THE DESIGN AND DEVELOPMENT OF A PROGRAMME FOR SIMULATION BEST PRACTICES IN SOUTH AFRICAN NURSING EDUCATION INSTITUTIONS

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DECLARATION

I, Catherine Hilary Thurling, declare that this thesis is my own unaided work. It is being submitted for the Degree of Philosophy at the University of the Witwatersrand, Johannesburg. It has not been submitted before for any degree or examination at any other university.

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Catherine Hilary Thurling

1st day of June 2017

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ABSTRACT

Although simulation has been part of health care education for the last 40 years, there appears to be some resistance to embedding the education methodology in both nursing and medical curricula. Possible reasons for this lack of integration could be the educators' fear of technology, organizational barriers, such as time for integration, and a lack of support for educators wanting to introduce simulation.

In South Africa at present, simulation is only being used in pockets at universities and nursing colleges, with no formal contextually relevant training programme in place, specifically for nursing education, despite evidence that simulation improves student's outcomes and critical thinking. Nurse educators have expressed anxiety and bewilderment and seem uncertain about the use of simulation.

The purpose of this study was to develop a best practice simulation programme for nurse educators wanting to use simulation in their undergraduate nursing curricula.

A multi-method design within a pragmatic paradigm was used for this study. The process was divided into four phases.

Phase one involved data collection, using the National Council of State Board of Nursing (NCSBN) survey: Use of Simulation in Nursing Education (Hayden, 2010), to describe the prevalence and use of simulation in both university and college undergraduate curricula.

Phase two consisted of two parts, conducted consecutively: a scoping literature review to determine simulation best practices in nursing and medical education, followed by a Delphi Study to elicit the perceptions of educators in South Africa regarding simulation and best practice. In the scoping literature review the question asked was: What does the literature identify as simulation best practices in nursing and medical education? Four best practices emerged from the literature, namely the importance of debriefing, identifying learner objectives, the integration of simulation into the curriculum and the inclusion of deliberate practice. A Delphi Study was then conducted to elicit the judgement and perceptions of simulation educators, working in the South African context, of the identified best practices.

Phase three was the design of a conceptual framework and the development of a constructivist blended learning programme, using the Assessment, Design, Development, Implementation and Evaluation (ADDIE) instructional design method. The goal of the programme was: Participants will be able to apply simulation knowledge and skills to meet the learning needs of their undergraduate nursing students. The four best practices and the National League of Nurses/Jeffries Simulation Framework guided the programme. The resultant programme was developed in seven Modules building towards the completion of a simulation scenario, including planning for the scenario and post simulation debriefing.

Phase four was an expert review of the programme, from an e-learning specialist, nurse educators and a simulation expert. Both an expert review guideline for a written report and interviews were used for evaluation and refinement of the programme, prior to the programme being rolled out to nurse educators.

Results: Simulation in South African nurse education institutions is predominantly at a task training level and has been developed into complex patient scenarios using higher fidelity simulations.

The programme was well received by the experts as relevant to simulation education in South African undergraduate nursing curricula, either in a university or nursing college educational environment.

Limitations: The limitations to the study include the small sample sizes in the data collection phases, due to simulation in South Africa being relatively new in nursing education. Universities were predominantly represented in the data collection findings, despite the researcher reaching out to nursing colleges for their perspectives and inputs. There is a dearth of South African simulation literature and none on best education simulation practices in South African Nursing Education Institutions (NEIs), and therefore the researcher relied on international literature in the scoping review.

Conclusion: The blended education simulation programme is based on the needs of nurse educators wanting to include simulation in their education environment, based on their resources, and allows them to work through the programme in their own work space and time.

ABBREVIATIONS

ADDIE	Instructional design model – Assessment, Design, Development, Implementation and Evaluation
CINAHL	Cumulative Index to Nursing and Allied Health Literature
INACSL	International Nursing Association for Clinical Simulation and Learning
NCSBN	National Council of State Boards of Nursing
NEI	Nursing Education Institution
NLN	National League of Nurses
SANC	South African Nursing Council

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Chapter 1 Introduction and Orientation to the Study

This chapter provides the reader with an introduction to the study, giving an overview of the research problem, the problem statement, and provides the research question, the research objectives and the conceptual definitions used in the study. The chapter concludes with an outline of the study.

1.1 Introduction

A crisis has occurred in undergraduate nursing clinical training globally for reasons that include: an increase in student numbers, diverse student populations, complex patient diagnoses and shortened in-patient hospital stays. The shortage of nurse educators results in a lack of suitable clinical supervisors in healthcare training (Alinier, Hunt, Gordon & Harwood, 2006; Sanford, 2010), and the reality of the clinical practice to which student nurses are often exposed impacts negatively on students' successful outcomes as nurses (Last & Fulbrook, 2003, NCSBN, 2015). Questions have been raised about the quality of clinical experiences for students in placement sites (Franklin, 2013), with the availability of suitable placement sites diminishing (McNelis, Fonacier, McDonald & Ironside, 2011; Jeffries, 2005).

It used to be sufficient to provide student nurses with a variety of clinical placements, wherein they could apply what they had learnt in the classroom under the apprenticeship model of nursing education (Jeffries, 2005). The current clinical practice environment often does not foster critical thinking and the higher order cognitive skills that are required by nurses in today's healthcare environment (Potgieter, 2012).

To address this crisis in clinical training, there is a growing need to explore alternative education methods to better prepare undergraduate nurses. Linking nursing theory to clinical practice helps students conceptualize and make their clinical practice more relevant and meaningful. This requires educators to move away from the passive and traditional didactic lecture styles to new education methodologies that can better equip and prepare nurses to meet the needs of their work environment (Crooks, 2015; Potgieter, 2012).

International undergraduate nursing and medical programs have embraced simulation. Nursing councils, including the New Zealand and Australian Nursing Councils (Brown, Guinea, Crooks et al., 2012), the United Kingdom's Nursing and Midwifery Council (NMC, 2005), and professional bodies such as the National League of Nursing (NLN, 2003, 2014, 2015) have endorsed this teaching methodology (Edgecombe, Seaton, Monahan et al., 2013). In South Africa, however, the lack of published research and the researcher's own anecdotal evidence indicates that only a few Nursing Education Institutions (NEIs) at an undergraduate level have fully embraced simulation beyond skills training with task trainers.

Arthur, Levett-Jones and Kable (2013:1357) describe simulation as "an educational strategy which provides students with a realistic clinical situation and allows them to practice in a safe environment". Simulation is an innovative teaching technique and not a technology (Gaba, 2004, 2007) and described by Issenberg and McGaghie (2002) as "a set of conditions that attempts to present (clinical) problems authentically" with the purpose of preparing students for clinical situations they might encounter in their clinical practice, and which nurse educators are using to augment clinical teaching (Harder, 2010). Simulation includes modalities such as role playing, the use of standardised patients, task trainers, virtual reality and high fidelity patient manikins. It is the needs of the learner and not the needs of the patient that guide the clinical experience and learning (Bradley, 2011). Simulation equipment is currently not being used in NEIs as simulation is perceived to be a technology and not appropriate for the South African NEI education environment.

The advantages of incorporating simulation into the nursing curriculum include benefits such as: the provision of a safe environment in which to practice new skills in a clinical setting as close to reality as possible, and the ability to provide challenging and complicated high-risk patient scenarios and learning opportunities for students when there is a scarcity of clinical practice settings. Simulation also provides for student assessment in a "controlled, time-sensitive, dynamic scenario" (Buykx & Kinsman et al., 2011).

Adamson (2010) and others (Sanford, 2010; Williams, Finney & Elliot, 2011) make the comment that many nursing schools have invested large amounts of money in high fidelity simulators, especially human patient simulators, but often fail to utilize

these simulators to their full capacity. The reasons cited were inadequate educator training and education, not allocating appropriate resources, time, and funds for the full integration of simulation into the undergraduate curricula, resulting in missed opportunities for improving nursing education and using the resources to their full potential (Adamson, 2010; Hertz, Eyck, Smith & Fitch, 2011).

1.2 Problem statement

Although simulation has been part of health care education for the last 40 years, there appears to be some resistance to embedding the education methodology in both nursing and medical curricula (Khamis, Satava, Alnassar & Kern, 2016; Wilson & Wittman-Price, 2015; Wilford & Doyle, 2006). Possible reasons for this lack of integration could be educators' fear of technology and simulation skills, including organizational barriers such as time for integration and a lack of support for educators wanting to introduce simulation (Adamson, 2010).

The most important resource when introducing a new education methodology is the training and preparedness of the educators. To ensure that simulation is an integral part of the curriculum, educators need specific training to become knowledgeable and skilled in the methodology.

At present, in South Africa simulation is only being used in pockets at universities and nursing colleges, with no formal, contextually relevant training programme in place specifically for nursing education, despite the evidence that simulation improves student's outcomes and critical thinking. Nurse educators have expressed that they do not feel comfortable using high fidelity simulation and seem uncertain about simulation methodology, due to their lack of preparedness, making it difficult to include the education modality in their teaching environment (Anderson, Bond, Holmes & Casan, 2012).

No programme exists currently specifically for nurse educators in South Africa to teach nurse educators the use, practice and benefits of simulation training in nursing education, and which focuses on best educational practices of simulation. This impedes the development of simulation as a teaching and learning modality.

1.3 Purpose statement

The purpose of this study was to develop a best practice simulation programme for nurse educators wanting to use simulation in their undergraduate nursing curricula.

The resultant programme was designed to prepare nurse educators to use simulation-based education in their teaching environment.

1.4 Research question

What education simulation programme would best address the needs of nurse educators for undergraduate nursing programmes in South Africa?

1.5 Study objectives

In order to answer the research question, the following objectives for this study were set:

- To identify the current practices regarding the use of simulation in the 4-year nursing curricula in South African nursing colleges and universities
- To explore what the international literature determines are best education simulation practices and how the simulation experts in South Africa engage with the identified best practices in simulation education
- To explore how best to prepare nurse educators to implement a best practice programme to improve their ability to use simulation in the undergraduate nursing program, and design and develop a programme accordingly
- To evaluate the simulation programme through expert review.

These objectives will be met in the following four phases of the study:

- Phase 1 – A survey of current simulation practices.
- Phase 2a – Scoping review
- Phase 2b – Delphi study
- Phase 3 – Programme design
- Phase 4 – Expert evaluation of the programme

1.6 Significance of the study

Although simulation has developed over the last 10 years in both nursing and medical education, nurse educators in South Africa have not embraced the teaching methodology. This might possibly be due to the fact that nurse educators equate simulation with expensive manikins and the use of technology, whereas simulation includes a range of activities including role playing, standardised patients and virtual environments and not just high fidelity simulators (Kim, Park & Shin, 2016).

Simulation should be embedded in nursing curricula in order to maximise the learning opportunities it offers students, but nurse educators need to understand the simulation teaching methodology in order to successfully use it in their teaching. It is through the development and availability of simulation training programmes that nurse educators will begin to be able to use simulation, through an understanding of the techniques involved, thereby helping to ensure that more practical/experiential learning opportunities are provided. At an institutional level it must become an essential and accepted part of the curriculum.

1.7 Research design

A multi-method design within a pragmatic paradigm was used for this study. According to Morse (2003), as cited in Tashakkori and Teddlie (2003) and Esteves and Pator (2004), a multi-method, multiphase design is selected when two or more research methods are used for data collection: each method is conducted rigorously and is complete, adding a robustness to the findings through cross validation and triangulation. In this study, the views and perceptions of educators and expert simulation educators were explored as well as the relevant literature.

A quantitative approach was selected, in the form of a survey, to describe the use of simulation in undergraduate nursing curricula. A scoping literature review was conducted to determine simulation best practices in nursing and medical education. The findings of both the survey and scoping review were brought together, clarified and interpreted in a Delphi Study by a panel of educators, regarded as experts in simulation education.

The results from the data collected were used to design a conceptual framework and then develop a programme to be used to train nurse educators in the use of simulations as a teaching methodology in the training of nurses, and to enable the nurse educators to design their teaching programmes to include complete simulations scenarios, including debriefing.

Finally, an expert review of the programme was conducted, and adjustments made based on the reviews. The expert review was provided by an e-learning specialist, nurse educators and a simulation expert.

This multi-method design is used frequently to support, evaluate or develop educational programmes.

1.8 Conceptual definitions used in this study

Best practices: in this study refer to the preferred set of existing educational procedures that are perceived to obtain widely agreed effectiveness (Alber, 2015). Specific to this study, best practices refer to simulation education practices that, when integrated into a simulation programme, result in improved student learning.

Clinical judgement: in this study refers to a complex concept that is critical to nursing, whereby nurses can identify and interpret symptoms, plan for care and prevent complications through the application of knowledge and clinical experience (Phaneuf, 2008).

Critical thinking: in this study is defined as: the identification of a nursing problem, evaluation of the findings, determination of the best course of action for the problem, and then being able to think critically about the course of action and determine if it was the right action or could have been improved upon.

Curriculum: is an academic programme or plan that a student will encounter under the direction of the school or educational institution where the student is registered. The plans are written and vary in detail and scope, but delineate the students' learning experiences (Oliva, 2009:7). A curriculum is therefore a pre-planned programme, which outlines objectives and outcomes and ensures that the students have the required competencies and skills to be effective, in this case as nurses within the health care profession and society after graduation.

