Clinical learning		
15. The simulation caused me to reflect on my clinical ability	5	4–5
16. The simulation tests my clinical ability	5	4–5
17. The simulation helped me to apply what I learned from the case study	5	3–5
18. The simulation helped me to recognise my clinical strengths and weaknesses	5	4–5

Note: 1= strongly disagree, 2 = disagree, 3 = unsure, 4 = agree, 5 = strongly agree

What students liked and disliked about the simulated learning experience

Analysis of the students' qualitative responses regarding aspects of the simulation experience that students liked revealed 61 meaning units, which were condensed into three categories and 13 subcategories. The three main categories related to students: 1) liking specific components of the teaching and learning activity, 2) being able to gain knowledge specific to the acute environment and 3) being able to become orientated to the acute environment (see Table 5).

Specific components of the teaching and learning activity liked by students

Several students commented that the opportunity for self-reflection and self-observation through the use of videos was a specific aspect of the teaching and learning activity that assisted learning, *"videos enabling self-observation was so helpful"* (S5). Students also liked the opportunity for *"structured feedback"* (S12) and that they completed the learning activity over 2 days, which allowed repeated practice, *"Practice, experience, and opportunity to improve are invaluable to students"* (S5). Students also liked that the scenarios involved SimMan and enacting the speech pathology role and family-member role, *"Getting to gain experience from the point of view of the family which we otherwise mighten ever [sic] get the chance"* (S11). The opportunity to learn in a safe environment

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Table 5
Summary of Categories and Subcategories From Qualitative Analysis

Category	Subcategory	Quote and Meaning Unit
1. Liked specific components of the teaching and learning activity (31)	1. Liked the opportunity for self-reflection and self-observation through the use of videos (11)	*"Having a comprehensive reflection process"* (S7). *"Opportunity to have video feedback very useful"* (S12). *"On the first day … we saw the gaps in our knowledge ourselves … this maximised learning"* (S9).
	2. Liked the opportunity for feedback, clarification and to debrief (5)	*"The structured feedback sessions allowing opportunity to offer suggestions"* (S12). *"Lots of opportunity to tell [facilitators] about our concerns about working in acute care; we could be totally honest and got lots of helpful tips and specific things we should not do"* (S3). *"I like that we got to have a debrief after the first day and re-evaluate what we did"* (S4).
	3. Liked the opportunity to repeatedly practise skills within a simulated setting (5)	*"I enjoyed having 2 days where we could experience and practise in the setting and apply newly learnt strategies, etc"* (S4). *"Do-over! What a great idea to get to do it again"* (S5). *"Allowed me to build confidence … especially with repeating scenarios"* (S12).
	4. Liked that the learning activity involved the Sim-man and role-playing multiple roles (4)	*"Sim-man and the simulated acute setting was great"* (S1). *"I absolutely loved this experience and I am so grateful I got to participate. I think Sim-man and simulated environment should be in all universities as it is SO BENEFICIAL!"* (S4). *"Getting to gain experience from the point of view of the family which we otherwise mighten ever [sic] get the chance"* (S11).
	5. Liked the opportunity to learn in safe and less confronting environment (3)	*"It was good to be paired so it wasn't as confronting going into the setting"* (S1). *"Allowed me to build confidence within a safe environment"* (S12). *"I liked that we didn't have to have all the answers or even knowledge of the environment on the first day"* (S9).
	6. Liked the opportunity to learn as a group and observe others (3)	*"Observing others … was so helpful"* (S5). *"Observing others"* (S5). *"Allowing opportunity to offer suggestions and improvements as a group"* (S12).
2. Liked being able to gain knowledge specific to the acute environment (13)	1. Increasing knowledge of hospital processes (4)	*"I feel like I have a much better idea of what it'll be like/my responsibilities/ etc, now"* (S1). *"Got lots of helpful tips and specific things we should not do"* (S3). *"Learning about hospital protocols"* (S11).
	2. Learning a lot that can be applied to the acute environment (3)	*"It was great to learn about the environment"* (S2). *"I feel like I learnt a lot … that I can use in an acute placement or grad. job"* (S1).
	3. Learning what to do in initial consult, what resources to bring and how to read the medical file (3)	*"I know what to do in an initial consult … and what to look for in a med/case file"* (S6).
	4. Learning how to interact with nurses and family members (3)	*"Having a nurse give us tips on … what we can do to keep nurses happy"* (S3). *"Learned how to deal with family's concerns and q's [questions] more competently"* (S10). *"I know … how to build rapport in a hospital and the etiquette"* (S6).

