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Abstract

Innovations in simulation in nursing and health care continue to be developed as creative and committed educators respond to challenges of providing pedagogically sound, engaging and effective learning experiences for large student cohorts. Time-pressed educators may find it difficult to network with others working in simulation-based learning, and thus, it is useful to provide summaries or snapshots to provide a brief overview of activities in various countries using simulation in a variety of ways. The purpose of this paper is to profile a diverse range of innovative, cost-effective, and tested simulation approaches that have been implemented in healthcare programs by nursing educators from a range of countries to spark creativity. Each strategy was designed to address contemporary and critical practice issues. They facilitate immersion in authentic clinical scenarios, increase students' awareness of cues in the environment that may compromise health and safety, and prepare students for cultural or clinical realities that they may not routinely encounter because of the inherent restrictions associated with clinical placements.

Keywords	nursing; role play; simulation; video; healthcare; innovation.
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Highlights

Simulation is a well-accepted learning strategy that can be substituted for some clinical hours and/or experiences.

Used around the globe, simulation can present learners with authentic practice issues and prepare them for clinical realities.

A diverse range of innovative, cost-effective, and tested simulation approaches is presented to spark creativity among readers.

Snapshots of simulation: Innovative strategies used by international educators to enhance simulation learning experiences for healthcare students

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135 **Snapshots of simulation**

136 **Abstract**

137 Innovations in simulation in nursing and health care continue to be developed as creative and
138 committed educators respond to challenges of providing pedagogically sound, engaging and
139 effective learning experiences for large student cohorts. Time-pressed educators may find it
140 difficult to network with others working in simulation-based learning, and thus, it is useful to
141 provide summaries or snapshots to provide a brief overview of activities in various countries
142 using simulation in a variety of ways.

143 The purpose of this paper is to profile a diverse range of innovative, cost-effective, and tested
144 simulation approaches that have been implemented in healthcare programs by nursing
145 educators from a range of countries to spark creativity. Each strategy was designed to address
146 contemporary and critical practice issues. They facilitate immersion in authentic clinical
147 scenarios, increase students' awareness of cues in the environment that may compromise health
148 and safety, and prepare students for cultural or clinical realities that they may not routinely
149 encounter because of the inherent restrictions associated with clinical placements.

150

151 **Keywords:** nursing, role play, simulation, video, healthcare, innovation

152 **Key point statements**

153 Time-pressed educators may find it difficult to keep up with innovations in clinical simulation
154 around the world.

155 A series of short case studies, or snapshots of innovative and international simulation
156 approaches are presented to stimulate creativity.

1   **Introduction**

2   A recent US longitudinal study suggested that up to 50% of clinical placements can be safely

3   substituted with simulated experiences (Hayden et al., 2014). This is good news for

4   universities who are challenged by the ongoing issue of inadequate numbers of clinical

5   placements. Yet, although simulation has become an almost ubiquitous learning approach in

6   healthcare education, multiple challenges remain, such as trained and available staff,

7   sufficient equipment and simulation facilities, and the time required to develop authentic,

8   high quality clinically relevant simulation scenarios.   Further, while innovative and cost-

9   effective simulations have been developed, they are not always shared for the benefit of the

10   broader simulation community.

11   This paper reports on diverse simulation approaches that are internationally relevant in

12   nursing education; they include: humanising manikin-based simulations, learning to provide

13   accurate and succinct clinical handovers, inter-professional collaboration, communicating

14   with children, home-based nursing, the lived experience of disability, and environmental

15   health and safety assessments.

16   **Humanising manikin-based simulations**

17   A common challenge when using manikins is humanising manikins which are often perceived

18   as lifeless and unresponsive (Barry et al. 2012). To address this issue, educators converted

19   paper-based case studies into authentic online vignettes as preparation for manikin-based

20   simulations. The approach has advantages: they engage multiple senses while telling an

21   unfolding, realistic story (Verleur, Hevelman & Verhagen, 2011), they encourage imagination,

22   reflection, problem-solving, (Moorman, 2015), and they can be stopped and replayed, which

23   is useful for reflection and for students whose first language is not English (McConville & Lane,

24   2006).

25   The online vignettes, developed from the team's clinical experience, which portrayed people

26   from a range of diverse backgrounds and social histories who were dealing with various health

27   challenges. Rather than simply reading a case study, this approach allowed learners to assess

28   the client by observing and listening, to notice differences, idiosyncrasies, cultural

29 vulnerabilities, and unique responses to care. The vignettes also allowed learners to consider
30 and reflect on the professional behaviours portrayed by the nurses. After viewing the
31 vignettes, students participated in a simulation where the manikins portrayed the same
32 persona, had the same 'back-story' and wore the same clothes as the people portrayed in the
33 videos.