Debriefing: is considered an essential component of simulation. It is when learning is considered to occur (Cantrell, 2008; Motola et al., 2013; Wilson & Wittman-Price, 2015). It is a group activity, where students are given the opportunity to re-visit the simulation and are encouraged to self-reflect, analyse and synthesize with the other participants on interventions and actions during simulation (Jeffries, 2014:45). In debriefing, the student "bridges the gap between experiencing an event and making sense of it" (Fanning & Gaba, 2007:115).

Deliberate practice: is the repetitive performance of psychomotor or cognitive skills in a focused domain, with skills feedback and assessment **(**Motola, Devine et al., 2013:e1514).

Learning objectives: are "statements of what we intend or expect students to learn as a result of our instruction" (Jeffries, 2012:32; Meyer & Van Niekerk, 2008:68). In this study they refer to the students' expected level of performance as well as framing the content and goals of the learning experience within the curriculum.

Nurse educator: is a person who can communicate knowledge to students, diagnose students' educational needs, formulate strategies to facilitate learning in various ways and is able to evaluate students (Bruce, Klopper & Mellish, 2011:108).

Simulation: is described by Arthur, Levett-Jones and Kable (2013:1357) as "an educational strategy which provides students with a realistic clinical situation and allows them to practice in a safe environment". Gaba (2004:i2) states that simulation is a "technique – not a technology – to replace or amplify real experiences with guided experiences that evoke or replicate substantial aspects of the real world in an interactive manner".

Simulation occurs along a continuum from low fidelity to high fidelity, and includes task training activities such as the insertion of a Foley's catheter or Intravenous cannulation to computer driven high fidelity simulators "that provide a realistic physiological response to students actions" (Cant & Cooper, 2010:3). Standardised patients are included in simulation training to enhance the realism of a simulation scenario by providing an opportunity to teach and practice communication skills (Uys, 2014).

In this study the following operational definitions of simulation will be applied:

- High-fidelity simulation: A patient care scenario that uses a standardised patient or a full-body patient simulator, which can be programmed to respond to affective and psychomotor changes, such as breathing chest action. Examples of high-fidelity simulators include SimMan and Noelle with Newborn Hal® (Hayden, 2010).
- Medium-fidelity simulation: A patient care scenario that uses a full body simulator with installed human qualities, such as breath sounds without chest rise. An example of a medium-fidelity simulator is VitalSim® (Hayden, 2010).
- Task trainer: Part of a manikin designed for a specific psychomotor skill. For example, an arm for intravenous insertion practices (Hayden, 2010).

Student Nurse: is registered as a learner nurse with the South African Nursing Council (SANC), under Section 23 (Nursing Act 50 of 1978). In this study, a student nurse will refer to a student who is registered at a university or nursing college on the R425 programme (SANC 1985), meaning the 4-year degree or diploma course.

Undergraduate nursing programme: in this study refers to both the 4-year degree and 4-year diploma programmes, which, on successful completion by a student nurse, will lead to registration with the South African Nursing Council as a professional nurse in general nursing, midwifery, community and psychiatric nursing.

1.9 Outline of the study

The following is an overview to the rest of the thesis:

Chapter Two: Literature review and background to simulation

Chapter Three: Research design and methodology

Chapter Four: Survey - The use of simulation in undergraduate nursing curricula in South Africa

Chapter Five: Scoping review of the international literature to determine the best education simulation practices

Chapter Six: A Delphi Study to understand the South African expert simulation educators' perception of and engagement with the identified best practices

Chapter Seven: Development of a conceptual framework

Chapter Eight: Designing the programme, using the instructional design ADDIE model

Chapter Nine: Expert review findings, recommendations, limitations and conclusions.

1.10 Conclusion

This chapter provided an overview to the study, including the conceptual definitions used by the researcher. Chapter Two gives a background to the use of simulation in health care education and provides an in-depth review of simulation literature in undergraduate nursing and medical curricula.

Chapter 2 Literature Review and Background

This chapter orientates the reader to simulation in health care education. The chapter begins with a brief history of simulation in health care and then provides an overview of the concept of simulation, discussing the need for simulation in nursing education. A review of the existing research on simulation in healthcare is conducted, including the use of simulation in undergraduate nursing programmes. The chapter closes with theories and education frameworks that are used in simulation-based education.

2.1 History of simulation

Simulation has its roots in aviation training, and the military, when a need was identified to improve teamwork, reduce critical events and improve the proficiency and readiness of military trainees in a safe environment (Aebersold & Tschannen, 2013; Rudd, Freeman et al., 2010; Summers, 2012). The aim of simulation in medical education is similar to that of the military, namely to prepare nursing and medical students, in a safe environment, for clinical situations that they may encounter during their clinical practice (Harder, 2010). Simulation also provides an environment where students can work together in interprofessional teams preparing for the real world of clinical medicine (Aebersold & Tschannen, 2013).

Simulation in health care dates back to the 1950s when the first full sized female manikin/task trainer was developed to teach medical and nursing students patient physical examination (Wilford & Doyle, 2006) at the Chase hospital in the USA. The manikin became known colloquially as ‘Mrs Chase’. ‘Resusci Annie’ was developed in the 1960s, by Armund Laerdal, and revolutionized the teaching of cardio-pulmonary resuscitation (Drews & Bakdash, 2013). The first computerised medium fidelity simulator was introduced to medical students in the late 1960s - Harvey ™ - to auscultate heart and lung sounds and to locate peripheral pulses (Rodgers, 2007).

Simulation has been used in nursing education over the last 40 years to teach nursing clinical skills, but this was mostly in the form of task trainers, such as static anatomical parts and whole body static manikins, such as ‘Nursing Anne’ (Alexander, Durham et al., 2015; Wilford & Doyle, 2006). In 1961, audio visual tutorials were introduced and

the concept that students could learn at their own pace with technology began to influence the education environment (Rizzolo, 1988; Jeffries, 2015).

In 2000, only 3% of nursing education institutions in the United States had purchased simulation manikins; this figure rose to 87% in 2010 (Hayden, Smiley et al., 2014). The reasons identified for the increase in simulator use include the affordability of computerised manikins and task trainers (Gaba, 2004; Nehring & Lashley, 2013; Jeffries, 2015); the increase in simulation research as a teaching methodology; and the formal development of simulation frameworks to underpin simulation methodology, including the NLN/Jeffries Simulation Framework (2005) and the Simulation Theory in 2015 (Jeffries, 2015). These factors have all contributed to the uptake of simulation in nursing education. Advances in technology, the use of audio playback and training of standardized patients for the provision of immediate student feedback have also been contributing factors to the growth in simulation (Alinier, Hunt et al., 2006; Jeffries, 2015).

Issenberg, McGaghie, Petrusa, Gordon, Scalese (2005) and Howard, Englert, Kameg, Perozzi (2011) all make the observation that the increase in simulation education in undergraduate medical curricula is also due to reasons primarily stemming from a shortage of clinical placement areas, and a corresponding increase in the registration of undergraduate students needing opportunities to develop clinical skills competency and clinical reasoning.

2.2 The concept of simulation in nursing education

The competition for available clinical placement sites, which is prevalent in nursing education globally, is exacerbated by the high vacancy rate of clinical facilitators and supervisors in the clinical area (Paskin & Peile, 2010). This has led nurse educators to explore different ways of teaching and facilitating students, especially in essential skills, knowledge and attitudes that nurses need to have attained by registration (National League of Nurses, 2014).

In this altered education environment, traditional methods of nursing education, such as didactic classroom teaching, are diversifying into other educational formats. These include more educational aids and training interventions, such as simulation and educational technologies - which help stimulate critical thinking, clinical judgment and

reasoning that are all required in clinical practice (Bremner & Adundell et al., 2006; Sinclair & Ferguson as cited in Jeffries, 2007:5).

Simulation in health care education is being used as an adjunct to clinical practice, and refers to activities that mimic the reality of a clinical environment. Simulation is not one specific technique or simulator; it includes a range of experiences, task trainers, role playing, standardised patients, computer based simulations, virtual reality and high fidelity human patient simulators. Simulation includes the demonstration of skills and practice of skills in a safe environment, with the aim of attaining skills competency. Students participating in well-designed, simulation-based learning are actively involved in complex simulated scenarios that promote decision making and the development of critical thinking.

The needs of the student in simulation-based education guide the learning and not the needs of the patient, as in clinical practice (Bradley, 2011). Each simulation experience is designed to achieve pre-determined student outcomes and provide the student with an environment where they can practice skills and make real-time decisions about patient care while not posing any harm to patients (Society for Simulation in Healthcare, 2013).

Due to the experiential and constructivist framework of simulation, educators who are not familiar with this methodology of teaching and learning will need guidance and training to become effective in using simulation within their curricula. Some nursing schools have invested large amounts of money in high fidelity simulators. These simulators are often not being utilized to their full capacity due to educators not feeling competent with the teaching method or comfortable using technology in the classroom (Adamson, 2010).

2.3 The need for simulation in clinical education

As mentioned in the previous section, the large number of nursing students, insufficient clinical educators who are experienced in clinical training, reduced length of hospital stays and a higher percentage of acutely ill patients (Issenberg, Mcgaghie et al., 2005) do not offer the clinical learning opportunities that were available in the apprenticeship model of clinical teaching. The face of patient hospitalization has changed: there is now a higher percentage of acutely ill patients who stay in hospital

for a shorter period, which poses a challenge for nursing and medical students who need to build a rapport with patients to develop both their communication and diagnostic skills that are essential to health care professionals. The shortened inpatient hospital stays also result in less exposure of undergraduate nursing and medical students to the range and variety of illnesses and diseases that are discussed in their undergraduate curricula. Didactic teaching alone, appears ineffective in teaching nurses how to prepare for clinical practice in this changing clinical environment (Buykx et al., 2011).

Specific to the South African nursing context, the Nursing and Training Strategic Plan 2012/13-2016/17 (Department of Health, 2013) highlighted some of the issues concerning clinical education and training of nurses in South Africa. The disconnect between nurse educators' skills and competency levels and the practice area is exacerbated by the closure of clinical training departments, leaving student nurses exposed to "insufficient supervision and a general lack of good clinical role models" (Nursing Education and Training Strategic Plan, 2012/13- 2016/17; Department of Health, 2013). The Strategic Plan makes the recommendation that the South African Nursing Council's requirements for educator training should include core competencies, such as teaching and learning methodologies that use technology in education (Nursing Education and Training Strategic Plan, 2012/13- 2016/17).

The proposed model for clinical nursing education and training in South Africa (Department of Health, 2013), which was presented in the Nursing Education and Training Strategic Plan, 2012/13-2016/17, was accepted as an efficient strategy for addressing the preparation of nurses for clinical practice. The model advocates for simulation both in the clinical teaching areas and the simulation laboratory, where simulation-based education can take up to 20% of prescribed clinical practice time.

2.4 The educational context for simulation education

There is a shift in nursing education to move away from content laden curricula, which require "linguistic intelligence and rote learning" (Galloway, 2009), to concept-based and experiential learning curricula, where students can make the connections between information, knowledge and the application of knowledge in their real, immediate world (Giddens, Caputi & Rodgers, 2015). An educational need has

developed to facilitate students' learning in their own social context (National League of Nursing, 2015). McGaghie, Issenberg, Petrusa and Scalese (2010) agree that, for effective use of simulation in medical education, attention must be paid to scenarios becoming context specific, meaning the education environment and simulation-based educational experience must resemble the real life context where the learner will apply the learnt competencies and skills, when they become independent practitioners (Schuwirth & van der Vleuten, 2004; McGaghie et al., 2010).

The 'real world' that Gaba (2004: i2) is referring to in his definition of simulation: "an experience .. that evokes or replicates substantial aspects of *the real world* in a fully interactive manner" is the health care environment in which the student nurse will be required to apply the competencies learnt as an undergraduate student – hence the importance of embedding the experience in the context of their real world (Burke, Rush et al., 2010; Stein, 1998). This means that the subject matter is decided by the environment and the conversations from within the communities where students will be working and applying their expertise. Campbell and Daley (2013) point out that the cultural differences of learners influence their clinical judgement and clinical reasoning, and therefore these elements should be included in simulation scenarios to enhance the reality of the learning experience.

No literature has emerged from Sub-Saharan Africa on what is the best programme to assist educators in creating a contextually relevant teaching simulation programme, and there is nothing specific to the South African context.

2.5 Existing research in simulation

This section is not an exhaustive review of the research done in simulation but rather provides the contextual background of simulation in medical and nursing education at present.

In 2011, the first simulation research consensus summit was held by the Society for Simulation in Healthcare (Dieckman, Phero et al., 2011). One of the findings was the lack of scientific reporting of simulation research in the literature. Riley (2015:288) comments that the focus of simulation research has been primarily on qualitative research in simulation, which explores the "social phenomenon" and the "acceptability" of simulation. Sanford (2010) and Wilson and Wittman-Price

(2015:335) agree that there is limited research on the effectiveness and evidence of simulation on improved student outcomes and patient outcomes within nursing education. McGaghie, Draycott et al. (2011) reviewed the literature for the impact of simulation on student outcomes. Their review identified 15 articles that found an improved skills performance overall with simulation, when used in conjunction with deliberate practice. It was agreed that simulation does offer the opportunity for students to practice clinical and communication skills in a non-threatening safe environment, which is an important part of developing competencies and the provision of safe patient care (Sanford, 2010).

