

Navigating the Storm of Deteriorating Patients: Seven Scaffolds for Simulation Design

Gwen D. Erlam, Liz Smythe, Valerie Wright

Department of Nursing, Auckland University of Technology (AUT), Auckland, New Zealand

Email: gerlam@aut.ac.nz

How to cite this paper: Author 1, Author 2 and Author 3 (2017) Paper Title. *Open Journal of Nursing*, 7, *-*.

<https://doi.org/10.4236/ojn.2017.71001>

Received: **** **, ***

Accepted: **** **, ***

Published: **** **, ***

Copyright © 2017 by authors and Scientific Research Publishing Inc.

This work is licensed under the Creative Commons Attribution International License (CC BY 4.0).

<http://creativecommons.org/licenses/by/4.0/>



Open Access

Abstract

Recent trends in simulation use have necessitated a more considered approach in the use of this teaching/learning tool. The aim of this research is to discover ways to improve simulation as a teaching/learning platform. Action research was used to answer the question, “How can I improve pedagogical practices with undergraduate nurses in simulation?” This study was implemented at a University in Auckland, New Zealand between November 2012 and March 2014. A purposive sample was sought from second and third-year nursing students (n = 161) enrolled in the three-year undergraduate bachelor of nursing program. Methods included focus groups, questionnaires, debriefing sessions, pre- and post-tests, and Lasater clinical judgment rubric analysis. Seven instructional scaffolds emerged which maximized student learning and retention. These scaffolds: 1) helped move students from known into unknown knowledge; 2) provided situated coaching; 3) modeled expected performance; 4) gave opportunity for improvement; 5) reduced confusion; 6) taught effective communication; and 7) promoted new learning through debriefing. These strategies resulted in a simulation experience which improved clinical reasoning in undergraduate nursing students.

Keywords

Simulation, Undergraduate Nursing Education, Scaffold, Deteriorating Patient

1. Introduction

Simulation as a teaching tool has been used in nursing education for over 100 years [1] [2]. However, simulation in its multiple current contexts is a form of inquiry learning which has the potential to assist students in the development of deeper understandings of complex clinical situations [3]. This is an essential requirement in undergraduate nursing education where clinical opportunities

continue to develop in complexity while diminishing in availability.

This research emerged out of a need to understand how educational philosophy impacts simulation design, and how to best apply educational scaffolds to support student learning [4]. Seven pedagogical scaffolds are offered as key insights to guide simulation design in order to prepare students to manage the “storm” of a deteriorating patient situation [5], with the ultimate aim of preparing students to manage the complex clinical settings for which they are destined.

2. Background

2.1. Scaffolding in Simulation Design

Developing a simulation program involves more than purchasing a manikin [6]. The belief that content knowledge and clinical experience alone will produce safe, confident and effective students is likely fiction [7]. Simulation design and implementation requires a knowledge of appropriate philosophical underpinnings [8] along with an ability to communicate effectively and safely with students during simulation [9]. Scaffolding is a learning approach designed to promote deeper understanding [10]. It is the support given during the learning process which is tailored to the needs of the student. The intention of scaffolding is to help students achieve the learning outcomes of the simulation while developing in cognitive and social skills [3].

2.2. Types of Educational Scaffolds

In education, scaffolding refers to a variety of instructional techniques used to move students progressively toward deeper understanding and, ultimately, greater independence in the learning process [11]. Different types of scaffolds are required in order to best support students’ recognition of clinical deterioration [12] [13]. There are several types of scaffolds which can be used to move students forward in their understanding. McLoughlin ([4], p. 128) outlines these below:

- 1) **Conceptual scaffold:** Cues or hints which help students to reach a solution;
- 2) **Coaching scaffold:** Direct teaching strategies or heuristics;
- 3) **Feedback scaffold:** Providing progressive feedback while the task is being undertaken;
- 4) **Reflective scaffold:** Encouraging reflection on tasks by asking the student to self-monitor their approach; and
- 5) **Modeling scaffold:** Providing an example or demonstration of expected performance.

Simulation, as a teaching tool, encourages more active participation and interaction among students because students “do not just watch the simulation, they are the simulation” [14]. This approach enables students to become immersed in an augmented learning environment in which they take an active role in their learning process and construct new understandings of abstract concepts in complex learning situations. Scaffolding is an essential aspect of

this process.

3. Methods

Participant rights in this research were protected and subject to institutional review board approval. Following ethics approval, this study employed action research with the intention of developing a living theory [15] of educational practice. Three investigative cycles were employed to answer the question, “How can pedagogical practices be improved when working with undergraduate students in simulation?” [8]. The aim of this research was to discover ways to improve simulation as a teaching/learning platform used with undergraduate nursing students. After student identification of helpful strategies, interventions were categorized into different scaffold categories [4]. Seven instructional scaffolds [4] emerged from this research which became key elements for improved simulation design [8].