34 An evaluation of the simulations identified that this approach humanised the manikins.
35 Students reported that they felt more connected and invested in caring for the manikin, were
36 more emotionally engaged with the unfolding storyline, and more aware of judgemental
37 attitudes and biases (Power et al. 2016).

38 **Safe and effective communication during handovers**

39 Internationally, communication failures are identified as the primary cause of adverse patient
40 outcomes, including safety incidents, ineffective teamwork, fragmented care, and
41 unsatisfactory healthcare experiences (Baron, 2014). To improve collaborative
42 communication during patient handover, the Simulated Practice Activity (SPA) was created.
43 The experience was designed to occur at the end of a communication course and involved
44 nursing students, service users/consumers, and service/clinical partners, such as practising
45 nurses. All stakeholders were first prepared for the encounter in a pre-briefing session. Then,
46 in groups of 3 students, took on the role of evaluator, mentor, or novice student. The student
47 was asked to assess a client, played by a consumer, using the service partner's hospital
48 admission form. The student then provided a handover to the service partner. The activity
49 concluded with a guided reflection session where all stakeholders provided constructive
50 critiques about the handover and areas for improvement. Although resource intensive, this
51 authentic simulation provided students with much needed practice in communicating with
52 clients and colleagues.

53

54 **Night duty, fatigue and the need for information**

55 Another issue affecting nurses globally, and yet something that many students may not
56 understand fully because of restricted placement times, is the ravages of shift work. Han et al

57 (2014) recently showed that fatigue from shift work can hinder work performance and

58 threaten both nurse and patient safety. Therefore, a simulation was designed so that

59 students would be exposed to a series of video-recordings of bedside handovers from tired

60 night shift colleagues, and asked to discern from this inadequate handover the

61 comprehensive medical and nursing needs of the client. The range of client issues simulated

62 included dementia, asthma, post-operative bowel resection and the repair of a fractured neck

63 of femur. Following the simulation, students reflected on the experience and wrote an essay

64 that focused on patient handover, clinical reasoning and professional practice. Although, in

65 some respects, this was a challenging experience, it did simulate the kind of situations many

66 students were likely to encounter as graduates, and it raised their awareness of the

67 responsibility that nurses have in ensuring that all required information is handed over safely,

68 even if the circumstances are time-pressed and difficult.

69 **Interprofessional communication and collaboration**

70 Nursing students across the world tend to spend the majority of their study time in uni-

71 professional groups and as a result, rarely get an opportunity to learn about the disciplines,

72 world views, and unique practices of other professional groups. This approach does not

73 prepare healthcare graduates with the requisite skills to collaborate and communicate

74 effectively with all members of the inter-professional team (Thistlewaite & Nesbit, 2007). To

75 address this concern, an inter-professional extracurricular, immersive simulation was

76 designed for nursing and paramedic students that aimed to explore a client's healthcare

77 journey from the perspective of the client, rather than the discipline.

78 The simulations involved the sudden onset of chest pain and an epileptic seizure. All students

79 were briefed together and then each discipline facilitator conducted a discipline-specific

80 briefing to ensure students were familiar with the equipment and environment. The

81 simulation began with the client's experience of health deterioration. It was followed by

82 paramedic students responding to an emergency call, attending, treating and transporting

83 the client, whilst being observed by the other nursing and paramedic students. The client was

84 transported to a simulated emergency department, where the nursing students received a

85 handover, assessed the client, and managed their care, whilst being observed by the other

86 paramedic and nursing students.

87 Reflective debriefing occurred following the activity, and explored professional role identities,

88 effectiveness of inter-professional communication, and the health care journey from the

89 client's perspective. Evaluation revealed that students found the activity relevant, exciting

90 and raised awareness of differing professional world views and approaches to critical thinking

91 and clinical decision making.

92 **Learning the art of communicating with children**

93 The challenge of communicating effectively with sick and injured children arises. Unlike

94 adults, children may lack experience and the cognitive capacity to fully understand the

95 meaning of illness, diagnoses and treatment. Similarly, they may not have the psychological

96 and social abilities yet to compose and contain emotions such as fear, distress or frustration

97 (Bjorklund & Causey, 2017).

98 A simulation was designed, incorporating the use of a silicone procedural puppet. The aim

99 was to prepare students for undertaking vital signs with paediatric clients. The puppet was

100 custom-designed and included a movable face, an injectable abdomen, catheterisable

101 genitalia, patent nares for naso-gastric insertion, intravenous access via the arm, and a porta-

102 cath for injections (See Figure 1). One puppet can be used for around 25 students, and costs

103 7000 Australian dollars. Tubing exists throughout the inner workings of the puppet so that

104 fluid can be extracted or delivered, for example, simulating urination or being able to insert

105 fluid into the portacath. The puppet can simulate sternal recession and abdominal breathing.