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Category	Subcategory	Quote and meaning unit
3. Liked being able to become orientated to the acute environment (17)	1. Increased awareness of issues unique to acute environment (e.g., equipment, emergency situations) (8)	*"It made me more aware of issues that may arise in acute settings (such as emergency situations)"* (S2). *"I think the O_2 levels etc. that changed and we would need to be aware of in a real hospital was very helpful to practise with"* (S11). *"The situations brought up so many issues of acute-care settings I'd never considered before"* (S3).
	2. Feel more prepared/ confident in the real acute setting environment (5)	*"I will be more comfortable in this real environment"* (S1). *"I feel so much more confident going into a hospital ward"* (S6). *"I … feel more confident as a student in an acute setting"* (S7).
	3. Provides an opportunity to expose students to an acute setting (4)	*"I found it beneficial as I have never acted as a speech pathologist in an acute setting before so it was great to learn about the environment"* (S1). *"Being able to experience a hospital setting"* (S8).

Note: Numbers in brackets represent the number of meaning units per category and subcategory

that incorporated observation and group learning was another component of the teaching and learning activity liked by students.

Students liked that they gained knowledge specific to the acute environment

Students commented that this simulated experience made them more knowledgeable about *"hospital policies and guidelines"* (S2), the acute environment, the *"kinds of resources to bring"* (S6) into an initial acute consultation and how to interact with nurses and family members.

Students liked that they were orientated to the acute environment

With respect to becoming oriented to the acute environment, students specifically liked that they gained an increased awareness of issues unique to the acute environment, such as the equipment and how to respond to emergency situations, *"I know what to expect from a hospital ward and how things like beds, nasal prongs, etc. work"* (S6). Students also commented that their orientation to the acute environment facilitated confidence and preparedness, *"Now feeling a lot more confident with the hospital environment"* (S10) and that they liked gaining exposure to speech pathology work in this particular setting, *"I liked that it … gave me a life-like example of what it would be like in an acute hospital setting"* (S4).

Students were also asked about aspects of the simulation experience that they disliked, with only 4 of the 12 students identifying negative aspects of the teaching and learning activity. Two of these four responses related to students disliking the feeling of being underprepared/unsure on the first day of the simulation, *"I did not like feeling unsure on the first role play"* (S2). The remaining two responses reflected a dislike for not having the opportunity to experience playing both the speech pathologist and family member role.

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Discussion

Following participation in the simulated learning experience, students reported having significantly more knowledge, experience and confidence related to working as a speech pathologist in the acute-care setting. The higher ratings post-participation may be in part due to the fact that all students who participated in the current study reported having limited or no experience in the acute-care setting prior to participating in this research. It has been frequently reported in the literature that health students may have limited opportunity to gain experience in the acute-care setting (Blackstock et al., 2013; Briffa & Porta, 2013; Hill et al., 2010; Paskins & Peile, 2010). Hence, the findings from the current study, that students reported feeling more knowledgeable, experienced and confident in the acute-care setting post participation in the simulated learning experience, and liked being oriented to this environment, highlight the potential of simulated learning in filling this gap in clinical placements.