In the field of nursing simulation, research has only recently begun to systematically study simulation education (Jeffries, Dreifurst et al. 2015). The areas that have been robustly researched are student satisfaction and confidence levels when exposed to simulation learning experiences, plus research on guidelines/standards for simulation.

Current research indicates that student satisfaction and confidence when exposed to simulation appears to increase. Khalaila (2014) conducted a descriptive, qualitative study, involving second year nursing students prior to their first clinical placement, to examine the effectiveness of simulation in reducing anxiety and promoting self-confidence. Khalaila's findings indicate that simulation does reduce anxiety in students prior to their first ward placement, with the result that students felt they were better able to communicate and care for patients, thus enhancing their clinical experiences. Arthur, Levett-Jones and Kable (2013) in their Delphi study, agree that simulation has a positive effect on student's satisfaction and self-confidence but also a positive impact on the student psychomotor skills, and therefore believe that simulation should be part of the curriculum ensuring an alignment between the programme and course objectives.

Guidelines/standards for simulation in nursing have been developed by the International Nurses Association for Clinical Simulation in their special edition on standards and guidelines, and published in the Clinical Simulation Journal (INACSL, 2013) with the aim of improving the quality of simulation within nursing education. Initially, there were seven standards namely: the use and standardisation of terminology, professional integrity of participants, participant objectives, facilitation,

the role of the facilitator, debriefing process, and participant assessment and evaluation. In 2015, two further standards were added: simulation enhanced inter-professional education and simulation design.

2.6 Simulation related learning theories and education frameworks

Various theoretical frameworks have linked educational models to simulation experiences (Humphries, 2013). Kolb's Experiential Theory of Learning (Poore, 2014; Wilson & Wittman-Price, 2015) and Benner's Novice to Expert (Galloway, 2009; Waxman & Telles, 2009) are often mentioned and are discussed below. Tanner's Clinical Judgement Model (Tanner, 2006) and the NLN/Jeffries Simulation Framework (Ravert & McAfooes, 2014; Jeffries, 2007) are also included in this literature review as they guide simulation and educational practices.

The assumption is made that no theory is used on its own in simulation, but aspects of various theories and models are combined, to provide a framework for educators to better understand and discuss the teaching methodology of simulation.

2.6.1 Kolb's experiential learning

Experiential learning is learning by "doing" (Quinn, 2007:235), and is a process where knowledge is continually tested, by the learner, through reflective observation of the experience (Kolb, 1984). Experiential learning draws on the work of prominent 20th century scholars, including John Dewey, Kurt Lewin, Jean Piaget, Carl Jung and Carl Rogers (Kolb and Kolb, 2006), who believe that experience is central to learning. Quinn (2007) describes experiential learning as a process that begins with a concrete experience that the learner finds to be problematic, and through a process of reflection, analysis and replaying of his/her observations and experiences, insights begin to emerge about the new experience, resulting in a modification of knowledge or behaviour, describes experiential theory.

Experiential learning and simulation learning both promote situational learning, where learning spaces are more than just the learner, the teacher and the classroom; they reflect the communities of practice and allow the student to progress from novice to expert in the relevant field of practice within the community (Kolb, 2006:12).

Simulation facilitates contextual learning through the replication of reality, both in the development of scenarios and environmental fidelity.

2.6.2 Constructivist learning theory

Constructivist learning theory is based on the work of Piaget and Vygotsky (Billings & Halstead, 2012:210). Piaget stated that students construct new knowledge through discovery and creating meaning from past experiences, with the aim of making sense of their new experiences. Vygotsky examined learning from a social constructivist paradigm, stating that learning is a collaborative activity with learning occurring through social interaction (Ozer, 2004).

High fidelity simulation and constructivist learning both require students to work in small groups, interacting with each other in the group. The group is required to solve complex patient problems through group decision making and applying previous experiences and knowledge, from both their theory and practical experiences, planning a course of action and discussing the effect of the action during the debriefing stage of the simulation, thereby developing clinical judgement and creating or refining new knowledge.

2.6.3 Benner's Novice to Expert

The Novice to Expert theory described by Benner (1982) was developed from the five stage Dreyfus Model of Skill acquisition (Waxman & Telles, 2009), which states that students gain skills competency as they move through the original five levels of skills acquisition (Waxman & Telles, 2009), viz: novice, competent, proficient, expert and master. Benner (Gobert & Chassy, 2008) adapted the stages for nursing skills to: novice, advanced beginner, competent, proficient and expert.

The novice student is task-orientated for basic skills and follows the rules, whereas the advanced beginner still follows the rules but is beginning to develop a questioning approach to tasks. In the competent stage, the student can prioritize actions in the patient context, and begins to develop an understanding of the effects of certain actions. The proficiency stage is characterised by intuition, and decisions are made by using previous experiences; the students at this stage can also use their experience to anticipate occurrences in the final stage - that of the expert: meaning

that intuitive decisions can be made and actions taken accordingly (Waxman and Telles, 2009). Pivotal to the transformation of a learner from novice to expert is the integration of knowledge and the conceptualisation of experiences that incorporate reflective learning (Humphreys, 2013).

Simulation allows the Novice to Expert framework to be applied in a structured and safe environment, with learning activities designed around the student's level of experience and competency. Task trainers are predominately used in the junior (Novice) years of training to develop skills competencies, and high fidelity simulation in the proficiency stages, or senior years, offering the students complex patient scenarios, where they can apply their knowledge and skills and make diagnostic and management decisions.

2.6.4 Knowles' Theory of Andragogy

In the 1980s, Malcolm Knowles described how adults learn, introducing the concept that adults and children learn differently (Knowles, Holton & Swanson, 2011). His andragogy model makes the following assumptions: adults need to see the value in what they are learning and want to apply the learning immediately, they appreciate problem solving and experiential learning where they can draw on their own previous experiences to assist in the learning process, and they are described as self-directed learners (Teal, 2011). Adults learn best when the content they are interacting with is relevant to their careers and delivered in a problem solving manner that requires group work, prompt feedback and with frequent change in activities (Wilson & Whitmann-Price, 2015:78).

Simulation learning suits the andragogy style of learning with a shift away from traditional learning practices, where the focus was on increasing knowledge (Zigmont, Kappus & Sudikoff, 2011), to a learning climate where mutual planning and identification of learners' needs are negotiated and discussed between the facilitator and the learners (Quinn, 2007:29).

In the andragogic style of teaching, the facilitator resists the notion of rote learning and memorization and focuses on creating learning opportunities, using materials and techniques that address the learner's needs. An article by Clapper (2010) highlights the similarities between Knowles' theory of andragogy and simulation,

where the process of learning includes problem solving, reflective learning, being self-directed and being able to build on past experiences to develop new knowledge and understanding.

2.6.5 Tanner's Clinical Judgement Model

Tanner's Clinical Judgement Model describes the process used by nurses to respond to specific clinical situations that they encounter in practice. Clinical judgement is an essential aspect of patient care and is defined by Tanner (2006) as a complex process involving a nurse's interpretation of a patient's situation and deciding on an intervention, specific to that patient's situation. Clinical judgement is complex in nature, requiring healthcare professionals to interpret clinical symptoms and meaning and being able to respond according to the situation. To be successful at this complex skill the nurse needs to be able to use his/her knowledge, experience and ability to interpret what he/she observes, including identifying the subtle differences in presenting signs and symptoms, in order to decide on the appropriate course of action (Tanner, 2006).

Simulation-based education is an educational technique that assists nurses to develop their clinical reasoning for situations that they may encounter, by providing the opportunity for students to both act and reflect on their actions. Debriefing is an essential part of simulation, and students are required to reflect-on-action at the end or during the learning experience. Reflection leads to an awareness, by the students, of possible gaps in knowledge that is needed for certain actions to be competently performed, leading to the development of critical thinking.

The simulation scenario should be developed in a complex, yet structured, manner that requires students to make clinical judgment decisions and plan interventions for the patient or manikin.

2.6.6 National League of Nurses/Jeffries Simulation Framework

The National League of Nurses (NLN)/Jeffries Simulation Framework (NLN/JSF), developed in 2005, has been widely used to underpin simulation practices. The framework, when used in the development of a simulation programme, provides "standardization and reproducibility to the programme" (Groom, Henderson & Sittner,

2014:342), informing decision making and practice within nursing education simulation (Mancini, 2015).

Simulation is a process of complex actions and processes that, if not placed within a theoretical simulation framework, could lack the consistency and structure to achieve the student's identified outcomes. The NLN/JSF provides an approach to simulation that guides simulation design and assessment of simulation-based learning (Issenberg, Phero, Kardong-Edgren, Ostergard & Ringsted et al., 2011; Jeffries, 2007). There are five components, with sub-components, to the framework namely: the teacher or facilitator factors, participant or student factors, simulation educational practices, simulation design characteristics and the expected outcomes of the simulation. The components work together to create a validated and sustainable framework that addresses teaching with simulation, programme infrastructure for debriefing and curriculum integration, as essential elements in simulation planning.

The NLN/Jeffries Simulation framework was used extensively in the development of the programme in this study, and is discussed in greater depth in Chapter 7.

2.7 Conclusion

The shift away from teacher-centred learning to a more experiential learning approach aligns well with simulation-based learning, which allows students to practice their skills and communication strategies in a safe environment, without fear of harming their patients. The literature reviewed in this chapter indicates that this promotes student competence and confidence, which are essential in the provision of safe patient care.

This chapter explored selective aspects of simulation, providing an overview of teaching and learning methodologies, as a background for the situational analysis that was conducted in Chapters 4, 5 and 6. The educational frameworks and theories provide the structure for the development of a context-specific programme for nurse educators involved in teaching undergraduate nursing students. The application of the frameworks are discussed in detail in Chapter 7.

The focus of this study is to increase the nurse educators' ability to use simulation education in their classrooms. The education and simulation frameworks will underpin the resultant programme.

The following chapter describes the methodology and research design used in the study.

Chapter 3 Research Design and Methodology

This chapter provides an overview of the overall research design and methodology used for the study. There are four phases to the study, with Phase 2 sub-divided into two sections, as depicted in Table 3.1.

The first phase of the study addressed the use of simulation in the 4-year nursing curricula in South African NEIs. The second phase determined what the literature describes as simulation best practices, and explored the perceptions of South African nurse educators, who are considered experts in simulation education, of the identified best practices. The third phase addressed the best mode of delivery and the design of the resultant education programme. The programme was evaluated in the fourth phase of the study.

The methodologies relating to the data collection for Phases 1, 2 and 3 are described in detail in this chapter. Rigour and ethical considerations are also discussed.

Details and findings of the three different phases of data collection are described in the subsequent chapters, namely the survey chapter, the scoping review chapter and the Delphi chapters respectively.

The third and fourth phases of the study, the programme design and evaluation respectively, are described in detail in Chapter 7 and Chapter 8.

3.1 Research design and methodology

The research design is the plan or blueprint for the collection and analysis of data (Babbie & Mouton, 2010:74). Research methodology refers to the decisions that need to be taken to achieve the stated end point of the research (Grove, Burns & Gray, 2013:195; Babbie & Mouton, 2010:75). This process involves explaining the research design, identifying the population, determining the data collection instruments to be used for data collection, describing the analysis methods and discussing any ethical considerations involved to ensure rigour and validity.

The study design focuses on the intended end-point of the study, and the research methodology is the process of getting there. The research design depends on the research question and the evidence required to provide answers to the questions

asked by the researcher (Babbie & Mouton, 2010:75). The design guides the researcher and controls the selection of the study population, sampling techniques, method for data collection and analysis (Burns, Grove & Gray, 2013:75). The research design for this study was an exploratory, descriptive and multi-method sequential

approach, using multiple research strategies, within a pragmatic paradigm.

3.1.1 Exploratory research

The exploratory approach is selected when little is known about the subject being researched, and the results from the data provide comprehension and insight into the phenomenon being studied (Babbie & Mouton, 2010:81). One of the goals of exploratory research is to "create a programme or an intervention that would benefit the population" (Grove, Burns & Gray, 2013:66). The research question asked in this study was "What education programme would best address the needs of nurse educators wishing to introduce simulation in undergraduate nursing programmes in South Africa?"

3.1.2 Descriptive research

Descriptive research is frequently used when little is known about a phenomenon. The focus in descriptive research is on describing what exists in the real life situation and generating new information about the phenomenon (Grove, Burns & Gray, 2013:49). The objectives of this study were to determine the use of simulation in the four-year undergraduate nursing degree and diploma programmes, and to establish the South African expert nurse educators' perspectives about simulation education practices that the literature determined as best practices.

3.1.3 Multi-method research

Multi-method research involves the combination of two more data collection methods that are relatively complete on their own, and designed to address a sub-section of the research question (Byrne & Humble, 2007). Findings from the different data collection methods, when combined, answer the overall research question with the results being triangulated to form a whole (Brink, van der Walt & van Rensburg, 2012;

Burke Johnson, Onwuegbuzie & Turner, 2007). The various methods used to obtain data from several data sources or perspectives to determine a complete understanding of the various aspects of the phenomenon being studied enhance the validity of a study (Babbie & Mouton, 2010; Salazar, Crosby & DiClemente, 2015:223; Brink, van der Walt & van Rensburg, 2012:99).