This study was implemented at a university in Auckland, New Zealand between December 2012 and April, 2014. Interpretation of data was informed by the writings of John Dewey [16] [17] [18], whose thoughts on experience and education have been foundational in changing habit formation (acquired ways of using and incorporating the environment) and subsequent integration of habits into how we think and act.

3.1. Action Cycle One

Cycle One involved two focus groups which explored the current context of simulation in undergraduate nursing [8]. A one-hour revised simulation was created embedding themes emerging from focus groups. This revised simulation invited focus group participants to give feedback on changes made. Thematic analysis was completed from the perspective of examining emerging values that informed practice, and then developing criteria and standards of judgment intended for practice improvement [15] [19]. An example of this analysis can be seen in **Table 1**.

Table 1. Example of thematic analysis.

Original sentence examples	Free Node (Code)	Tree Node (Category)	Theme
<i>What I really hate about the simulation is the glass. I'd love the educator to be down on the floor with us.</i>	Anxiety-producing	Supportive learning environment	Situated teaching in room by facilitator
<i>Being in the simulation knocked my confidence. When you're running around like headless chickens you think, "When this does happen in the hospital, am I going to know what to do?"</i>	Anxiety producing (decreased confidence)	Supportive learning environment	Facilitator training in debriefing
<i>I do not think we have enough opportunities. We should be doing one a week.</i>	Practice	Simulation opportunities	Scaffolded simulation program
<i>Knowing at the beginning what is expected of us would have been helpful, rather than being chucked as a group into the room. They just start the simulation and we wonder what it is we should be doing.</i>	Lack of orientation	Simulation design	Sound pedagogical underpinnings in design
<i>If we go from the parenting thing, we know the educators can ride a bike. We need to have the training wheels on at first until we can gain the confidence to take the training wheels off.</i>	Practice	Simulation opportunities	Scaffolded simulation program

3.2. Action Cycle Two

Cycle two embedded student suggestions made in cycle one. This cycle involved second year students who participated in the newly designed scenario which employed pre- and post-questionnaires to determine the most valued instructional elements. The following changes were made to the simulation:

- More time was allotted (1.5 hours) for the simulation and debriefing.
- Students were oriented to the simulation room before scenario.
- Pre-briefing to the simulation was given.
- Educator came out from behind the one-way glass and stayed in the room.
- Students were allocated one of four roles.

In Cycle Two, students completed a pre- and post-simulation questionnaire [8]. The responses from these questionnaires were transcribed and thematically coded in the same manner as described in Cycle one [15] [19]. Emerging themes were used to design a simulation suite for Cycle Three.

3.3. Action Cycle Three

Cycle Three involved students moving through a simulation suite of three scenarios (hypovolaemic shock, croup, acute coronary syndrome) [8]. The students proceeded through a specific sequence of instructional events for each scenario, and moved through the scenarios in a specific order (repeated measures design). A 10-question pre-test began the simulation experience and closed the simulation experience for each scenario. The pre- and post-test results were collated and analyzed using SASTM data analysis software.

The students' second performance in each scenario was analyzed by two educators using the Lasater Clinical Judgment Rubric [20]. This data was analyzed using SASTM data analysis software in order to see student changes in clinical judgment as they progressed through the simulation suite.

3.4. Participants

Recruitment methods for this research varied within each cycle. Cycle one recruited participants via student university email and involved students from all three years of an undergraduate nursing program (n = 15). Cycle two recruited volunteers via an intermediary in the second year of the nursing program (n = 125). Cycle Three employed recruitment via university email to final semester nursing students which quickly expanded to snowballing as students began to recruit through a student-operated FacebookTM page (n = 21).

Sample size involved no power calculation and was dependent upon student availability and snowballing (cycle three). Participants were all between the ages of 18 and 32 years at the time of this research. Four participants were male, the remainder female. All participants were enrolled in a three-year bachelor of nursing program in Auckland, New Zealand. Participants were 54% European, 22% Asian, 9% Pasifika, 6% Maori, and 9% undeclared.

Confidentiality was maintained by way of using aggregated data and/or pseudonyms. Informed consent was obtained after reading the prepared information

sheets. Participants consented to being photographed and videoed during all three cycles of this project. Researchers stressed throughout that no judgements of educational or clinical practice were being made and that decisions regarding participation would not affect future education or employment.

3.5. Data Analysis Cycle One: Understanding Nature of the Storm

Themes emerging from thematic analysis [15] [19] in Cycle one included 1) erosion of student confidence in current simulation practice; 2) need for stated learning outcomes before simulation commencement; 3) need for educator training in simulation facilitation; and 4) need for a scaffolded simulation program throughout the undergraduate degree [8]. Students were remarkably clear about erosion of confidence and need for educator training in simulation facilitation:

“I feel sick on the days I have to go into the SIM room—literally sick. No confidence. I feel awkward the whole time. It is too quick, and the situations are complex which isn’t really necessary (Focus Group 1, Cycle One)”.