It was noted that the majority of students did not report having an increased knowledge of the function of an electrocardiograph (ECG) machine following participation in the learning experience. It was interesting to note that students reported having significantly more experience and confidence related to the use of an ECG machine post-participation in the learning experience. It is likely that students' knowledge ratings reflected the fact that the simulated learning experience did not specifically teach the students about an ECG machine, and furthermore, none of the students asked about its function. The scenarios, however, did expose students to this commonly encountered item of medical equipment in the acute-care setting and the sounds when the machine alarmed. Hence, whilst students may not have fully understood the ECG's function, they had an opportunity to respond to, or observe other students' responses to decreases in ECG readings, which may have influenced their ratings of experience and confidence.

In addition to students gaining knowledge, experience and confidence related to speech pathology practice in the acute-care setting, the students demonstrated an increase in the number of speech pathology clinical processes displayed across the first and second attempts at the simulated clinical scenarios. Although this was a positive finding, it was noted that in the second attempt at the scenarios, fewer students provided a summary of the visit and outlined the next steps. A logical explanation for this was that imposed time constraints of the simulation task limited the students' ability to complete these final clinical tasks during this learning activity. Instead, students tended to complete other tasks during the 10-minute scenario, such as acknowledging the family members and explaining the SLP role. These findings may reflect a need for students to develop their skills in concise and more time-efficient clinical practices, which could be gained through repeated opportunities to participate in learning activities such as simulation and case-based discussions during tertiary coursework. It is also important to note that the observer checklist, developed for this purpose, consisted of 14 discrete behaviours, and the completion of this number of tasks during a single 10-minute encounter with a patient may be more representative of the skills of a more experienced clinician. Therefore, it is not surprising that these third-year speech pathology students

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infrequently began a case history interview, initial communication screen or informal assessment. Finally, it is worth noting that, during both attempts, very few students checked whether the patient required any communication devices, such as hearing aids and glasses. This may highlight the need to remind students, specifically, of the need to do this task in their initial encounter with patients.

All participants strongly agreed that the simulation was a valuable learning experience; therefore, this pilot study provides findings that may support embedding simulated-learning experiences within university academic programmes, a notion that has recently been promoted by international researchers and educators (Blackstock et al., 2013; Briffa & Porter, 2013; Hill et al., 2010; MacBean et al., 2013; Paskins & Peile, 2010).

Another positive finding from this study was that students reported benefiting from the opportunity to reflect on and to discuss their performance, an essential skill for speech pathology students (Hill, Davidson, & Theodoros, 2012). In addition, qualitative comments from the students emphasised the benefits of feedback and repeated practice at the same clinical scenario, both of which are recognised as key features to include in a simulation experience to ensure effective learning (Issenberg et al., 2005).

Although the students' qualitative comments related to the learning experience were overwhelming positive, it is important to note that two students reported not liking the fact that they did not have an opportunity to experience role playing the speech pathologist, which was not possible due to practical limitations related to the time available to complete the simulated-learning experience in this pilot study. This is a valid consideration in the design of future simulated-learning experiences, especially given reports in the literature that the educational value in simulation may be less for students if they do not play their own professional role (Kyrkjebø, Brattebø, & Smith-Strom, 2009).

Limitations and future directions

It is acknowledged that findings from this pilot study relate to the experiences and perceptions of a small number of students (n = 12) and, furthermore, the positive outcomes need to be considered in the context of a possible response bias related to the volunteer nature of students' participation.

While a strength of this study was that the outcome measures included an observational component, it is also acknowledged that the study contained self-reported measures related to attainment of knowledge and did not include standardised assessments of student competence. It will be important to address this in future research to demonstrate the value of simulated learning experiences on students obtaining clinical competencies.

Conclusion

Findings from this pilot study provide important insights into the benefits of simulated learning for speech pathology students, especially within the context of an acute-care setting. Students overwhelmingly reported positive feedback on the simulation, encapsulated in the following student comment, *"I absolutely loved this experience, and I am so grateful I got to participate. I think Sim-man and simulated environment should be in all universities as it is SO BENEFICIAL!"* (S4).

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