Multi-method triangulation offers the researcher an opportunity to develop a complete understanding, providing corroboration and elaboration of the phenomenon being studied from different sources (Burke, Johnson, Onwuegbuzie & Turner, 2007; Esteves & Pastor, 2004; Salazar et al., 2015). Increasing the validity of a study through triangulation of the data findings from different sources neutralises any inherent bias of the researcher or method (Brink, van der Walt & van Rensburg, 2012:99)

Triangulation, for completeness of the data in this study, was achieved using a combination of three data collection methods: a survey, a scoping review and a Delphi study.

In Phase 1, and the first step of data collection, a survey, determining the use of simulation in undergraduate nursing curricula, was sent to nurse educators involved in nursing education in South African NEIs. In Phase 2a, the second step of data collection, a scoping review established what the national and international literature identifies as simulation education best practices. A Delphi study was then completed in Phase 2b to determine the South African expert simulation nurse educator's perceptions of the best practices and how they have included them in their own simulation-based activities.

To establish what mode of delivery educators would prefer for the resultant programme, an online survey poll was conducted on completion of the first two phases of data collection.

3.1.3.1 *Description of the multi-method research process*

In order for a data collection method to be declared a multi-method design the following processes need to be addressed by the researcher:

- Data are purposefully collected from different sources, using different data collection approaches in response to the research question, and merges the results to develop a better understanding of the phenomenon being studied (Cresswell, 2013).
- Data can be collected concurrently or sequentially, but it is essential that all forms of data are analysed independently, and rigorously explained in the research.
- The multiple forms of data are integrated through a process of merging, connecting and embedding the data in the final findings of the study.

A sequential data collection method was used in this study.

3.1.3.2 *Rationale for using a multi-method sequential design in this study*

The rationale for selecting a multi-method sequential design for this study was the following:

- Prior to the commencement of this study, anecdotal evidence showed the possibility of limited data being available. Although the use of simulation in nursing education has increased over the last decade, there is very little literature on the use of simulation in South Africa, and little is known about the use of simulation in NEIs and hence a quantitative survey was deemed the best method for establishing the uses.
- The use of multiple angles in establishing a complete "picture": The survey in stage one examined the use of simulation from a nurse educator's experience and the Delphi study in stage three of data collection explored the perspectives of a purposively selected sample of expert simulation educators to obtain a complete picture.
- The triangulation of data from the multiple sources provides a complete understanding of how to approach the development of an education programme for nurse educators from different dimensions. The educator's perspective and the literature on what is considered the best simulation practices were both considered important sources of information for a complete understanding of the phenomenon.

3.2 Pragmatic philosophy underpinning this study

Identifying the philosophical assumption that underpins a research study assists the reader in establishing the view of the researcher and the context of the research problem (Cresswell, 2014a:9). The underlying philosophy for using a multi-method paradigm for data collection is that of pragmatism, where knowledge is constructed out of actions and situations (Cresswell, 2009:10). Pragmatism provides the best understanding of the research question, using multiple research methods (Cresswell, 2013:11).

Knowledge of the educational context as well as the nurse educator's perspectives about simulation as a teaching methodology needed to be determined in the early stages of the study, in order to ensure that the resultant programme was relevant to nursing education. This required the researcher to explore the phenomenon of simulation education from multiple perspectives, in order to provide a comprehensive understanding of both the situation at present and the needs of the educators – a single research method would not have provided this understanding.

3.2.1 Pragmatism as a research paradigm

A paradigm is regarded as a "philosophical position relating to the nature of a social phenomenon and social structures" (Feilzer, 2010:7). The research question determines which research paradigm is best suited to the study. Pragmatism is an alternative to the more well-known research paradigms of positivism, post-positivism (quantitative) and constructivism (qualitative). Pragmatists accept that there may be singular or multiple realities in a phenomenon, and as the pragmatist's focus is orientated to exploring problems that are present in the real world, the use of a single research method would limit how the phenomenon being explored could be studied.

Pragmatists support the notion of combining and converging multiple research techniques (Feilzer, 2010:8; Onwuegbuzie & Leech, 2007) using the strengths inherent in each method to address the research question, and thereby understanding the phenomenon being studied. Onwuegbuzie and Leech (2007) explain that the ongoing debate about qualitative and quantitative research techniques, and the need to select either in research, has divided researchers and research into two "research cultures", one expressing the richness of observational

data and the other hard survey data. The pragmatic research paradigm allows the researcher to interrogate a research question through a bi-focal lens (Onwuegbuzie & Leech, 2007), both from a statistical or survey perspective and from an interpretive naturalistic perspective in qualitative research.

The pragmatic approach addresses the usefulness of the study in "guiding action in real world settings" (Glasgow, 2013). This study goes beyond being explorative only – it applies the findings from the first two phases to the development of a programme that addresses the needs of both the educators wanting to introduce simulation into their curriculum, and the NEIs where they are lecturing.

3.3 Methodology of the four phases of the study

As mentioned at the start of this chapter, this research study was done in four phases (Table 3.1). The four stages of data collection are discussed in detail below as they form the research design and blueprint for the achievement of research objectives.

When designing an educational intervention, a situational analysis should be one of the first critical steps in the process to identify the need for the intervention, the resources already in place, the facilitating factors for the programme and the barriers to success of the programme (Christofides, Jewkes & Lopez, 2006). Thus, a situational analysis helps ensure that the programme is relevant and meets the needs of its stakeholders. In this study, a situational analysis was conducted via a survey, a scoping literature review and a Delphi study, in Phases 1 and 2, to determine key inputs/factors to the development of a programme for assisting educators to use simulation as an adjunct learning method in the undergraduate nursing curriculum.

Table 3.1: Overview of the study

Phase	Objectives	Population	Sample	Method	Instrument	Trustworthiness and Rigour
Phase 1 Survey of current simulation practices	To establish the current use of simulation	Nurse educators	Maximum variation. Nurse educators who use simulation in the 4-year undergraduate degree or diploma programmes	Survey of current simulation uses and practices	The National Simulation and Use of Simulation Survey (Hayden, 2011)	Survey validated in 2010 by the original author. Used in the original study (2011) reviewing simulation use in1060 pre-licensure programmes (Hayden, 2011). The survey instrument was pre tested for content validity amongst four educators at a university prior to being distributed to participants. Sampling: To ensure all elements of the identified population were represented, and a maximum variation to the final population was achieved, a sampling frame was used. The total population of NEIs was obtained from the South African Nursing Council website (SANC 2014 http:www.sanc.co.za/neis.htm(public nursing education institutions by province and type).
Phase 2a Scoping review	To review all current literature that describes best practices	Literature	Qualitative and quantitative literature 2001-2012 Electronic data bases Reference checking and tracing Search words	Scoping review	Qualitative and quantitative literature 2001-2012	The database searches were performed independently by the researcher and a post-graduate student who had received training in an integrative and scoping review process.

Phase	Objectives	Population	Sample	Method	Instrument	Trustworthiness and Rigour
Phase 2b Delphi study	To explore educators' perceptions of the best practices	Nurse educators	Reputational and snowball sampling	Delphi study	Questionnaire open and closed questions	Criterion sampling was done for the selection of informed experts. Delphi study questionnaire (round one) was based on the findings from both the survey and scoping review to ensure relevancy to the question being asked, and verified with an expert reviewer prior to being circulated. Round two questionnaire was based on the results from round one. Second round member checking to verify the results from the first round of the Delphi study.
Phase 3 Programme design	To determine the preferred mode of delivery of the education programme Design and development of the intervention	Nurse educators	Sample accessed from educators used in the data collection survey (Phase 1) Evidence from the 3 data collection processes and analysis of the findings Development of a conceptual framework for the development of the programme	Survey poll	One question poll with an optional space for an opinion Guidance from the Simulation framework Jeffries 2007, Constructivist learning theory and the blended learning theory	The same sampling technique was used as for the survey conducted in phase 1. Peer scrutiny of work was achieved throughout the process through conference presentations, special interest group discussions and other forms of scholarly interaction. The use of multiple data collection methods to ensure that the programme content was relevant and evidence based. Critical examination of previous research studies and the literature, to assess the congruency of the findings and the relevance for inclusion in the resultant simulation programme was done throughout the research process. Thick description of the different phases in the design of the programme (Table 7.2; Table 8.1; Table 8.3)

Phase	Objectives	Population	Sample	Method	Instrument	Trustworthiness and Rigour
Phase 4 Programme evaluation	Expert evaluation of the programme	Experts involved in simulation and education	Nurse educators, e-learning specialists involved in education, and simulation	Thematic analysis of report	Semi- structured interviews and expert reports using a question guide	The programme was reviewed by four experts representing different specialities related to the development of an online programme specific to simulation. The criteria used to guide the experts' review was based on The Interactive Design foundation (2012).

3.3.1 Phase 1: Survey

Literature (Adamson, 2010; Aggarwal, Mytton, Derbrew et al., 2010; Fernandez, Lee & Page 2010) suggests that there is a possible underuse of bought simulators in NEIs despite evidence indicating that simulation has advantages in this setting. The dearth of literature from South Africa and Sub Saharan Africa, as identified in the review and the researcher's own anecdotal experience, indicates that South African NEIs are not using simulation to its fullest capacity in nursing education. To further explore this phenomenon, a survey of the use of simulation in South Africa was conducted. The validated 2010 Simulation in Nursing Education Survey (Hayden, 2010) was used for data collection (Annexure B), with permission obtained from the author (Annexure C). The aim of the original survey was to assess the use of simulation in pre-licence undergraduate nursing programmes in the United States of America (Hayden, 2010).

3.3.1.1 *Survey Research*

In this study, the term 'survey' refers to the data collection method and the instrument used for data collection. Self-reporting questionnaires were emailed to potential participants (Grove, Burns, & Gray, 2013). Survey research was the appropriate method of data collection for this situational analysis, as the aim was to develop a broad overview of a representative sample (of educators) from a large population (Mouton, 2012). The web-based survey data collection method, which was selected for this study, is defined as "the collection of data through a self-administered electronic set of questions on the web" (Archer, 2003 [online]).

3.3.1.2 *Population*

The population selected for this study were educators situated at either a university or nursing college (NEI) offering a four-year undergraduate nursing degree or diploma. The accessible population were all educators involved in simulation in the NEIs. The realised sample for this study was 57 with 51 responses being included; six responses were not included due to insufficient data being entered by the participant.

To ensure that all elements of the identified population being surveyed were represented, a sampling frame was used (Buskirk, 2015). The total population of NEIs for the survey was identified from the South African Nursing Council (SANC) website of public nursing education institutions (SANC 2014). The total population of NEIs offering four-year degree or diploma courses was established as N=55.

3.3.1.3 *Sampling process*

From the list obtained from the SANC, NEIs were selected using purposive sampling. NEIs were first stratified into universities, colleges, and into provinces, as per the sampling frame. The aim was to include at least one university and one college from each province in the final sample. The researcher attempted to contact all nursing colleges and universities to establish if they used simulation in their undergraduate curricula, and whether they would be interested in participating in the study. The contact details and the email address of the relevant educator was requested by the researcher during this initial contact. An information letter about the study was sent to all colleges and universities that indicated their willingness to participate, and to the educator who was responsible for simulation at the NEI. The SurveyMonkey® link was also forwarded to the participants via email. The researcher followed up telephonically and via email to encourage participation, but ultimately the final sample was decided on by the participants' valid and current email addresses being accessible to the researcher, and their response to the request to participate in the survey.

3.3.1.4 *Sampling issues*

The challenges of achieving good population coverage using web-based surveys are documented in the literature (Lynn, 2013), and are described as coverage bias. Low response rates could be due to the following factors: technological challenges due to the necessity for internet access, lack of internet access at some colleges, as well as inadequate computer literacy of respondents. The retrieval of an email address is also a challenge as no email directories are available, and people change email addresses, or have multiple addresses, and finally, the decision not to respond may be made by default as the participant may not get around to answering the survey (Archer, 2003; Solomon, 2001).

The researcher considered the benefits and potential disadvantages of using an online survey, and placed certain measures in place in an attempt to mitigate the possible anticipated difficulties. The following measures were included:

- All selected nursing colleges and universities were initially contacted telephonically and sent a letter via email by the researcher informing them of the study.
- Snowball sampling was used as the researcher asked for the contact details of any potential contacts, who were educators involved in simulation who might have been interested in participating in the study.
- The researcher was present at as many nursing functions and conferences as possible, in order to promote the study, and to ask interested nurse educators for their current email addresses. All contacts were sent follow up emails and contacted telephonically.
- Where possible, emails were sent to both work and home email addresses.

3.3.1.5 *Final sample*

Data were collected from December 2013 to December 2014. A total of 138 surveys were emailed to educators (Table 3.1). In some institutions more than one educator was using simulation in the undergraduate curriculum and the decision was made not to limit the sampling to one representative from each university or college, but rather to obtain as wide a response as possible for the survey. Table 3.1 also represents the distribution of surveys sent to either a college or university during the 12 months of data collection. A total of 57 surveys were completed and 51 surveys included in the final sample.