Students desired to be gently moved through the simulation instead of being exposed to what felt like an out-of-control situation. The need for stated learning outcomes was voiced in the following comment:

“Going over it [the learning outcomes] before the simulation helped us. We could check the BP and make sure we could hear everything, and review how to do the nebulizer. The devil is often in the details in an arrest and it’s those little things that can trip you up (Debriefing, Cycle One)”.

The need for educator training in the facilitation of simulation was voiced by the following student:

“We need to have the training wheels at first until we can gain the confidence to take the training wheels off. It would be better to say, ‘Keep the wheels on until you can go to the end of the driveway by yourself. When I was learning to ride a bike, my dad would run beside me and say, ‘You’re going to fast!’ I need the lecturers to do the same thing (Focus Group, Cycle One)”.

This comment, along with many others, expressed the need for educator training in simulation design and facilitation. We had the equipment, but we now needed the training in order to build an effective undergraduate simulation program.

3.6. Data Analysis Cycle Two: Beginning to Navigate the Storm

Cycle two yielded a prioritization of instructional scaffolds which were valued by students and contributed to their learning. The four most valued educational components of the revised simulation were: 1) educator modeling of expected simulation performance; 2) opportunity to repeat simulation after feedback given; 3) supportive debriefing after simulation; and 4) using the ISBAR tool to obtain support from other professionals.

In regards to modeling of expected performance, one student stated:

“The role play that [the educator] did in the middle was really helpful to show

us all of the roles needed and assessments that needed to be done (Questionnaire, Cycle Two)”.

In regards to repetition, the comment was made:

“[Repetition] helped immensely. It gave me an opportunity to ‘right what was wrong’. Being told what went wrong, and then leaving it at that is not enough for me to know that I have learnt it properly. (Questionnaire, Cycle Two)”.

Supportive debriefing during and after the simulation was voiced as follows:

“In the past, the lecturers needed to have a more positive attitude when giving feedback [debriefing]. Historically we had lecturers who ‘told us off for the negative aspects of practice with no emphasis on even a tiny bit of positive aspects of our practice (Questionnaire, Cycle Two)”.

The simulation employed in Cycle Two involved a deteriorating situation in which students were required to recruit assistance of other professionals using the ISBAR tool (Identify, Situation, Behavior, Assessment, Requirement). The use of the ISBAR tool was identified as the fourth most valued educational component in the simulation. One student stated:

“I feel more confident as I now know effective communication skills [through ISBAR]. I mostly appreciated learning that in a live situation we must be fully prepared before calling doctors as being hung up on in reality would be extremely humiliating (Questionnaire, Cycle Two)”.

Communication is key to management of safe patient care. Ultimately, Cycle Two students requested a simulation suite be available in their final semester in order to prepare for entry to professional practice. Thus, Cycle Three emerged.

3.7. Data Analysis Cycle Three: Surviving and Learning from the Storm

Cycle Three provided some insight as to the effect of simulation on content knowledge. As can be seen in **Figure 1**, within each scenario the post-tests improved overall. The focus group comments showed improved student confidence and a feeling that content knowledge was growing as evidenced by the following comment:

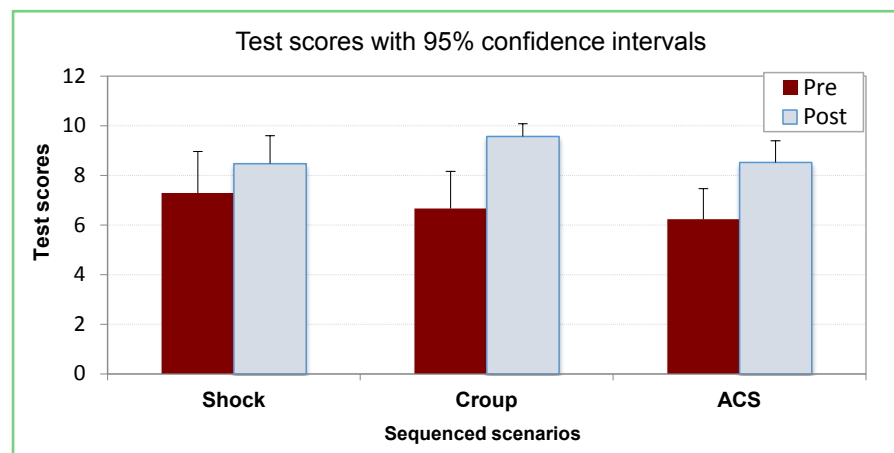


Figure 1. Average pre- and post-simulation scores by scenario.

“I liked the pre- and post-test because I could see my improvement. It makes you aware of what you do not know also (Focus Group, Cycle Three)”.

An interesting aspect from the pre- and post-test data involved a measure of variability called the standard deviation (SD). Standard deviation is a descriptive statistic which indicates the variation from the average [21]. This becomes important in educational research for determining the mastery of subject matter. A smaller standard deviation is desirable indicating a greater degree of mastery over the subject.

