

# Learning in simulation: Ready? Steady? GO!

I Crafford<sup>1</sup>, C Kilian<sup>2</sup>, R Moore-Saayman<sup>1</sup>, J Dreyer<sup>1</sup>, M Rossouw<sup>3</sup>

<sup>1</sup> Netcare Education, Western Cape, Netcare Education (Pty) Ltd. Registered as a Higher Education Institution

<sup>2</sup> Netcare Education, Gauteng South West, Netcare Education (Pty) Ltd. Registered as a Higher Education Institution

<sup>3</sup> Western Cape College of Nursing

## Abstract

Learning through simulation is rapidly becoming a significant teaching and learning strategy in nursing education. With this strategy nurse educators can teach nursing students the principles of patient care in a controlled and safe simulated environment prior to real patient contact. Confidence in skills and having the knowledge to manage complex patient situations are crucial outcomes for nursing education programmes. Because nursing students cannot be prepared in the clinical environment for every possible patient encounter which will require specific skills and knowledge, clinical simulation has been incorporated as a teaching and learning strategy by nurse educators to enhance these skills and knowledge. This study assessed first-year nursing students' experiences of learning in simulation.

**Keywords:** simulation, simulation laboratory, learning, nurse educator, nursing students, clinical experience, psychomotor skills, affective skills, confidence

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## Introduction

Clinical simulation is increasingly becoming an essential component in nursing education and other healthcare professions, based on several professional, educational, social, economic, political and safety factors propelling its use (Dunnington, 2014:157). The use of a simulation laboratory is making a significant contribution in nursing education and the healthcare profession because nurses can be trained to successfully deal with uncommon, inaccessible, or dangerous procedures that require competency prior to application in real patient care situations (Dunnington, 2014:157). Furthermore, learning in simulation, may ultimately have a powerful impact on the quality of health care when these skills can be transferred to the clinical setting (Botma, 2014; Robinson and Dearmon, 2013).

## Background

It is not a new concept in the training of healthcare practitioners to be trained and found competent in certain skills in a simulated environment. As early as 1847 (Nehring, 2010: 10,34), the *Handbook for Hospital Sisters* recommended that every nursing school should have models of legs and arms to learn bandaging, a mechanical dummy, a black drawing board, a jointed skeleton, drawings and books.

The World Health Organization (WHO, 2002; 2016) reported on current trends reflecting a growing concern for the state of health globally. These concerns emanate from various factors including an ageing population, a more demanding society, increased costs and decreased resources. Consequently, there are increased demands on health education institutions to produce professionals who are able to meet the healthcare needs of society (The Guardian, 2015; Griffiths, Speed, Horne and Keeley, 2012). To this end, the fundamental objectives of the regulators of nursing education institutions are to provide students with the knowledge, skills, values and attitudes to function as competent healthcare practitioners (WHO, 2002; 2016).

The South African Nursing Council (SANC) is the governing body for nursing and nursing education in South Africa and has specific rules related to theoretical and clinical components of training of nurses. All nursing education institutions (NEI) offering nurse training must be accredited with the SANC and comply with these rules. The private NEI where this research was undertaken is accredited with the SANC for the training of nursing auxiliaries, enrolled nurses and registered nurses. Here, clinical training takes place predominantly in authentic clinical settings with real patient situations. A portion of the clinical training for student nurses attending this institution is, however, dedicated to learning in simulation in the clinical skills laboratory (SANC, 1997).

Schiavenato (2009:389) defines simulation as 'techniques used to represent nursing processes and actions in an educational context'. These processes and actions could range from basic skills addressing psychomotor skills to complex skills targeting psychomotor, cognitive, and affective, as well as critical thinking and clinical judgment skills (Cato, 2013; Betts, 2012; Kadoura, 2010).

Simulation as a learning method is advocated in the literature and has gained popularity over the last few decades (Harder, 2009; McCallum, 2007). This may be attributed to technological advancements e.g. high-fidelity simulators, which make it possible to provide realistic conditions for learning (Bland, Topping and Wood, 2011). Other factors that have contributed to the increase in the use of simulation are the lack of clinical training facilities and mentors (Poikela, Ruokamo & Teräs, 2014), an increased number of nursing programmes (Cato, 2013), and changes in nursing education (Houghton, Casey, Shaw & Murphy, 2011). Furthermore, the traditional assumption that clinical settings offer more authentic learning experiences has been replaced by support for the use of simulation as an additional method for the teaching of clinical skills (Gibbs, Trotta and Overbeck, 2014; Jeffries, 2012).