Table 3.2: Distribution of sent surveys

Province	University	College	Other	Total
Gauteng	25	10		35
Western province	4	6		10
Eastern province	11	3		14
Limpopo	8	4		12
Kwa Zulu Natal	9	7		16
Northern Cape	0	2		2
Mpumalanga	0	5		5
Free State	9	8		17
Northwest province	9	2		11
Not delivered - returned			16	16
Sample Total				138

3.3.2 Phase 2a: Scoping review

A scoping review was conducted in Phase 2a of the study to address the first part of the second research objective: “What does the literature describe as simulation best practice?”

A scoping review, unlike a systematic review, is a broad systematic mapping of the literature from diverse research methodologies, including both experimental and non-experimental studies, qualitative research, methodological studies, and theoretical papers on a specific topic. The reason for conducting a scoping review in this study was to report on “evidence and the types of evidence that address and inform practice in a topic area” (Johanna Briggs Institute, 2015:6).

3.3.2.1 *Scoping review process*

The Johanna Briggs Institute (2015) and the Arksey and O’Malley (2005) scoping review frameworks include the identification of the research question, identifying relevant studies, selecting the studies, charting the data, collating, summarising and reporting of the results. Each stage of the review is discussed in detail below.

3.3.2.2 *Defining the review question*

The focus of the scoping review was on identifying simulation educational best practices in nursing and medical undergraduate curricula. Initially, the intention was to limit the search to undergraduate nursing curricula, as the resultant programme is intended for use in this field of health sciences education, but it was decided to expand the search to include both nursing and medical simulation practices. Undergraduate medical and nursing students have commonalities of clinical skills training: the development of critical thinking and problem solving skills. Limiting the inclusion criteria would have limited the review and reduced the generalizability of the findings. Ganong (1987) states that methodological changes are acceptable when the initial findings suggest that the inclusion criteria be expanded to enhance the review.

The review question was formulated using the mnemonic PCC, representing the Population, Concept and the Context of the phenomenon being studied. The population is undergraduate nursing and medical students, the concept is simulation best practices and the context is undergraduate nursing and medical curricula. The resultant research question used to identify the search strategy was: What does the literature identify as simulation best practices in nursing and medical education?

The following criteria were used to select sources:

- Literature published between January 2001 and March 2014. The decision to start the search from January 2001 was made on the knowledge that simulation pedagogy has rapidly increased over the last 20 years, with the corresponding increase in simulation literature over the last decade. Limiting the period to the last 13 years for this study provides a current view on current education practices.
- Simulation practices had to refer to educational methodologies and pedagogies and not to clinical best practices.
- Publications in English only.

3.3.2.3 *Search strategy*

The researcher and her research assistant, a post-graduate student, who had received training in literature searches and completed his own post-graduate research report including an integrative review, conducted a comprehensive electronic search of the literature, using five major databases namely: Cumulative Index to Nursing and Allied Health Literature (CINAHL), Sage journals online, Science Direct, PubMed, and Wiley Online. The databases were selected for the search as they are aligned to both nursing and medical education and provide a broad overview of both educational and nursing education literature. The decision was made not to include Google Scholar as a search engine in, as a quick search of Google Scholar revealed many duplicate articles plus a large volume of literature that was not relevant to the study nor fitted the inclusion criteria. References included in the articles aided the search for additional literature.

The researcher selected the following search terms from the research question and the PCC mnemonic: *best practices, simulation* and *undergraduate, nursing and/or medical education*, which guided the search within and including the dates from January 2001 to March 2014. The search terms were used in combination and to ensure a comprehensive search for relevant articles.

The search strategy is displayed in Figure 3.1.

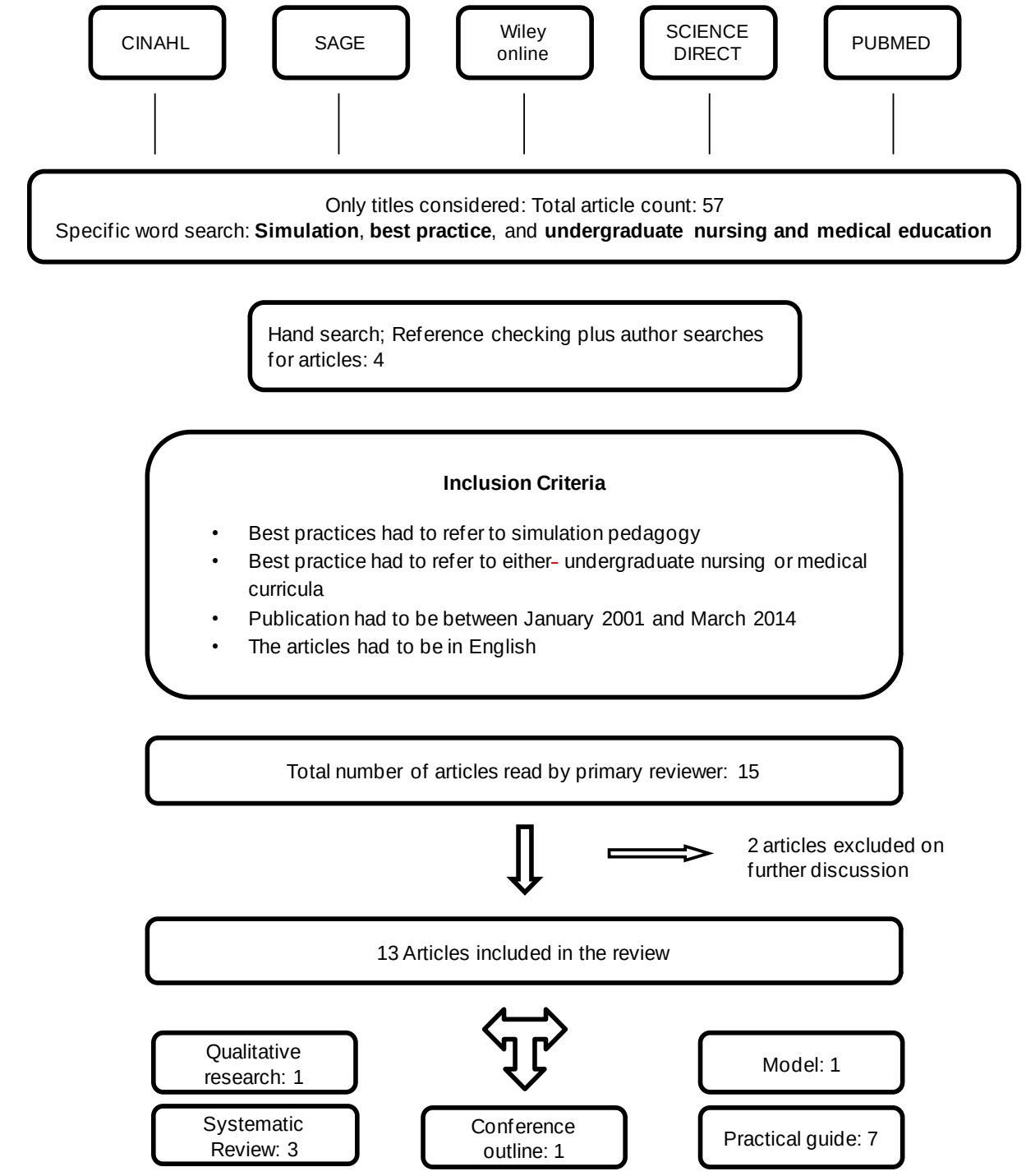

Figure 3.1: Scoping review search strategy

3.3.2.4 *Data analysis*

A scoping review does not require the researcher to critically appraise the data collected in the review (Arksey & O'Malley, 2005), but the presentation of the data must relate to the research question and provide meaning from the dataset (Braun & Clarke, 2006).

Thematic analysis is a systematic "method of identifying, analysing and reporting patterns (themes) within the data" (Braun & Clarke, 2006:6). The researcher based her thematic analysis on the guidelines provided by Braun & Clarke (2006):

- **Familiarising one's self with the data**: this involved both the researcher and her assistant actively and repeatedly reading the articles.
- **Generating initial codes**: codes were identified in the data through highlighting interesting and related segments within the text that are linked to the question being asked in the review.
- **Searching for themes**: codes were clustered into themes; the researcher grouped ideas with similar meanings together, for example, self-reflection and debriefing, learning objectives and learning outcomes.
- **Reviewing themes**: this step involved re-reading the articles to confirm or add to the established themes.
- **Defining and naming themes**: themes were identified in relation to both simulation education practices, using simulation terminology, and education practices.
- **Producing a report**: the report provides a description of the themes and highlights the important aspects of the simulation education best practices. This process created a more comprehensive knowledge of the phenomenon being studied and generated perspectives that ultimately strengthened the research, see Chapter 5 (Ohlsson, Ringer & Borglin 2014; Torraco, 2005).

3.3.3 Phase 2b: Delphi study

A Delphi Survey is a systematic, iterative, group communication process of obtaining, exchanging and developing informed opinions on a specific issue (Hsu, 2007; Rayons, 2012). According to Burns and Grove (2005:407), it is used "to measure the

judgement of a group of experts for the purpose of making decisions, assessing priorities or making forecasts". The purpose of a Delphi Survey is to elicit subjective perceptions or judgements, in a specialized field, which result in subjective, expert opinion and therefore cannot be construed as scientific fact (Yousuf, 2007). Nonetheless, the solicited opinions should be insightful and add value to the research question posed. Hanafin (2004) describes the use of a Delphi Survey as appropriate in situations where the problem defined can benefit from subjective judgements, made on a collective basis, by a group of defined experts.

This resonated with the second part of the second objective of this study, which was to explore the perceptions and engagement of South African nurse educators, who are considered experts in best education practices in simulation. The aim of the Delphi study was to determine if there was a consensus of how South African nurse educators are using the identified education simulation best practices within their respective NEIs. The perspective of South African nurse simulation experts was regarded as important because they are working in South African nursing context and can provide insight into how they have embedded the practice into their NEIs, adding to the context and relevance of the resulting programme.

A Delphi Study allows the researcher to consult with the selected participants, eliminating the geographical barriers that may exist when attempting to get groups together.

3.3.3.1 *Structure of the sequential questionnaires*

Powell (2002) suggests that the first round of a Delphi Survey is unstructured, with open-ended questions, as its purpose is to elicit opinions and issues raised by gathering the opinion of a panel of experts. The opinions and issues raised in the first round are then addressed in the second round of the Delphi Survey (Hsu ,2007; Kalaian and Kasim, 2012; Powell, 2002; Stevenson, 2010).

Stevenson (2010) suggests formulating a concise statement followed by open-ended questions for round one. The questions that were included in the Delphi study round one emerged from both the scoping review and the survey (see Chapter 4 and Chapter 5). The four best practices identified represented four categories for the Delphi, with the literature from the scoping review included in the sub questions. The

results of round one of the Delphi Survey were analysed according to the research paradigm of the question asked, qualitative data was coded, and statistical values and meaning were determined from quantitative questions (Hsu, 2007:4).

The structure of the second round questionnaire is dependent on both the objectives of the Delphi Survey and the results of round one. The researcher may either focus the responses from round one, or be directed by the responses of the panellists in the development of the second questionnaire (Skulmoski, Hartman, Krahn, 2007). In this Delphi Study, the researcher was guided by the responses in round one, so in round two of the Delphi Survey the panellists were asked to elaborate on comments from round one and were asked to provide additional insights thus adding to the richness of the data.

In this study, the questions for the Delphi study were derived from the survey and the scoping review conducted in phase 1. This is discussed in more detail in section 6.3.

3.3.3.2 *Participant selection*

The sample for a Delphi Survey includes an identified group of informed individuals, hence the term *experts* (Hasson, Keeney & McKenna, 2000). The success of a Delphi Survey relies on two aspects of the sample: a) the definition of what the researcher defines as an expert, and b) the panel size of pre-selected experts in the field (Powell, 2002).

3.3.3.2.1 *Definition and selection of experts*

The purpose of the data collected in the Delphi Survey guided the selection of the experts by the researcher for inclusion in the Delphi Survey (Bruce, Langley & Tjale, 2008). This lends itself to a purposive sampling or judgemental sampling method (Burns & Grove, 2005). Purposive sampling is defined as a sampling method whereby participants are "information rich" (Burns & Grove, 2005:352), and perceived to have expertise in the subject being studied (Keeney, Hasson & McKenna, 2005). Baker, Lovell and Harris (2006) explore the concept of experts in a Delphi Survey, and identify two key characteristics of an expert:

a. Knowledge, which could be a relevant professional qualification or registration, and peer-reviewed publications in the specific area being

researched, but free from bias, and with no reason to manipulate the results in any way (Baker, Lovell & Harris, 2006)

b. Experience, often linked to professional qualifications in attempting to define being an expert (Baker, Lovell & Harris et al., 2006), but the onus is on the researcher to determine what level of experience is required, and to rigorously identify this in the exclusion and inclusion criteria for the panellists (Keeney, Hasson & McKenna, 2005).

3.3.3.2.2 *Expert selection and sampling*

The total population for this study comprised nurse educators based at either a university or nursing college, from four of the nine provinces in South Africa, teaching undergraduate nursing students using simulation.

The area of expertise for this study was simulation used in an undergraduate nursing curriculum. Therefore, nursing lecturers with an education qualification, who have been using simulation in their curriculum for a minimum period of 2 years were considered as experts.