The standard deviation for the three scenario test results were 1) hypovolaemic shock SD = 1.94; 2) croup SD = 1.63; and 3) acute coronary syndrome SD = 1.23. The standard deviation decreased as the students progressed through the scenarios. This indicates that the students were showing progression in their ability to master the subject matter. This improvement in content knowledge was echoed in the focus groups:

“Seeing the progress is what is satisfying to us. Seeing ourselves get better really satisfies us personally. Because we know we can improve (Focus Group, Cycle Three)”.

The students also commented on the powerful influence of modeling on their learning:

“With the pediatric simulation I noticed when [my partner] and I did the simulation first time we went for the IM injection first. When we watched the model clip we noticed the educator did the nebulizer first. That made sense as it [the adrenaline nebulizer] acts faster in the lungs than the IM injection. So we changed that order of medications for our second attempt because that made sense (Focus Group, Cycle Three)”.

Figure 1 shows the pre- and post-simulation test scores. As can be seen in **Figure 1**, within each scenario the post-tests improved showing a positive influence of the simulation experience on content knowledge. Secondly, the pre- and post-tests highlighted a marked improvement of students in the second of the three scenarios (*i.e.* croup). The overall improvement in scores of pre- and post-tests across the three scenarios was as follows:

- **Hypovolaemic shock:** Average improvement of 1.2 points between tests
- **Croup:** Average improvement of 2.9 points between tests
- **Acute coronary syndrome:** Average improvement of 2.3 points between tests

Research has shown that it is possible to enhance performance by warming students up to tasks in the educational environment [22]. This is known as the *warm-up effect*. Thus, a possible explanation for the higher scores in the croup scenario might be the *warm up effect* resulting in an increase in the second set of scores by nearly three points. The degree of improvement in the third scenario was not as great as the second, possibly due to the *fatigue effect* [23] influencing student performance after two previous hours of simulation.

By the time the students had completed two scenarios (one hour each), it is possible fatigue began to influence their performance in the final scenario. Re-

search has shown that with progressive multiple choice testing, there is a point where fatigue or boredom can influence test results in the opposite direction, and thus increase the variance and errors in test results [23]. This fatigue effect may have influenced the test scores in the third scenario explaining why the overall improvement in scores dropped from the second to the third scenario. This concept must be taken into consideration in overall simulation design when using multiple scenarios.

Cycle three employed the Lasater rubric [20] which evaluates students in four areas: 1) noticing; 2) interpreting; 3) responding; and 4) reflecting. The Lasater scores showed improvement in clinical judgment as students progressed through the scenarios (**Figure 2**). This data demonstrates that simulation as a teaching platform, can improve students' ability to notice, interpret, respond and reflection on deteriorating patient conditions. This ability is pivotal to patient safety [24].

When asked about the effects of simulation on her overall performance as a nurse, one student summed it up stating:

"...just being able to hold a space in an emergency situation has improved. Even my knowledge and interventions grew and we learned more as we progressed (Focus Group, Cycle Three)".

This renewed confidence coupled with an improved ability to manage deteriorating situations was keenly felt by students participating in the simulation suite.

4. Discussion

Simulation of real-world settings in which students construct knowledge through active participation in learning increases student engagement [25]. From this research, seven strategies emerged which operated as scaffolds in improving student performance and engagement while managing the "storm" of a deteriorating clinical situation. It is important that designers of simulation become adept at using scaffolds to assist students in constructing effective clinical

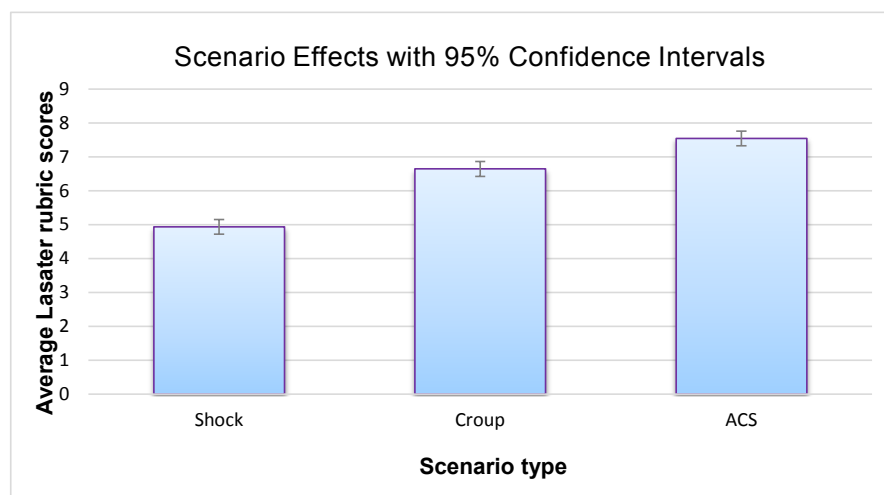


Figure 2. Average Lasater rubric scores by scenario.

management strategies. Seven scaffolds emerged from this research which helped guide students as they constructed their own learning in the management of deteriorating clinical situations.