Numerous studies have been undertaken to determine the value of simulation for the development of clinical skills. Weller, Nestel, Marshall, Brooks and Conn (2012) and Jeffries (2012), claim that simulation-based education could improve efficiency and accuracy of students as compared to learning in clinical settings. This is supported by Cioffi, Purcal and Arundell (2005), and Muir (2017) who found that students who engaged in simulation during learning were able to arrive at clinical decisions much sooner.

Childs and Sepples (2006) summarised the advantages of using simulation in education as: i) the achievement of better outcomes when combined with lecturing; ii) enhanced retention of knowledge and skills, for a longer period, in comparison with traditional teaching alone; iii) mastering of new skills occurs faster, with more student satisfaction in the teaching and learning process, and iv) the enhancement of problem-solving skills and self-confidence, as a result of stimulation of critical thinking in simulated environments (Childs and Sepples, 2006). In addition, Cato (2013), in her study on simulation settings, discovered that nursing students preferred learning in simulation since it offered an opportunity to reflect on their actions. Critical thinking and communication skills were also identified as benefits of learning in simulation (Muir, 2017; Houghton, Casey, Shaw & Murphy, 2011; McCallum, 2007). Contrary to this, some literature identifies challenges with the use of simulation. Jeffries (2012) found that students felt pressurised in a simulated environment due to the constant close evaluation by the instructor. In certain instances, students found it difficult to transfer skills from simulation to clinical settings (Arigbede, Denloye & Dosumu, 2014; Botma, 2014; Medley & Horne, 2005).

## Aim

The study aimed to explore the experiences of first-year basic nursing students about their learning in simulated environments.

## Research design

The qualitative descriptive, explorative and contextual study comprised a population of first-year students, registered for at least six (6) months at the NEI for the programme leading to the Enrolment as a Nurse. These students were from eight (8) private accredited hospitals in the Western Cape (N=61). Purposive sampling was used. The respondents completed a demographic survey and an open-ended questionnaire with questions which focused on the experiences during learning in simulation of the respondents. The researchers took all the material and immersed themselves, reading through the text many times. Themes were selected and were rearranged in a smaller number of main themes with several sub-themes under each of the main themes. The themes related directly to the way participants felt about the simulation laboratory.

## Ethical considerations

The conduct of this study was guided by the principles of written informed consent from the Institutional Research Operations Committee (ROC), NEI and the participants. Since nursing students were considered a vulnerable group, participation was voluntary and students were informed that they may withdraw from the study at any stage without providing a reason. The participants did not provide identifiable data, to protect their confidentiality.

## Participants

The inclusion criteria were limited to first-year basic nursing students registered for at least six (6) months with an accredited nursing school for the following course: R2175 of 19 November 1993-Regulation relating to the programme leading to Enrolment as a Nurse (Nursing Act of 1978, Regulation 2175).

## Data collection and analysis

Data was collected using open-ended questionnaires (See Table I).

Transcripts of the open-ended questions were read and re-read. Coding was done by coloured marker pens to group sections together. The researchers marked different sections of the data as relevant to the themes. Phrases, sentences and paragraphs which participants used, were coded, while exploring themes more closely.

## Presentation of findings and discussion

The data revealed five (5) key themes related to nursing students' perceptions of learning in simulation:

Table 1

How is simulation used in your nursing education programme?
How did simulation learning experiences assist you to become skilled in nursing procedures, like monitoring of vital signs?
How did simulation learning experiences assist you in developing your skills to effectively observe your patients?
How did simulation learning experiences assist you in developing your abilities to interpret the information you obtained from your patient?
How did simulation learning experiences aid you in developing your abilities to respond to patient's condition/or the findings of your observations of the patient?
What would you want to do differently with regards to simulated learning experiences?