Purposive and snowball sampling techniques were used to establish the expert participants, which is often used in the exploratory stages of qualitative research, when the focus of a phenomenon is related to individuals with specific expertise. The researcher is known in the simulation education field, and was aware of the educators who had experience of working with simulation and were regarded as experts in simulation. These educators were approached by the researcher to consider participating in this study, as well as being asked if they could recommend other educators who they thought might fit the inclusion criteria.

The initial participant contact by the researcher included an introductory letter with an explanation of the study (Annexure E), and the estimated time that it would take to complete the 21 item, mixed Likert scale and open-ended questionnaire. Return email was used to indicate willingness to participate, and the questionnaire for round one was then forwarded to the participants.

Three potential participants from both a university and a college, who did not wish to participate, were asked by researcher if they could recommend anyone from their NEI. One referral was recovered, but the final sample for the Delphi Survey did not

represent any colleges; geographically 4 of the 9 provinces were represented. The total sample was 7 participants.

3.4 Phase 3: Poll

The poll at the start of the design phase was used to determine what the preferred mode of delivery for the education simulation programme would be. A poll gathers information on a single item or topic allowing a researcher to ask one multiple-choice question, with one or multiple answers (Guay, [undated]). Offering the researcher a general overview to the topic , in a poll there is no place for the responders to give a detailed answer on the topic. A poll of the educator's preference for the delivery of a simulation programme was conducted to ensure that the programme was relevant and applicable to potential participants.

3.4.1 Methodology used for the poll

The poll was delivered via SurveyMonkey® and the question asked was: "What advice would you give in regards to the mode of delivery of the simulation programme?" (Annexure D)

The multiple-choice options were:

- Face to face
- Blended learning (online with contact sessions)
- Online

A single answer was required.

3.4.2 Sampling for the poll

The population for the poll were nurse educators employed for an undergraduate nursing curriculum at the time that the poll was conducted. The realised sample comprised educators that replied to the survey conducted in phase one on determining the use of simulation in the undergraduate nursing curriculum. The rationale for using the same sample was that the respondents had expressed a need for a simulation programme and therefore would be the potential users of the programme.

3.4.3 Final sample

Data were collected over a period of 2 months. A total of 138 surveys were emailed to the original survey sample; 27 surveys were retuned as ‘not delivered’. A realised sample of 37 completed polls was included in the final sample. The same response issues that were evident in the survey were again evident in the poll, resulting in the low response rate.

Table 3.3 The poll findings (n= 37)

Mode of delivery	**Replies**	**Percentage**
Face to face	8	21.62%
Blended learning	29	78.37%
Online	0	0%

Figure 3.2: Poll findings (n= 37)

Despite the low response rate, there was an overwhelming indication 78.37% (29) that the preferred mode of delivery for the programme was a form of blended learning. None of the respondents indicated that online was suitable for simulation, which is understandable as simulation is a practical, hands-on teaching methodology.

Therefore the resultant programme was developed in a blended learning format, with participants working within their own NEIs and developing a simulation scenario relevant to their curriculum, NEI resources and student level of training.

3.5 Rigour of the research as addressed in this study

Validity in quantitative research refers to the extent that the phenomenon being studied is being measured accurately, using a validated instrument; reliability refers to the accuracy of the instrument in measuring the concept (Roberts, 2006).

The following measures were applied to ensure the rigour of the study:

3.5.1 Instrument factors

The National Simulation Prevalence and Use of Simulation survey (Hayden, 2011) was used for data collection in Phase One of this study. The original survey was validated in 2010 and used in 2011 in the United States of America to review 1060 pre-licensure nursing programmes, with the aim of determining the uses of simulation in their undergraduate courses.

Prior to being used in Phase one of this study, the original survey was pre-tested for face and content validity with 4 educators, who gave feedback on the instrument's relevancy to the South African education environment, as well as the terminology used in the original questionnaire. The educators agreed on the relevancy and applicability of the instrument to answer the research Question One: To identify the use of simulation in the 4-year nursing curricula in South African nursing colleges and universities. All changes that were made were communicated to the original authors' and are discussed in Chapter 4.

3.5.2 Researcher factors

The development of a relationship of trust with the participants was achieved by the researcher being present at nursing conferences, and presenting instructional presentations on simulation when relevant or invited to do so by nursing colleges and universities interested in simulation. Being available to answer questions, to listen to and to share ideas and new information on simulation practices in South Africa, in order to stay well informed about the needs of nurse educators and new developments in education, also contributes to a relationship of trust.

The researcher purposively used maximum variation and expert sampling to ensure information was gathered from a wide variety of informants, who met the inclusion criteria. All potential participants were given information letters and the researcher's contact telephone numbers prior to participating, with an explanation of the independence of the researcher and her affiliations. The anonymity of the SurveyMonkey® questionnaire also ensured that participants could answer freely without fear of reprisal.

Frequent meetings between the researcher and her supervisor were on-going, establishing an environment of collaboration: the sharing of ideas and was evident throughout the research process.

Peer scrutiny of work was achieved throughout the process through conference presentations, special interest group discussions and other forms of scholarly interaction. The researcher interacted with colleagues within her department who were interested in using simulation. This interaction took the form of sharing of ideas and issues that arose from the data collection and the on-going development of the simulation programme.

Background qualifications and experience of the investigator – the researcher had attended a simulation training course run by Drexel University in 2012, was a 2015 member of the National League of Nurses Simulation Leadership Programme and successfully became an accredited Certified Healthcare Simulation Educator in 2015 (Society for Simulation in Healthcare).

3.5.3 Use of multiple data collection methods

To ensure the trustworthiness of the data collected, different techniques and methodologies were used to establish nurse educators' uses of simulation, as well as enquiring how expert educators perceived the education simulation best practices that emerged from the scoping review.

A thick description of the phenomenon under study –detailed descriptions of all aspects of simulation, the research methods used and the findings from this study – has been presented. The context has been explained and the issue that arose with sampling process in the survey have been fully explained in Paragraph 3.3.1.4, as well as measures taken to try to prevent a low respondent rate, offering a context specific possible explanation.

Critical examination of previous research studies and the literature, to assess congruency of findings – this was done throughout the research process.

3.5.4 Trustworthiness and rigour of qualitative data

Validity and reliability cannot be addressed in the same manner as for quantitative research, but measures can be taken to ensure the validity and reliability of the qualitative findings (Shenton, 2004: Babbie & Mouton, 2010:276; Cresswell, 2009:190). The rigour of qualitative data refers to the trustworthiness of the data. The measures for ensuring the rigour of the qualitative phases are described below:

***Credibility**:* refers to the credibility or believability (Babbie & Mouton, 2010) of the findings from the reality of the participants. This was achieved in the following manner:

- **Thick description of the phenomenon understudy** –detailed descriptions of all aspects of simulation, the research methods used and the findings from this study. The context has been explained and the issues with sampling in the survey have been fully explained, as well as measures taken to try to prevent the low respondent rate, offering a context specific possible explanation.
- **Member checking** – although the results of the survey were not able to be member checked, due to the anonymity of the responses, the Delphi technique lends itself to member checking as it is an iterative process where information is fed back to the participants. The results of this study have been presented at conferences in both 2015 and 2016, where members would be able to comment on the findings, either to agree or disagree.
- **Sampling** - maximum variation, snowball sampling and expert sampling were used throughout the three data collection phases to ensure information was gathered from a wide variety of informants.
- **Congruency** - examination of previous research studies and the literature, to assess congruency of findings was done throughout the research process, as the investigator read prolifically.
- **Trustworthiness** - The use of multiple data collection methods, to ensure the trustworthiness of the data collected, was achieved by introducing phases to this study, using different techniques and methodologies to establish the educator's perceptions of simulation uses and prevalence and what they understand as best practices. Triangulation was also achieved with the

inclusion of both universities and colleges offering the four-year degree or diploma program, as they may use different teaching methods, thus engaging in a variety of educator perspectives.

Transferability and generalizability of the findings. Transferability refers to the extent to which the findings can be applied to a different context and/or involve different participants (Babbie & Mouton, 2010). A detailed description of the purposive sampling method used has been included in the study. A description of the participants, the setting and context for the study and all data collection methods were described and recorded in detail throughout the stages of data collection, to allow for transferability of the study.

3.6 Ethical considerations

The relevant ethics committee for post graduate research at the University of Witwatersrand critically evaluated the research proposal, prior to permission to conduct the research being granted (certificate M130635, Addendum A).

Permission to conduct this research was granted from the post graduate assessors committee.

The rights of the individuals and institutions participating in this study were respected in the following manner:

- Full disclosure of all information pertaining to this study was given to the potential participants and institutions.
- Individuals and institutions were informed of their right to voluntarily participate or withdraw from the study, with no penalty to themselves.
- It was made clear to the potential participants that by completing the survey questionnaire in phase one of the study, informed consent to participate in the study was presumed (Annexure B).
- Permission from the original author of the NCSBN survey used in phase one of data collection, was obtained (Annexure C).
- A letter requesting nurse educators to participate in the Delphi study was emailed to the potential expert panel members, with an informed consent attached. (Annexure E).

- Privacy of the individual and institution was protected by the omission of any names on the questionnaires, and all data from the survey was kept in the researcher's personal password-protected computer.
- The Delphi technique lends itself to anonymity as the participants do not correspond or meet each other, but send information back the researcher.
- The data were handled in a rigorous manner allowing for an audit trail, and scrutiny to occur if required.

3.7 Conclusion

Chapter three gave an overview to the research design and the methodologies used in the data collection phases of this study. Details of the survey are described in Chapter 4, the scoping literature review in Chapter 5 and the Delphi Study in Chapter 6. This covers Phases 1, 2a and 2b of the research. Phases 3 and 4 are described in Chapter 7 and Chapter 8.

The next chapter describes Phase 1, the survey data collection, which was conducted to determine the use of simulation in undergraduate nursing curricula.

Chapter 4 Phase 1: Survey - Use of Simulation in Undergraduate Nursing Curricula

This chapter describes the first stage of data collection including the data analysis and findings. The data collection instrument for this phase was a quantitative questionnaire survey to determine the prevalence and use of simulation in undergraduate nursing curricula and teaching in South Africa. The findings form part of the situational analysis for the development of a relevant, specific programme for nurse educators.

The findings from the survey are presented as they were analysed, and the implications for education simulation practice and the need for a simulation programme are then discussed.

4.1 Survey Instrument

SurveyMonkey® was selected as the website host and survey tool for the survey. The survey questionnaire used (Annexure B) was titled: The Use of Simulation in Nursing Education: National Survey (NCSBN, 2011). The survey was pre-tested for content validity among four nurse educators from a school of nursing in a university, and was amended following the pre-testing. The original survey differentiated between different programme types; for application in this study the differentiation was made between the different years of study, i.e. the first, second, third year and fourth year of study in either the 4-year degree or diploma programme. The survey was sent via email, and the responses were delivered anonymously in aggregate form from SurveyMonkey®.

The final amended South African survey consisted of 28 questions, with both Likert scale and open-ended questions being used.

4.1.1 Overview of the survey

The following definitions were applied to this survey and were described in the preamble in the original survey exploring simulation experiences (Hayden, 2010).

- High-fidelity simulation: A patient care scenario that uses a standardised patient or a full-body patient simulator, which can be programmed to respond to affective and psychomotor changes, such as breathing chest action. Examples of high-fidelity simulators include SimMan and Noelle with Newborn Hal® (Hayden, 2010).
- Medium-fidelity simulation: A patient care scenario that uses a full body simulator with installed human qualities, such as breath sounds without chest rise. An example of a medium-fidelity simulator is VitalSim® (Hayden, 2010).
- Task trainer: Part of a manikin designed for a specific psychomotor skill. For example, an arm for intravenous insertion practices (Hayden, 2010).

The survey was structured in three sections:

1. Demographic information about the NEI and the total student population number at the NEIs.
2. Simulation experience, with conceptual definitions.
3. Departmental resources available for simulation.

A brief description of the above three stages is included below.

4.1.2 First section of the survey: Demographic Information

The NEIs were either colleges or universities, and identified as either rural suburban or urban (Question 28). The survey determined the student population in each year of study, and the amount of clinical time allocated to each year of the study.

4.1.3 Second section of the survey: Simulation experience

The aim of this section of the questionnaire was to establish the use of simulation in each year group: the type of simulation used more frequently in each year group and how much simulation time is credited towards the mandatory clinical hours.

The student's level of participation was explored in a series of questions. The survey asked if students, who observed specific simulations, had been given evaluation instruments for the simulation objectives, to guide their critical observation of their peers during the simulation. The question was asked as to whether debriefing was routinely done after simulation, and if the students observing the simulation participated in the debriefing process.

4.1.4 Third section of the survey: Departmental resources

This section of the questionnaire focused on the resources available to educators within their NEIs. This included exploring the development of scenarios and the training of educators to use simulation. The participants were then asked to describe their own perceptions of whether they felt their programmes offered sufficient use of simulation, and what the barriers to further integration of simulation might be.

4.2 Results

Fifty-seven replies were returned from the 138 surveys (41.3% return) sent out via email, but only 51 replies could be included (36.9%) in the study, as 6 of the replies had conflicting data or were not sufficiently complete to add any valid information to the data. This reflected a 36.95% inclusion response rate. Completed surveys were returned from 8 of the 9 provinces in South Africa, only the Northern Cape did not respond.