4.1. Scaffold One: Understand the Basic Causes of the Storm

In order to gently introduce students to the scenario, a pre- and post-simulation test were employed. The test was designed to highlight what the student knew about the causes and contributing factors of the particular deteriorating situation they would encounter in the simulation. The causes of the deterioration were outlined in the pre-briefing (a video podcast of 7 minutes) [8]. Scaffolding as an instructional design technique is often used to bridge learning gaps, highlighting the difference between what students have learned and what they are expected to know [4].

The pre- and post-tests were a form of *conceptual scaffolding* in that they hinted to ways students might reach a solution in managing the “storm”. Because the tests were administered before and after the simulation, they were also a form of feedback given within the simulation learning package (feedback scaffold). In nearly every case, post-tests showed improved scores over pre-tests (**Figure 1**). The pre- and post-tests gave the students a sense of progress, confidence, and accomplishment as they progressed through the “storm” of caring for a deteriorating patient.

Simulation should engage the student’s activities in a way which is at once both enjoyable, and at the same time inspires future learning. Dewey ([18], p. 27) states, “no experience lives and dies to itself”. Every experience lives on in future experiences. The pre- and post-tests had the effect of “living on”. The students encountered the “storm” first in the pre-test, and again in the post-test. They sensed their improvement in knowledge and clinical reasoning, and wanted to continue to experience this by participating in more simulation. This strategy provided concrete and visible evidence of student progress, which is integral to successful navigation of the simulation storm.

4.2. Scaffold Two: Providing Course Correction in the midst of the Storm

Students in the focus groups in cycle one shared that simulation educators “behind the one-way glass” unnerved them, and created a sense of competition between students and educators which destroyed their sense of a supportive learning environment. This strategy of working alongside students during the simulation provides progressive feedback while the task is being undertaken [4]. It is a form of coaching scaffold providing expected feedback in the midst of the storm.

John Dewey ([17], p. 90) emphasized that, “... the meaning of native activities is not native; it is acquired”. Meaning develops when students interact with a matured social medium. In the context of simulation, the matured social medium is the educator. When the educator is in the simulation with the students, helping them navigate the storm, feedback can result in new understandings

based on a combination of previous knowledge woven together with new ideas.

Some [9] term this form of interaction with students situated teaching. It involves coaching the student through what is salient (most notable and significant) about a specific clinical situation. Ultimately, if this process is occurring regularly and in a safe environment, students will begin to develop clinical imagination and the skills of clinical reasoning [26]. This ability to translate knowledge from pathophysiological, pharmacological, and skills silos, into concerns and actions for a particular patient, is the gold nugget of immersive classrooms [27] [28].

4.3. Scaffold Three: Modeling Best Practice in Managing the Storm

Students in the second action cycle rated modeling by the educator as the most valuable aspect influencing their performance in the simulation. According to McLoughlin [4], modeling is another form of scaffolding which assists students in revising their own performance. Dewey [18] emphasized that a revised performance requires new habit formation. The formation of new habits requires a change in the conditions or context of the learning environment [17]. In this case, modeling provided a changed context which had direct influence on student performance [8].

Dewey [18] explains that modeling expected performance allows for impulse formation. An impulse is a turning point, a point of deviation which begins a new course of response to a problem [17]. Impulses are the starting points for assimilation of new knowledge, which paves the way for the integration of new habits. To the constructivist, learning is a result of the student integrating this new knowledge into current problem-solving processes [29]. The content is not delivered, but constructed in a learner-centric, team-based, collaborative learning environment. Through modeling, new information was “delivered” which the students could use to navigate to safety.

4.4. Scaffold Four: Perfecting New Skills for Navigating the Storm

Students in cycle two stated that the second most valued aspect of the simulation was the allowance of a repeat performance. Allowing for repeat performance, after feedback is given, is a form of conceptual scaffolding [4] which helps students to reach a final solution. Repetition asks students to self-monitor their approach and improve which is also a form of reflective scaffolding [4].

Repetition is a valuable aspect of behaviorist and cognitivist philosophical thought [8]. Repetition combined with reinforcement can assist learners in retaining new knowledge [30]. Cognitivists echo this sentiment stating that repetition ensures that habits are formed which will be embedded into long-term memory [31], thus reducing cognitive load on working memory [32]. Repetition allows for the storing of automated skills ready to be used in the next storm [31] [33]. Repetition as a design scaffold has also been used to allow for refined skill performance and offer a path to skill improvement [34].

4.5. Scaffold Five: Ensuring Every Sailor Has a Role in the Midst of the Storm

Students in all three action cycles stated that creating roles helped them to manage clinical deterioration with greater efficiency and confidence. Designing the simulation so students perform within a role is a conceptual scaffold [4] which assists students to manage the storm of a deteriorating patient while working within a team. They might feel intimidated with managing the entire situation alone, but working within a role is “safer” as no one individual bears the entire weight of the situation.