1. Level of satisfaction concerning simulation laboratory;
2. Confidence before doing nursing procedures in real patient situations;
3. A positive experience regarding reinforcement/ repetition of skills in the simulation laboratory;
4. A positive application of theory and practice learned in the simulation laboratory and;
5. Responsiveness to patients' needs.

**Level of satisfaction concerning simulation laboratory/peer support**

A positive practical experience was quite a dominant factor emerging from the nursing students' responses. All the participants (N=61) indicated positive experiences of learning in simulation. Students generally verbalised that learning in simulation made them feel confident:

*"It is used to practice all procedures freely until we feel confident enough to be signed off as competent", and*

*"...the simulation is an excellent place to gain confidence, experiences to approach the patient".*

From a systematic review on simulation-based learning in nurse education, the learning outcomes were compared for three intervention groups: case study, a static manikin and HFS (high fidelity simulation) group (Cant & Cooper, 2009:11). All groups reported that they gained knowledge, however the HFS group was more satisfied and the HFS and static manikin groups reported greater confidence when caring for a postoperative patient compared with the case study group (Cant & Cooper, 2009:11). HFS using manikins has implications for practice and policy because it is an effective teaching and learning method when best practice guidelines are adhered to (Cant & Cooper, 2009:11).

Although simulation has long been part of nursing education, high-fidelity human simulators (HFHSs), are gaining widespread adoption in the classroom as well as the clinical setting because these manikins mimic real life patients through pulse, voice, heart and lung sounds (Brown & Chronister, 2009:45).

Some of the positive conclusions reached in a study in

the USA regarding the use of HFHSs, are that it affects the self-confidence of nursing students in the clinical setting (Brown & Chronister, 2009:47). Critical thinking scores were also significantly related to higher self-confidence (Brown & Chronister, 2009:45) when supported by peer learning also.

Palsson, Martensson, Leo Swenne, Adel and Engstrom (2017:81) indicate peer learning as a useful method which improves nursing student's self-efficacy and self-confidence to a greater degree than traditional supervision. The benefits of peer teaching are well documented within the literature (Ramm, Thompson & Jackson, 2015:823; Palsson et al (2017:81).

The supervised teaching role of nursing students allowed them to gain insight into their own personal values, teaching styles and attributes (Ramm et al, 2015:823). This and peer support were important factors emerging from the nursing students' responses in this study:

*"...having my fellow students demonstrate assisted me in performing procedure better each time..."; "...allow us to grow confidence, standing in on each other and learn from each other correct our wrong...";*

*"...for me it helped because we would practice with your peers and the sim lab was set up to assist".*

In short, learning in simulation, creates a meaningful experience for nursing students (Muir, 2017). It furthermore helps students to cope more effectively with their first clinical assessments and clinical placements (Stunden, Halcomb & Jefferies, 2015; Wardy, 2010; Small, Pretorius, Walters, Ackerman, & Tshifugula, 2013).

The above comments from students are supported by literature; they demonstrate the important value of simulation in reducing anxiety levels (Gore, 2011:179). In the NEI where the study was conducted, peer learning forms an integral part of teaching and learning.

**Confidence before doing nursing procedures in real patient situations**

Confidence was a strong theme:

*"...it made me feel more confident and made me feel more ready to do it on a patient...";*

*"...I was allowed to make mistakes because the lecturer is there to assist and guide me through the procedures...when I get to the patient I am not allowed to make mistakes...";*

*"...it allows us to get confidence so when we do procedure on patient we feel ready. Because we practise on doll do mistake and redo it...it gave me a lot of confidence and gain experience...";*

*"...you become more confident when doing procedures in the hospital, knowing that you were taught the right way in simulation...";*

Research supports the above statements by students regarding the use of a simulation laboratory in developing their self-confidence and clinical competence (Botma, 2014; Rutherford-Hemming, 2012; Gore et al, 2011:176; Blum, Borglund & Parcells, 2010:8). Kroner and Bierman (2007:580) explain that confidence arises from competence via the dynamic interplay between these two constructs.