4.2.1 Demographic Data (Questions 1-5)

The representation from the universities was higher than that of the colleges, with 36 (70.59%) responses compared with only 15 (29.41%) from colleges (Table 4.1). The response rate from university participants was also higher, with 48% (36/75), whereas only 32% (15/47) of college participants responded.

The number of students per year was asked Question #2. First year had the highest student numbers, with an average of 92 students, second year averaged 66 students, third year had an average of 50 student and fourth year 48 students.

The respondents were either year coordinators (63%) or subject coordinators (71%). In South African NEIs nurse educators can be both a course coordinator and a year coordinator.

Table 4.1: Demographic data

Geographic location	**Responses**
Rural	2
Suburban	3
Urban	37
Skipped question	9
Total	51
Description of NEI	**Responses**
University	36
College	15
Total	51
Type of programme	**Responses**
4-year degree	34
4-year Diploma	15
Skipped question	2
Total	51

A total of 57 surveys were returned and 51 surveys included in the final sample. Table 4.1 indicates that the majority of responses were from universities in South Africa, who offer the four-year degree undergraduate nursing programme, with most being from the urban areas within South Africa.

4.2.2 Use of simulation per year of study

In Question #5, respondents were asked in which year of study the different types of simulation were used, referring to the definitions given in the preamble to the survey.

Respondents could select more than one answer for each course in which they were involved, therefore the percentages could total more than 100% in some sections.

Table 4.2: Type of simulation used per year group

	High-fidelity Simulation % (n)	Medium-fidelity Simulation % (n)	Task Trainers %(n)	Total Respondent Numbers
First year	11.11% (4)	47.22% (17)	83.33% (30)	36
Second year	21.88% (7)	50.00% (16)	65.63% (21)	32
Third year	38.71% (12)	51.61% (16)	70.97% (22)	31
Fourth year	39.29% (13)	45.45% (15)	60.61% (20)	33

All student year groups used a combination of the three different types of simulation. All four years predominately used task trainers, with first year using them more than any other group at 83.33% (30). High-fidelity Simulation is the least used at an average use of 27.27% (36), with it being most used in the fourth year at 39.93% (13).

4.2.3 Simulation use per area of study

The data show that task trainers are the most commonly used form of manikin simulation in South Africa across all the years of student training, see Table 4.2 and Table 4.3.

Table 4.3: High fidelity, medium fidelity, and task trainer simulation use per selected courses

	High-Fidelity Simulation % (n)	Medium-Fidelity Simulation %(n)	Task Trainers % (n)	Total Respondent Numbers
Physical assessment	23.08% (9)	46.15%(18)	56.41% (22)	49
Medical and surgical nursing	27.78% (10)	38.89%(14)	5.56% (2)	26
Midwifery	36.11% (13)	50.00%(18)	5.56% (17)	48
Paediatric nursing	20.00% (3)	26.67% (8)	56.67% (17)	30
Community nursing	9.09% (3)	30.30%(10)	54.55% (18)	33

	High-Fidelity Simulation % (n)	Medium-Fidelity Simulation %(n)	Task Trainers % (n)	Total Respondent Numbers
Psycho social nursing	12.50% (4)	9.38% (3)	28.13% (17)	32

High-fidelity and medium-fidelity simulators are mostly used in midwifery (36.11% and 50.00% respectively). Medium-fidelity simulators are commonly used in the physical assessment of patients (46.17%) and in the medical and surgical nursing courses (38.89%).

4.2.4 Other types of simulation

The most commonly used form of simulation in South Africa, excluding task manikins, is role playing, Question #13 (Table 4.4) with 92% (40) of educators nominating this as their most frequently used simulation modality, followed by the standardised patient 56% (24).

Computer-based simulation tools such as CD-ROMs and internet-based virtual programmes were used by 42.22% and 20% of educators respectively.

Table 4.4: Use of other simulations, besides manikins, in the nursing programmes

Type of simulation	Percentage
Standardised patients	55.56%
CD Rom	42.22%
Internet based Virtual Reality	20%
Role playing	91.11%

4.2.5 Learning opportunities offered by simulation laboratories

In line with the prevalent use of task trainers identified at the beginning of this section, Question #15 asked what type of learning opportunities are offered in the respondents' simulation laboratories (Table 4.5). Simulation laboratories are designed for task training and for the practicing of skills-orientated procedures, such

as suctioning and Foley's catheter insertion, accordingly 90.70% (40) of the respondents' simulation laboratories offered this type of simulation.

Table 4.5: Types of learning opportunities offered by simulation laboratories

Simulation laboratory types	**Percentage**	**Numbers**
Practise procedures such as suctioning, Foley's catheter insertion, medication administration	90.70%	40
Practise routine assessments such as health and lung sounds expected in clinical normal and abnormal findings	46.51%	20
Practise patient scenarios discussed in class	72.09%	32
Practise rare scenarios that students may not see in clinical facilities	46.51%	21
Practise high risk patient scenarios	34.88%	16
Remediation of skills	77%	34

4.2.6 Simulation Scenarios

A simulation scenario is defined as the potential or expected course of events for a simulated clinical experience (Palaganas, Maxworthy, Epps & Mancini, 2015). Various steps need to be considered in the design process for a scenario; these may include student preparation, equipment preparation and equipment availability, planning the course of the simulation from beginning to an ending point, and the debriefing approach best suited to the students and environment (Palaganas, Maxworthy, Epps & Mancini, 2015).

Question #7 asked the length of time of the average scenario for each training session, 50% (21) of the respondents indicated that most of their scenarios run for between 31 and 60 minutes, with 29.5% (12) running for over an hour. The original study by Hayden (2010) indicated that the majority of scenarios ran between 15 and 30 minutes, with less than a quarter of the scenarios running for more than an hour.

The responses indicate that educators are writing their own scenarios 95% (40) (see Table 4.6), but only 16.7% (7) of educators are sharing scenarios with other NEIs (Question #23).

It was also noted that the quality assessment of the scenarios (Question #24) is achieved mostly by student review post simulation (61.54%). Many educators do not have any quality assurance measures in place for their scenarios (25.64%) (see Table 4.6).

Table 4.6: Scenario information

		Yes % (n)	No % (n)	Total Respondents
Educators who write their own scenarios		95.0% (40)	4.7% (2)	42
Educators who share their scenarios with other NEIs		16.6% (7)	83.37% (35)	42
	Colleague evaluation	**Pilot testing**	**Student review**	**None**
Quality of simulation session/ scenario Multiple choices could be selected.	26.83% (11)	9.76%(4)	61.54% (24)	25.64%

4.2.7 Debriefing in simulation

Question #11 asked about the debriefing process. Debriefing is not routinely performed after simulation experiences in South African NEIs. Of the participants who replied to the question, 43.59% (18) debrief students while 56.41% (23) do not accommodate debriefing. Eleven participants did not reply to this question, possibly because they were not fully aware of the meaning of debriefing in the context of simulation. Question #12 asked whether students who observe the simulation participate in the debriefing, 64.3 % (27) of students who observed the simulation were not included in the debriefing, but debriefing does not occur post all simulation-based learning opportunities as seen in Table 4.7 (Question #11).

Table 4.7: Debriefing frequency in simulation

Debriefing occurrence	**Percentage**
Educators debrief students routinely after simulation	43.59% (17)
Debriefing does not occur after simulation	56.41% (23)

This might be linked to the predominance of task training in the simulation laboratories, which traditionally do not have debriefing session post the experience, rather the clinical facilitator offers a quick “evaluation of the performance and discusses alternative actions needed by the students” (Johnson-Pivec, 2011).

4.2.8 Educator training in simulation

Table 4.8: Training frequency of educators in simulation

Simulation Training	**Percentage**
Formal training in simulation i.e. attended a workshop	11.63% (5)
Introductory course in simulation (provided by merchants)	79.07% (34)
No training	9.30% (4)

Only 11.63% (5) of participants who are involved at some level with simulation have attended a training workshop or programme on simulation training, although 79.07% (34) of course coordinators had some introductory course to simulation, and 9.3% (4) of respondents had no training in simulation at all. One respondent did not answer this question.

Question #16 asked if simulation experiences were being graded routinely in South African NEIs. The results indicate that simulation is most commonly not graded (61.90%), and when it is graded 26.32% of educators give an objective graded score and 28.95% give a high stakes pass/fail grade.

4.2.9 Amount of simulation used in the NEIs

Question #25 asked a question about whether there was a perceived need for simulation in South African NEIs (Table 4.9) An overwhelming 95.23% (41) of respondents stated that they should be using more simulation, with only 4.77% (2) stating that they were using just the right amount of simulation in their programme. There was no indication that too much simulation was being used in nursing in NEIs.

Table 4.9: Perceptions of educators to amount of simulation being used

Amount of simulation	**Percentage**	**Number**
Should be using more simulation in their programmes	95.23%	41
Using just enough simulation	4.77%	2
Should be using less simulation in our programmes	0%	0

4.2.10 Barriers to increasing the simulation platform in the NEIs

Question #26 addressed the nurse educators' perceived barriers to integrating simulation into their programmes. Knowing what the barriers are, prior to the development of an education simulation programme allows the developers to address the barriers, and thereby makes the programme relevant and meaningful for the potential participants

The findings in Table 4.10 reinforce the need for a simulation education programme, with 76.19% (32) of respondents citing the lack of training for educators as the largest barrier to simulation integration. The availability to use the simulation laboratory was the lowest ranked barrier, which could indicate an underuse of existing facilities.

Table 4.10: Barriers to increasing simulation

Barriers to increase	**Percentage**	**Number**
More departmental lecturers need to be trained in simulation and debriefing	76.19%	32
Departmental lecturers do not have enough time to write scenarios	47.62%	20
More departmental lecturers need to be trained in *facilitating* simulation	61.90%	26
Not enough staff are involved in controlling the simulation equipment	28.57%	12
It is difficult to schedule additional time in the simulation laboratory as other groups are using the lab	26.19%	11

(Respondents could select more than one answer).

4.2.11 Does simulation count towards clinical hours required for registration?

Of the nurse educators participating in this study, 61.79% (39) that responded to the question indicated that time spent on simulation can be counted as clinical hours, and the remaining respondents did not include simulation as clinical hours. The percentage of simulation hours substituted for clinical hours ranged from 1% to 30% with the average being 15.2%.

If the respondents answered “yes” to the above question, they were asked to comment on what percentage simulation time has in relation to clinical time. The narratives provided included the following (responses are from different respondents):

“It varies as systems do not exist to set standards, at present it is done on a needs basis, which leads to overloading of programs”

“It varies – six hours of simulation cannot be regarded as six hours of clinical (experience) because the learning is more condensed”

“It varies because each programme is changing and adapting their simulation experience (to student’s needs)”

“We haven’t measured it yet, it differs per year group, but we will standardise our approach”.

4.3 Discussion of the results

The results of the survey indicate that South African NEIs are using simulation in undergraduate nursing courses, suggesting that nurse educators are aware of simulation and the positive outcomes related to student training and skills improvement. Only 4.77% (2) of educators that respondent thought they were using the right amount of simulation in their courses, with an overwhelming 95.23% (41) reporting they should be using more. The greatest barrier to inclusion of simulation into the curriculum is the lack of training, with 76.19% (32) of the survey sample reporting the need for more training in simulation and debriefing.

Educators are predominantly using task trainers to teach nursing skills. This could be due to limited access to high-fidelity simulators. High fidelity simulators are expensive in terms of both cost and the amount of training required. Another possible reason may be that high-fidelity simulation is a relatively new technology in nursing education (Arthur, Kable, & Levett-Jones, 2011), and more so in South Africa, as evidenced by the lack of South African published research and lack of educator collaboration in the simulation field.

Due to the 'newness' of simulation in nursing education in South Africa, nurse educators have not had the opportunity to be sufficiently trained in the methodology, and are mostly reliant on vendor or merchant training. It is the researcher's opinion that although vendor training in simulation is important from an equipment and mechanical instruction perspective, it does not equip the nurse educator with a comprehensive integrated approach to nursing simulation, relevant to the student nurses learning needs. Hence educators often do not feel comfortable using this form of simulation, reinforcing the need to introduce relevant nursing training programmes.

4.3.1 Use of simulation in NEIs

Task trainers are used in the first year of nursing training to establish competency in certain fundamental skills that are required by the nurse prior to entering the clinical placement area. These skills include bed bathing, and taking blood pressure using a blood pressure static arm. It is not surprising that the midwifery curriculum has the highest use of simulation, as exposure to clinical emergencies may be infrequent, but students need to be able to manage them during their training. Therefore, simulation-based learning has an essential role to play in the curriculum, to help a nurse gain the necessary confidence and knowledge about how to respond to a given emergency.

The literature discusses the use of simulation for teaching or student competency in high risk skills training (Buykx et al., 2011; Lateef, 2010), but the scheduling of simulation in already full student timetables may need educators to decide on what approach to simulation will be taken by the NEI. This idea was further explored in the Delphi study.

The results of this survey are in line with the original study's (Hayden, 2010) low rate of simulation in psycho-social nursing (Table 4.3), this may be due to the need to develop specific scenarios as well as the unavailability of standardised patients who can respond in a certain manner.

Standardised patients appear to be commonly used simulation modalities in South Africa, with 55.56% of respondents indicating that they do use them. The training of standardised patients was not addressed in this survey, and it may be worthwhile exploring this aspect of simulation in a further study, for their inclusion on psycho social nursing.