106 It has a cartoonish appearance with larger head, engaging eyes, and smaller body to make the

107 puppet friendly and appealing. Lastly, the puppet was made of silicone for ease of cleaning

108 and to address infection control issues identified in previous studies when using cloth puppets

109 in the clinical environment (Author et al. 2014).

110 {Insert Figure 1 about here}

111 A specific pedagogy has been developed and published on the use of puppets for health

112 professional learning. This approach requires the educator to transform the puppet into a

113 little person with a story and history relevant to the learning experience. The narrative then

114 becomes the platform for learning and teaching and the educator guides and facilitates the

4

115 learning through the character puppet (Author et al. 2017). Evaluation has shown that
116 learning in this way, students do not experience the detachment that has been reported to
117 commonly occur when students learn solely on manikins (Dean et al. 2017). Yet, importantly,
118 students learn how to simultaneously interact compassionately and even playfully, whilst
119 implementing a nursing procedure effectively.

120 **Case-managing in a person's home**

121 In many countries across the world, home-based nursing is just as prevalent as hospital-based
122 care, and students need practice to learn about the unique and challenging nature of working
123 in a person's home, where access to clinical supervision and resources are limited (Savarese,
124 2016). Students need to be familiarised with and oriented to this new environment because,
125 unlike in a hospital setting, students and nurses are guests in someone's home and
126 surrounding community, and this requires a different dynamic for communication and
127 interventions. Skills in environmental and psychosocial assessment and provision of safety
128 require development (Unwin & Tatum, 2011).

129 Home visiting is one way that students case mange clients in one program's Population
130 Health Nursing (PHN) course. In a simulation of home-visiting, students participated in groups
131 of two in four different home situations. Prior to the experience, students prepared by
132 reading about interviewing (Frankel & Stein, 1999), therapeutic strategies to meet and
133 intervene with clients in their homes (Unwin & Tatum, 2011), and guides for specific
134 assessments, such as risk for suicide and child/older adult abuse. A home setting was
135 established in the simulation centre, and standardised patients were used to enhance the
136 realism. These four scenarios presented students with health, social, and environmental
137 challenges: (1) a new mom/newborn visit; (2) an older adult female who was frequently
138 calling emergency services for non-emergencies; (3) a recently widowed male who was
139 discharged from the hospital to home, following an exacerbation of heart failure; and (4) a
140 middle-aged Type I diabetic woman, who could not afford her medications and testing
141 materials. Other professional healthcare students partnered with nursing students in
142 simulated and actual home visits.

5

143 Although the simulations focused on individual clients, the debriefing widened the lens to
144 consider populations experiencing similar issues and community resources. Evaluation has
145 shown that students gained a new appreciation for the importance of environmental and
146 population-based issues that impact upon health-outcomes and confidence in conveying a
147 respectful stance to support client autonomy.

148 **Learning clinical skills peer to peer**

149 A challenge for large schools of nursing globally is the sheer number of students that need to
150 learn effectively in settings where time and resources are tight. Building on the idea that
151 learning can be effective even when students are observing and critiquing, rather than
152 directly acting – a term Spouse (1998) describes as *legitimate peripheral participatio*n, a
153 simulation experience was designed to harness and potentiate the impact of peer learning.

154 Rather than the nursing educator directing activities, their role was restricted to facilitate peer
155 interaction. Students took responsibility for actively learning from each other though peer
156 observation, critical review and feedback discussion (Stone, Cooper & Cant, 2013).

157 Groups of up to 30 students working in teams of four to five worked through four different
158 client scenarios. The scenarios were approximately 15-minute duration and took place in a
159 simulated ward with six SimMan manikins, that could simulate human physiological functions
160 when manipulated by a handheld SimPad system.

161 The SimPads were programmed so that each of the scenarios allowed a number of pathways
162 or stage tabs that varied in complexity. The person controlling the device chose a stage tab,
163 according to the student's clinical reasoning process upon encountering the clinical issue.
164 Each stage tab had pre-set human physiological functions, for example, the manikin might
165 deteriorate, die, or recover depending on the decisions made by the student. The student's
166 actions and decisions could also be recorded and timed in the SimPad program. Standard
167 recording activities in each SimPad scenario were listed on the right-hand side of screen and
168 included: hand hygiene, introduces self, effectively communicates, gains consent, comfort
169 measures, reassures client, ISBAR handover framework, documents, team communication

170   and correct medication administration. The left-hand side of the screen predicted care

171   activities pertaining to that particular stage of scenario were listed.

172   Each scenario required four student roles: one person to operate the SimPad ® device, one to

173   play a doctor, one to provide the client's voice and one to play the nurse. On completion of

174   each scenario the group debriefed with each other, asking: 1) What did you do well? 2) What

175   did you not do not so well? and, 3) What would you do differently next time? Evaluation has

176   shown that students found the peer learning to be as effective, and challenging as the

177   educator-led simulation experiences.