However, the real practical experiences cannot be fully recreated in a simulation laboratory (Botma, 2014, Blum et al, 2010:10). The research study done by Blum et al (2010:11) indicated an overall improvement in self-confidence and competency among junior nursing students involved in learning in simulation. The students' past academic and life experiences provide students with self-confidence and competence for everyday situations but the healthcare environment presents slightly different challenges for junior nursing students (Brown et al, 2003). Roach (2002) describes confidence in nursing as a caring approach supporting trust and respect in the nurse-patient relationship. Nurses, on the other hand, reported an increase of self-confidence as "feeling, knowing, doing, and reflecting" (Crooks et al, 2005:360).

The results reported in this study were in agreement with the findings of other studies – Gore, Hunt, Parker & Raines (2011:175), Nel and Stellenberg (2015) and Parka, Park, Kimb and Song (2017) mentioned that confidence and competency are essential skills whereby a patient is assessed holistically. Furthermore, learning in simulation is an essential strategy in nursing education to teach students the principles of patient care in a controlled and safe environment. In a study done by Nel and Stellenberg (2015), data showed that nursing students are in favour of simulation as a foundation phase but rather preferred to be introduced by a human being. However, Botma (2014) confirmed that simulation with clear objectives and appropriately challenging problems correlated with students' satisfaction and self-confidence. This was in agreement with the findings of this study because students mentioned that *"...you become more confident when doing procedures in the hospital, knowing that you were taught the right way in simulation..."*.

According to Botma (2014) and McCartney (2005), simulation is a useful teaching method for psychomotor skills in a

controlled laboratory environment prior to patient contact. A study conducted by Gordon et al (2013) showed that simulation-based teaching to medical and surgical graduate nurses resulted in confidence and ability to interpret and respond in clinical emergencies. Botma (2014) confirmed that simulation with clear objectives and appropriately challenging problems correlated with students' satisfaction and self-confidence.

### **A positive experience regarding reinforcement/ repetition of skills in the simulation laboratory**

Opportunities to practise in a safe environment until ready for real life application featured strongly: *"...made me get more confident to observe my patients...";*

*"...it definitely helps you with learning new skills like what to observe and what to look at when observing a patient...";*

*"...because you can practice without a real patient you know exactly what to look for without feeling anxious...";*

*"...simulation has helped me to gain more experiences and confident...";*

*"...I could practice whenever I needed to, to better my skills...";*

*"...the more I practice, the more confidence I got...";*

Research supports these statements by students because key aspects of simulation-based learning are the ability to practice repeatedly to reinforce learning and therefore develop competence (Hogg, Pirie & Ker, 2006:214-223; Kardong-Edgren, Starkweather & Ward, 2008):

*"...the more I practice, the more confidence I got...";*

*"...it made me a skill practitioner at all times because I know what I was about to do...";*

*"...it made me feel more confident due to the fact I was introduce to a similar environment where I could practice...";*

*"...observing patients is less intimidating than live patients and practicing in simulation gave me confidence and made me competent...";*

*"...made me feel more observant and made me more aware of what must be done and how to do it...";*

*"...I could practice whenever I needed to, to better my skills...";*

The above statements by the students are echoed in research regarding clinical simulation which has gained tremendous momentum over the past decade in medical teaching programmes and has been found to be an effective method of supporting clinical knowledge, improving communication in the team and facilitating decision-making skills (Muir, 2017).

### A positive application of theory and practice learned in the simulation laboratory

Most of the nursing students expressed their experiences as valuable and that learning in the simulation laboratory improved their practical abilities:

*"...understanding work easier";*

*"...better interpretation of data" and "...it helps because you can interpret theory and practical together,"* which is in accordance to Cant and Cooper (2010): *"Simulation enables nurses to develop, synthesise and apply their knowledge in a replica of real experience"*.

There was only one participant out of the group (N=61) that indicated that learning in simulation is not useful and that for her the real situation is at the patient's bedside in the hospital: *"...did not learn in simulation..."*. This can be supported by Lundberg (2008) who stated that simulation learning can be intimidating and even fearsome for some learners, thus inhibiting their ability to learn in this environment. Students are supported as they learn the skills of nursing assessment, react to changes in their patient's health and prioritise each patient's care needs without exposing real patients to risk (Robinson & Dearmon, 2013).

Students verbalised that *"...by continuous assessment and learning in simulation it equips you to do better before working with the patient..."*, and *"...simulation helped me to do things in a proper way and gave the time I needed to develop my full confidence and be competent in my abilities to interpret the information I obtain..."*. This is supported by Reilly and Pratt (2007) regarding the intensity and pace of the clinical learning environment, where learning through simulation takes place at a measured pace in order to meet all individual learning needs.