Additionally, roles help to reduce cognitive load, the amount of processing required to integrate new information by the working memory [32]. Roles assist students to manage the new information more efficiently resulting in renewed confidence and competence. Simulation design should consider the load on working memory (which can only cope with 5 - 7 new pieces of information), while encouraging automated skill formation [33]. This form of conceptual scaffolding helps maximise learning while reducing the sense of being overwhelmed by the simulation storm.

4.6. Scaffold Six: Calling for Help to Ensure Survival of the Storm

The use of the ISBAR (*I*dentify, *S*ituation, *B*ackground, *A*ssessment, *R*equirement) tool was the fourth most valued interventional scaffold identified by students. Teaching the use of this tool is a coaching scaffold [4] which allows students to improve in their ability to elicit assistance. It provides a standardized structure of communication which helps both parties to prioritize information while decreasing the chances of omitting relevant information. It also helps to decrease assumptions by making the reason for the communication obvious at the outset.

These comments are aligned with the importance of clear and concise communication shown in the literature [35]. Failures in communication have been estimated to be the major factor in 60% - 70% of serious incidents [36] in the United States. In a large review of reportable adverse events that led to permanent disability in Australia, 11% were estimated to be attributable to communication issues [37]. It is interesting to note that this is almost double that attributed to inadequate skill levels in practitioners. The students felt that the ISBAR tool kept them focused when stress and other confounding factors were producing anxiety and distraction. In essence, it enabled them to better manage the complexity of the situation, and in educational terms it reduced the load on working memory [32] [38].

4.7. Scaffold Seven: Reflecting on How to Better Manage the next Storm

Debriefing is a reflective scaffold [4] which encourages students to self-monitor and self-assess. It is a means of reflecting with the educator and peers as to ways they might improve in managing the storm when it reoccurs. Debriefing weaves

together the students' prior understandings with new knowledge in a manner which helps clarify confusion [17].

Dewey [17] explains that in order to create educative learning environments, the means (intermediate steps) are as important as the end (the final thought/act). Debriefing is an intermediate step, very close to the end, which allows students to move in a scaffolded manner from knowledge acquisition (pre- and post-tests) to problem solving in the simulation, to reflection on the simulation. The job of a simulation educator is to carefully manage the means by embedding scaffolds to guide students to the desired end. Debriefing, when employed as a reflective scaffold, surfaces new insights and ways of managing the storm.

These instructional events are categorized into scaffold types in **Table 2**. Each instructional event serves a particular purpose in assisting students to navigate the simulation storm of managing a deteriorating patient.

5. Limitations

This study was limited by the number of participants involved. Small numbers in the third action cycle constrained generalizability. In order to make appropriate applications to practice, further research could use a similar design to the third action cycle with approximately 100 students in each scenario (acute coronary syndrome, croup, hypovolemic shock).


Another limitation in the study was a lack of training for raters in the *Lasater Clinical Simulation Rubric*. Due to time constraints, the raters were not upskilled resulting in compromised interrater reliability. This could be amended by training all raters in the use of the Lasater rubric before data collection. Taking this extra step would improve the internal validity of the study.

6. Conclusions: Seven Scaffolds to Manage the Simulation Storm of Deteriorating Patients

In this research, seven scaffolds were employed to help students manage a simulated deteriorating patient situation. Clinical deterioration in patients is similar

Table 2. Scaffolds used for instructional events.

Instructional event	Scaffold used	Purpose of Scaffold
Pre- and post-simulation tests	Conceptual & Feedback Scaffold	To assist students in understanding the basic causes, signs, symptoms, and treatment of a deteriorating patient condition
Work alongside in situated coaching	Coaching & Feedback Scaffolds	To improve problem-solving and enhance critical thinking
Model expected performance	Modeling & Reflective Scaffolds	To provide an example of expected performance while allowing students to reflect and modify their own performance
Give opportunities for improvement	Conceptual & Reflective Scaffolds	To encourage student self-monitoring with a mind to improve overall performance while improving patient outcomes
Allocate roles	Conceptual Scaffold	To assist students to perfect one role while reaching final goal of saving patient and working effectively within a team
Teach effective communication (ISBAR)	Coaching Scaffold	To allow students to call for assistance in a deteriorating patient situation
Debriefing	Reflective and Feedback Scaffolds	To encourage students to self-monitor and self-assess while improving overall performance

to navigating a “storm on the open seas”. As on the seas, the ultimate end of poor patient management could be severe loss or even death. The seven scaffolds highlighted in this research are in actuality seven instructional interventions. In summary, the seven scaffolds are: 1) understanding basic causes of the storm; 2) providing course correction in the midst of the storm; 3) modeling best practice in managing the storm; 4) perfecting new skills for navigating the storm; 5) giving every sailor a role in the midst of the storm; 6) calling for help to ensure survival of the storm; and 7) reflecting  how to better manage the next storm.