178   **Taking an empathic stance towards illness and disability**

179   Thanks to advances in health-care, more people world-wide are surviving serious injuries and

180   illnesses, yet this also means that many people are living long lives with disabilities that range

181   from physical to emotional (Vos et al., 2015). This requires that nurses move beyond the

182   medical model, towards the psycho-socio-cultural and spiritual so that they can support

183   clients and communities in ways that are functionally useful, but also emotionally empathic

184   and uplifting. In preparing for this shift in practice, students need to learn how to listen

185   empathically, and communicate to clients that they are trying to understand and work with

186   their unique needs and experiences (Anderson, Ford & Thorpe, 2011).

187   Although empathy is integral to practice, many health professionals have a limited

188   understanding of the experiences, needs, and preferences of people with disabilities and

189   clients continue to perceive discrimination from nurses and others (Flickinger et al. 2016).

190   To enhance students' empathy towards people with a disability, an immersive simulation

191   experience was devised. Participants were allocated the role of either a person with an

192   Acquired Brain Injury (ABI) or a rehabilitation nurse. The simulated clients wore hemiparesis

193   suits that replicated the experience an ABI, and they were provided with the following

194   information:

195   *You have recently been transferred to a rehabilitation unit after being in an acute care*

196   *hospital for three months. You have an acquired brain injury as a result of being involved*

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197   *in a car accident three months ago. You have difficulty talking, difficulty swallowing,*
198   *blindness over half of your field of vision and paralysis to one side of the body.*

199   The students allocated the role of a rehabilitation nurse were given the following instructions:

200   *You have been allocated the care of a recently admitted patient with an ABI. Their long*
201   *term prognosis is uncertain, but your goal is to help them become as independent, self-*
202   *caring, and confident as possible. You will need to help the patient dress, take them for*
203   *a walk, and help them pour and drink a glass of thickened juice.*

204   Evaluation demonstrated that students' empathy levels improved and students' stigmatising

205   beliefs were challenges and replaced. When the students assumed the role of the patient

206   during the simulation they gained new understanding of the personal experience of ABI.

207   **Game-based simulation learning**

208   The digital revolution is not only changing the way health-care and education are delivered,

209   but it is transforming the very nature of social interaction, including the ways students learn

210   (Mawhirter & Garafalo, 2016). The use of gaming technology, where a player solves a puzzle,

211   advances to higher levels or wins rewards engages learners, building their interest in the

212   subject matter, and personal self-efficacy (Sung, Hwang & Yen, 2015).

213   A game-based simulation was designed to teach nursing students environmental health and

214   safety assessment. In this game, learners were introduced to clients who live in a variety of

215   contexts, including a cottage, long term care, community park and supermarket car-park.

216   Immersed in a 3D virtual environment, learners' curiosity and sense of adventure were

217   sparked as they entered and moved around dwellings, opened doors, switched on lights and

218   assessed for potential and actual hazards. Over a hundred different hazards were randomly

219   generated each time the learner entered a level in the game. Using drop down boxes, they

220   identified and categorised hazards and selected interventions that contain, minimise and

221   eliminate health and safety risks. This promoted learners' critical thinking and clinical

222   reasoning skills and offered a practical opportunity to apply theoretical concepts and practice

223   undertaking skills that are not often available to them in clinical environments. At the

224   completion of the game, detailed analytics and individual feedback provided learners with

225   information about the number of hazards found, correctly categorised and managed.

226 Evaluation has shown that students improved their detection and management of health risks
227 and that the game technology is accessible, cost effective and engaging.

228 **Summary**

229 Over the last decade, the use of simulation has matured, and educators are increasingly
230 utilising creative and pragmatic solutions to address contemporary practice and educational
231 issues. As has been detailed in this paper, simulation learning can introduce students to
232 technical as well as non-technical skills required for competent nursing practice. The paper
233 described strategies from the United Kingdom, Australia, and the US to enhance realism
234 within simulation to foster learner engagement – audio-visual enhancement of case studies,
235 child-like puppets, and body suits that simulate the restricted movements experienced by a
236 client with acquired brain injury are examples. The paper also described activities to build
237 confidence and accuracy in the processes of client assessment, clinical handover and
238 collaborative communication. Because nursing and health care are increasingly taking place
239 beyond hospital borders it is imperative that students learn to use a wider lens in their
240 assessment of clients, families and communities – beyond physiology. The paper explored
241 home-based simulation and a game to promote awareness of environmental hazards. In
242 providing this series of snapshots from across the world, it is hoped that educators
243 everywhere will be inspired to incorporate and adapt these activities to continually improve
244 the quality of simulation learning experiences and to build collaborative networks to
245 capitalize on others' learning.

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Figure 2: Silicone Procedural Puppet