### Responsiveness to patients' needs

This was a predominant theme: *"...it gave us an opportunity to think back to how we did procedures in the simulation room and use the procedures correctly on the patient..."*. This study supports research done by Blum et al (2010) that simulation improves self-confidence in junior nurses before doing nursing procedures in reality, but does not necessarily enhance the patient caring aspect.

Aebersold and Tschannen (2013) reported faster referral of patients to intensive care units because of improved responses to deteriorating patients and prompt recognition of deteriorating signs in patients after regular simulated learning experiences of emergency healthcare workers. The same authors summarised studies done on the impact of training in simulation of nurses working alone in emergency departments. It was concluded that there was a huge improvement in accurate triaging of patients.

From this study, students also confirmed:

*"...as it has equipped you with the knowledge and skills to interpret the data obtained. That means you could formulate an intervention to put into place and help your patient..."*;

*"...you gained confidence to apply your knowledge to integrate theory and practical components to care for the patient..."*.

The Virginia Board of Nursing (2013) supports learning in simulation experiences: *"As a teaching methodology, a clinical simulation experience is an active event in which students are immersed into a realistic clinical environment or situation. During this authentic clinical experience learners are required to integrate and synthesize core concepts and knowledge and apply appropriate interpersonal and psychomotor skills. Students must incorporate critical thinking and decision making skills using a process (e.g., nursing process) involving assessment, diagnosis, planning, implementation or intervention and evaluation"*.

A conclusion was drawn by Aebersold and Tschannen (2013) about the benefits of learning in simulation in nursing and its role when preparing nurses for the clinical environment. In a specific study nurses had to keep a journal of their regular reflection and critical thinking about their experiences. Integration of skills learned during simulated experiences with the real clinical experience was reported, as well as increased confidence, improved observation and management of patients, better stress management strategies and developing communication and reflection skills.

Moule (2011) agreed that simulation provides opportunities to practise clinical skills, while feedback from peers and facilitators enhances learning about real patient outcomes and responses. At the same time, confidence and competence in critical thinking, problem-solving and decision-making are built in a safe learning environment. Assessment in a simulated learning environment was also described by the author as an opportunity to build students' confidence, to which students in the current study agreed:

*"...it helped me to be more observant towards patients in the hospital..."*;

*"...to always record and report all findings and to ask questions for the lecturers if I'm uncertain of anything..."*.

Aebersold and Tschannen (2013) referred to aspects of patient deterioration and concluded findings of a study done with nurses in an emergency room. It was found that after simulated learning experiences the nurses' recording of pain scores and observations increased, while applicable interventions followed correctly, e.g. administration of oxygen.

### Recommendations

Further research is needed to explore how nursing students are supported and eventually apply their learning in

simulation in the clinical setting, where they work with real patients, with regards to critical thinking, reasoning and judgement (Botma, 2014). This is essential to ensure safe and effective practice in the healthcare settings (Brannan, White & Long, 2016:63; Botma, 2014).

Teaching critical thinking, clinical reasoning skills and judgement in isolation from clinical practice is not only unacceptable but educationally unsound if students are expected to redirect and apply these skills in the healthcare environment.

In order for nursing students to learn more about how to apply decision-making skills in practice, they need experienced mentors in the clinical environment to explain the interpretation of clinical patterns and the rationale underlying their clinical decision-making (Botma, 2014).

The study emphasises the need for further investigations regarding teaching and learning strategies to be developed to assist first-year basic nursing students in the transfer of self-confidence and competence from the simulation laboratory to the clinical setting (Botma, 2014).

## Limitations

Although the study was limited to the study population, the results are similar to many other studies regarding learning in simulation. However, readers may be able to relate and apply findings to their own context.

## Conclusion

It was concluded that learning in simulation improves nursing students' satisfaction, self-confidence and cognitive learning in a safe environment. Students reported being satisfied with learning in simulation and enjoy peer teaching in small groups, while being engaged with each other on an emotional and cognitive level. It is an excellent learning strategy to prepare students for the real clinical environment.

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