None of this is hard. Nevertheless, at the nursing school where this research was conducted, these scaffolds were not being enacted prior to the work done in this research. They are simple strategies that underpin a learning experience that excites, engages and grows the confidence and competence of students.

References

- [1] Nehring, W. and Lashley, F.R. (2009) Nursing Simulation: A Review of the Past 40 Years. *Simulation & Gaming*, **40**, 528-551.
<https://doi.org/10.1177/1046878109332282>
- [2] Nickerson, M. and Pollard, M. (2010) Mrs. Chase and Her Descendants: A Historical View of Simulation. *Creative Nursing*, **16**, 101-105.
- [3] Basu, S., Sengupta, P. and Biswas, G. (2015) A Scaffolding Framework to Support Learning of Emergent Phenomena Using Multi-Agent-Based Simulation Environments. *Research in Science Education*, **45**, 293-324.
<https://doi.org/10.1007/s11165-014-9424-z>
- [4] McLoughlin, C.E. and Alam, S.L. (2014) A Case Study of Instructor Scaffolding Using Web 2.0 Tools to Teach Social Informatics. *Journal of Information Systems Education*, **25**, 125-136.
- [5] O’Leary, J., Nash, R. and Lewis, P. (2016) Standard Instruction versus Simulation: Educating Registered Nurses in the Early Recognition of Patient Deterioration in Paediatric Critical Care. *Nurse Education Today*, **36**, 287-292.
<https://doi.org/10.1016/j.nedt.2015.07.021>
- [6] Seropian, M., Brown, K. and Driggers, B. (2004) Simulation: Not Just a Manikin. *Journal of Nursing Education*, **43**, 164-169.
<http://www.journalofnursingeducation.com/>
- [7] Adamson, K. (2010) Integrating Human Patient Simulation into Associate Degree Nursing Curricula. *Clinical Simulation in Nursing*, **6**, e75-e81.
<https://doi.org/10.1016/j.ecns.2009.06.002>
- [8] Erlam, G., Smythe, E. and Wright-St Clair, V. (2015) Improving Pedagogical Practices with Undergraduate Nursing Students in High-Fidelity Simulation: A Thesis Submitted to Auckland University of Technology in Partial Fulfilment of the Requirements for the Degree of Doctor of Health Science, 2015. Auckland University of Technology, Auckland.
- [9] Benner, P., Sutphen, M., Leonard, V. and Day, L. (2010) *Educating Nurses: A Call for Radical Transformation*. San Francisco, CA: Jossey-Bass.
- [10] Tiantong, M. and Teemuangjai, S. (2013) The Four Scaffolding Modules for Collaborative Problem-Based Learning through the Computer Network on Moodle LMS for the Computer Programming Course. *International Education Studies*, **6**, 47-55.
<https://doi.org/10.5539/ies.v6n5p47>

- [11] Abbott, S. (2015) Scaffolding. <http://edglossary.org/scaffolding/>
- [12] Tait, D. (2010) Nursing Recognition and Response to Signs of Clinical Deterioration. *Nursing Management*, **17**, 31-35. <https://doi.org/10.7748/nm2010.10.17.6.31.c8007>
- [13] Walshe, N., O'Brien, S., Murphy, S., Hartigan, I. and Graham, R. (2014) Original Research: Simulation Performance Evaluation: Inter-Rater Reliability of the Detect Deterioration, Accurate Assessment, Rapid Response, Effective Escalation-Patient Safety Rubric. *Clinical Simulation in Nursing*, **10**, 446-454. <https://doi.org/10.1016/j.ecns.2014.06.005>
- [14] Yin, C., Song, Y., Tabata, Y., Ogata, H. and Hwang, G.-J. (2013) Developing and Implementing a Framework of Participatory Simulation for Mobile Learning Using Scaffolding. *Educational Technology & Society*, **16**, 137-150.
- [15] McNiff, J. and Whitehead, J. (2011) All You Need to Know about Action Research. 2nd Edition, Sage, Thousand Oaks.
- [16] Dewey, J. (1910) Valid Knowledge and the "Subjectivity of Experience". In: Boydston, J.A., Ed., *John Dewey: The Middle Works, 1899-1924, Vol. 6*, Southern Illinois University Press, Carbondale, 70-79. <https://doi.org/10.2307/2010781>
- [17] Dewey, J. (1922) *Human Nature and Conduct: An Introduction to Social Psychology*. Henry Holt, New York.
- [18] Dewey, J. (1938) Experience and Education. *Educational Forum*, **50**, 241-252. <https://doi.org/10.1080/00131728609335764>
- [19] Guest, G. (2012) Applied Thematic Analysis. <http://methods.sagepub.com/book/applied-thematic-analysis>
- [20] Lasater, K. (2007) Clinical Judgment Development: Using Simulation to Create an Assessment Rubric. *Journal of Nursing Education*, **46**, 496-503.
- [21] Mills, G.E. (2014) *Action Research: A Guide for the Teacher Researcher*. 5th Edition, Pearson Education, Boston.
- [22] Estalkhbijari, Z.P. and Khodareza, M. (2012) The Effects of Warm-Up Tasks on the Iranian EFL Students' Writing Ability. *International Education Studies*, **5**, 190-203.
- [23] Czajkowski, M., Giergiczny, M. and Greene, W.H. (2014) Learning and Fatigue Effects Revisited: Investigating the Effects of Accounting for Unobservable Preference and Scale Heterogeneity. *Land Economics*, **90**, 324-351. <https://doi.org/10.3368/le.90.2.324>
- [24] Steven, A., Magnusson, C., Smith, P. and Pearson, P.H. (2014) Patient Safety in Nursing Education: Contexts, Tensions and Feeling Safe to Learn. *Nurse Education Today*, **34**, 277-284. <https://doi.org/10.1016/j.nedt.2013.04.025>
- [25] McDonnell, J. (2016) Scaffolding Practices: A Study of Design Practitioner Engagement in Design Education. *Design Studies*, **45**, 9-29. <https://doi.org/10.1016/j.destud.2015.12.006>
- [26] Ashcraft, A., Opton, L., Bridges, R., Caballero, S., Veasart, A. and Weaver, C. (2013) Simulation Evaluation Using a Modified Lasater Clinical Judgment Rubric. *Nursing Education Perspectives*, **34**, 122-126. <https://doi.org/10.5480/1536-5026-34.2.122>
- [27] Erlam, G., Smythe, L. and Wright, V. (2016) Simulation and Millennials—The Perfect Storm. *Open Journal of Nursing*, **6**, 688-698. <https://doi.org/10.4236/ojn.2016.69071>
- [28] Passmore, G.G. (2014) Concept Mapping: A Meaningful Learning Tool to Promote Conceptual Understanding and Clinical Reasoning. In: Bradshaw, M.J. and Lowenstein, A.J., Eds., *Innovative Teaching Strategies in Nursing and Related Health*

Professions, 6th Edition, Jones & Bartlett Learning, Boston, 397-415.

- [29] Haw, M.A. (2006) Learning Theories Applied to Nursing Curriculum Development. In: Keating, S.B., Ed., *Curriculum Development and Evaluation in Nursing*, Lippincott Williams & Wilkins, Philadelphia, 49-60.
- [30] Skinner, B.F. (1938) *The Behavior of Organisms: An Experimental Analysis*. B.F. Skinner Foundation, Cambridge.
- [31] Artino, A.R. (2008) Cognitive Load Theory and the Role of Learner Experience: An Abbreviated Review for Educational Practitioners. *Association for the Advancement of Computing in Education Journal*, **16**, 425-439.
- [32] Reedy, G.B. (2015) Using Cognitive Load Theory to Inform Simulation Design and Practice. *Clinical Simulation in Nursing*, **11**, 355-360.
<https://doi.org/10.1016/j.ecns.2015.05.004>
- [33] Sweller, J., Ayres, G. and Kalyuga, S. (2011) *Cognitive Load Theory*. Springer Publishing, New York. <https://doi.org/10.1007/978-1-4419-8126-4>
- [34] Clapper, T.C. and Kardong-Edgren, S. (2012) Using Deliberate Practice and Simulation to Improve Nursing Skills. *Clinical Simulation in Nursing*, **8**, e109-e113.
<https://doi.org/10.1016/j.ecns.2010.12.001>
- [35] Finnigan, M.A., Marshall, S.D. and Flanagan, B.T. (2010) ISBAR for Clear Communication: One Hospital's Experience Spreading the Message. *Australian Health Review*, **34**, 400-404. <https://doi.org/10.1071/AH09823>
- [36] Joint Commission on the Accreditation of Hospital Organizations (2014) Sentinel Event Data: Event Type by Year.
http://www.jointcommission.org/assets/1/18/Event_Type_by_Year_1995-2Q2013.pdf
- [37] World Health Organisation (2007) Communication during Patient Handovers, Aide Memoire. *Patient Safety Solutions*, **1**, 1-4.
<http://www.westwick-farrow.com.au/mags/circulation.asp?origin=safety>
- [38] Josephsen, J. (2015) Cognitive load Theory and Nursing Simulation: An Integrative Review. *Clinical Simulation in Nursing*, **11**, 259-267.
<https://doi.org/10.1016/j.ecns.2015.02.004>



Scientific Research Publishing

Submit or recommend next manuscript to SCIRP and we will provide best service for you:

Accepting pre-submission inquiries through Email, Facebook, LinkedIn, Twitter, etc.
A wide selection of journals (inclusive of 9 subjects, more than 200 journals)
Providing 24-hour high-quality service
User-friendly online submission system
Fair and swift peer-review system
Efficient typesetting and proofreading procedure
Display of the result of downloads and visits, as well as the number of cited articles
Maximum dissemination of your research work

Submit your manuscript at: <http://papersubmission.scirp.org/>

Or contact ojn@scirp.org