Simulation, when situated as an integral part of the curriculum, can address the educational issues of teaching communication skills and interpersonal skills. Simulation training and simulation educational programmes should address the extended use of simulation beyond skills training.

4.3.2 Quality control of the simulation scenarios

Data show that the majority of nurse educators in South Africa designed their own simulation scenarios (95% of respondents); this was not explored further in the survey. The researcher makes the assumption that this may be to ensure the relevance of the scenario to the health care profile of the population and the South African nursing curriculum. What does appear to be a missed opportunity for the development of simulation in this context is the lack of sharing and collaboration amongst the educators and NEIs. If collaboration could be achieved among educators, quality control measures in the scenario design and implementation would also improve.

4.3.3 Timing of a scenario

Anderson, Jenkins, Kardong-Edgren et al. (2014) make the observation that there is no optimal time allocated for the length of a scenario; short scenarios are described as taking less than 30 minutes and longer scenarios taking more than 30 minutes. The length of time for each scenario should be decided on by the simulation objectives, which must be achievable within the allocated time frame (Lioce & Reed

et al., 2013), and the required complexity of the scenario for the different years of study.

The researcher would also suggest that the time available in the curriculum, student numbers and student scheduling should also be considered in deciding on the length of the scenario. There is also a need for developing scenarios that are concise and well planned in accordance to the students specific learning objectives.

4.3.4 Lack of debriefing

The lack of debriefing in simulation-based learning in South African NEIs, with only 43.59% of respondents having indicated that they debrief after simulation, is of concern. Debriefing is rated as the most important practice when using simulation (Cant & Cooper, 2009; Howard, 2006; Motola, Devine, Chung et al., 2013; National League of Nurses, 2014), as this is when the students have an opportunity to learn through reflecting-on-action and through their own self-reflection on their performance.

4.4 Conclusion

This chapter described the findings on the prevalence and use of simulation in South African NEIs in undergraduate nursing programmes in universities and colleges that use simulation. While the respondents were included because they were using simulation in their teaching, it would appear there are constraints that are preventing them from utilizing simulation to its full extent. The lack of training and lack of awareness of the possibilities are impeding progress in implementing simulation to its full capacity.

The following chapter is a scoping review of the literature to determine best educational practices in simulation.

Chapter 5 Scoping Literature Review

The previous chapter discussed the survey that was used to determine the use of simulation by and simulation practices of nurse educators in undergraduate nursing education in South Africa. This chapter describes the second data collection stage, Phase 2a, to address the second research objective: “To determine what the literature describes as simulation best practices?” Both the survey and scoping review findings will be further developed in the next data collection stage, which is a Delphi Study.

This chapter begins by identifying the reasons why a scoping literature review was considered important in this study. The methodology for a scoping review is then defined, and the data collection method is described. The term best practice is also defined for its relevance to this study and the resultant simulation education best practices, as found in the literature, are identified and discussed.

5.1 Introduction

Scerbo, Murray et al. (2012) mention the importance of using data collected by education researchers to develop evidence based simulation practices. Current simulation literature reviewed for this study, discussions with nurse educators and the researcher’s own experience of simulation practises in undergraduate nursing, all indicate a need to determine simulation education best practices in nursing education.

Best practices refer to techniques or methodologies that are proven to lead to desired outcomes (Rouse, [undated]). The term *best practice* in this study refers to the preferred set of existing simulation educational practices that are perceived to obtain widely agreed effectiveness, resulting in improved student learning.

Identifying what the literature in medical and nursing simulation consider educational best practices can assist in defining standards, introducing techniques and offering a framework for appropriate training of educators involved in the delivery of simulation-based undergraduate nursing education

The aim of this scoping review was to explore the current literature on what is considered education best practice in nursing and medical education simulation.

5.2 Research method

Scoping reviews are undertaken to examine the extent, nature and range of existing research findings appropriate to a study. All relevant literature is reviewed, regardless of the study design, and the assessment of the quality of the included articles is not considered. The review includes peer reviewed publications as well as 'grey' literature, including editorials, conference publications and articles in non-peered reviewed journals, published between January 2001 and March 2014.

Arksey and O'Malley (2005) suggest that the method for identifying the literature includes a framework that is as rigorous and transparent as for other literature reviews, such as a systematic or integrated review. It is essential that the process of literature retrieval and inclusion is documented in detail, in order to ensure the rigour of the scoping reviews findings.

The scoping review framework described by Arksey and O'Malley (2005) and Johanna Briggs Scoping Review (2015) guided the process: the identification of the research question, search and retrieval of the relevant studies, study selection from the inclusion and exclusion criteria, charting of the data and the creation of a new understanding of the topic through the collating, summarising and reporting of the results.

5.3 Data search

A comprehensive electronic search of the literature, using five major databases that are aligned to both nursing and medical education, was undertaken by the researcher and her research assistant, a post-graduate student. The following databases were used: Cumulative Index to Nursing and Allied Health Literature (CINAHL), Sage journals online, Science Direct, PubMed, and Wiley Online. The decision was made not to include Google Scholar as a database in the search, as a quick search of Google Scholar revealed many duplicate articles plus a large volume of literature that was not relevant to the study nor fitted the inclusion criteria.

The terms *best practices, simulation* and *undergraduate, nursing* and/or *medical education* guided the search within and including the dates from January 2001 to March 2014.

Table 5.1: Results from the data search

Database	Key Words	No. of Titles Scanned	No. of Abstracts Read	No. of Articles Read	No. of Articles Included
Science Direct	Simulation AND Nursing AND Best Practice	2			
	Simulation AND Medical AND Best Practice	0			
	Simulation AND Best Practice	21			
	Total	**23**	**8**	**8**	**8 - 1 excluded on second review = 7**
PUBMED	Simulation AND Nursing AND Best Practice	0			
	Simulation AND Medical AND Best Practice	2			
	Simulation AND Best Practice	6			
	Total	**8**	**8**	**7**	**5 – 1 excluded on second review = 4**
CINAHL	Simulation AND Nursing AND Best Practice	1			
	Simulation AND Medical AND Best Practice	0			
	Simulation AND Best Practice	19			
	Total	**20**	**9**	**7**	**2**
SAGE Journals	Simulation AND Nursing AND Best Practice	0			
	Simulation AND Medical AND Best Practice	0			
	Simulation AND Best Practice	0			
	Total	**0**	**0**	**o**	**0**
Wiley Online Library	Simulation AND Nursing AND Best Practice	0			
	Simulation AND Medical AND Best Practice	0			
	Simulation AND Best Practice	6			
	Total	**6**	**0**	**0**	**0**
TOTAL		**57**	**25**	**22**	**13**

Table 5.2: Data obtained from included articles

Authors	Article Title	Journal	Year Published	Type of Article	Findings
CINAHL					
Paskin, Z Peile, E	Final year medical students' views on simulation based teaching: A comparison with the best evidence medical education systematic review	Medical Teacher	2010	Qualitative research using a Human Patient Simulator (HPS)	Immediate feedback from the HPS Integration into the curriculum The learning environment Degree of realism Teamwork
Buykx, P, Kinsman, L Cooper, S McConnell-Henry, T Cant, R.,Endacott, R Scholes, J	First2Act: Educating nurses to identify patient deterioration: A theory-based model for best practice simulation education	Nurse Education Today	2011	Description of an evidence-based Model	Developing theoretical core knowledge Reflective review Performance feedback (debriefing)
PUBMED					
Bremmer, M Aduddell, M Adamson, J	The use of human simulators: Best practices with novice nursing students	Online Journal of Nursing Informatics	2008	Experimental research with randomized intervention groups	Well-articulated learner outcomes A clear connection between course and clinical objectives Student involvement in scenario planning, implementation and evaluation Reflection during and after the HPS simulator session

Authors	Article Title	Journal	Year Published	Type of Article	Findings
Murdoch, N L Bottorf, J L Mc Cullough, D	Simulation approaches to enhance collaborative healthcare: A best practices review	International Journal of Nursing Education	2014	Systematic review	High-fidelity human simulators Role play Didactic lectures with audience response followed by role play with standardized patients
Motola, J Devine, L A Chung H S Sullivan, J E Issenberg, S B	Simulation in healthcare education: A best evidence practical guide. AMEE Guide No. 82.	Medical Teach AMEE	2013	Guide	Curriculum integration Feedback in simulation Deliberate practice Mastery learning Range of difficulty Capturing clinical variation Individualized learning Approaches to team learning
McGaghie, W Issenberg, B Petrusa, E R Scalese, R J	A critical review of simulation-based medical education research: 2003-2009	Medical Education	2010	Systematic review	Feedback Deliberate Practice Curriculum integration Outcome measurement Simulation fidelity Team training High stakes testing Instructor training Skill acquisition and maintenance Mastery learning Transfer to practice

Authors	Article Title	Journal	Year Published	Type of Article	Findings
McGaghie, W Issenberg, B Petrusa, E R Gordon D L Scalese, R J	Features of high-fidelity simulation that lead to effective learning: a systematic review.	Medical Teacher	2005	Systematic review	Providing feedback Repetitive practice Curriculum integration Range of difficulty Multiple learning strategies Capture clinical variance Controlled environment Individualized learning Defined outcomes
Science Direct					
INACSL Standards Committee Gloe, D, Sando, C, Franklin, A., Boese, T, Decker, S, Lioce, L, Meakin, C, Borum, J.	Standards of best practice Standard II: Professional Integrity of Participants	Clinical Simulation in Nursing	2013	Guide	Protecting the scenario content Demonstrating professional and ethical behaviour in simulation Receiving and giving constructive feedback
Lioce, L, Reed, C, Lemon, D, King, M A, Martinez, P A, Franklin A E	Standards of best practice Standard III: Participant Objectives	Clinical Simulation in Nursing	2013	Guide	Participant objectives are the guiding tool for simulation
Boese, T, Decker, S, Sando, C, Bloe, D, Meakim, C, Borum, J	Standards of best practice Standard IV: Facilitation	Clinical Simulation in Nursing	2013	Guide	Facilitation method determined by the participant's objectives and expected outcomes
Franklin, A, Boese, T, Gloe, D, Lioce, L, Decker, S, Sando, C, Meakim, C, Borum, J	Standards of best practice Standard V: Facilitator	Clinical Simulation in Nursing	2013	Guide	The facilitator is central to the Students' learning, guiding and supporting the students to achieve their learning objectives through evidence- based practice solutions

Authors	Article Title	Journal	Year Published	Type of Article	Findings
Decker, S, Fey, M, Sideras, S, Caballero, S, Rockstraw, L, Boese, T, Franklin, A, Gloe, D, Lioce, L., Samdo, C, Meakim, C, Borum, J	Standards of best practice Standard VI: The Debriefing Process	Clinical Simulation in Nursing	2013	Guide	Debriefing aimed at promoting reflective thinking
Sando, C, Coggins, R, Meakin, C, Franklin, A, Gloe, D, Boese, T, Decker, S, Lioce, L, Borum, J	Standard VII Participant Assessment and Evaluation	Clinical Simulation in Nursing	2013	Guide	Simulation; involves both formative and summative assessment

5.4 Findings

The findings from this review are congruent with the notion that simulation research lacks studies that explore the effectiveness of simulation (Sanford, 2010, Wilson & Wittman-Price, 2015). Two of the articles described a research study, one a qualitative study with 28 final year students, and the other a quantitative study with a participant group of undergraduate student nurses and registered nurses. One of the studies assessed student outcomes after a simulation experience, using a quantitative student self-assessment instrument. Three articles provided a definition of simulation-based education, with ten articles clearly defining the identified best practices. The definitions provided in this scoping review of simulation educational best practices form the bases for further discussion and development, both in the following Delphi study and the development of the programme.

5.5 Themes

Data from the articles were extracted and summarised, based on thematic analysis guidelines provided by Braun & Clarke (2006), as described in Chapter 3, and are documented in Table 5.3 and discussed below.

This study identified four common best practice features from the literature, and are described in the following section. The presentation of the best practices is in order of the level of frequency in the literature.

Table 5.3: Best practice themes for simulation education in order of frequency in the literature

Themes: Identified best practice	**Publications**
1. Debriefing and Feedback	• Buykx, Kinsman, Cooper, Mc Connell-Henry, Cant, Endacott & Scholes, 2011 • Decker, Fey, Sideras, Rockstraw, Boese, Franklin, Gloe, Lioce, Sando, Meakin & Borum, 2013 • Issenberg, McGaghie, Petrusa & Scalese, 2005 • McGaghie, Issenberg, Petrusa & Scalese, 2010 • Motola, Devine, Chung, Sullivan & Issenberg, 2013 • Paskins & Peile, 2010.
2. Identifying learner objectives	• Bremmer, Aduddell, Adamson, 2008 • Boese, Decker, Sando, Bloe, Meakim & Borum, 2013 • Issenberg, McGaghie, Petrusa, Gordon & Scalese, 2005 • Lioce, Reed, Lemon, King, Martinez, Franklin, , Decker, Sando, Bloe, Meakim & Borum, 2013 • McGaghie, Issenberg, Petrusa & Scalese, 2010.
3. Integration of simulation into the curriculum	• Issenberg, McGaghie, Petrusa & Scalese, 2005 • McGaghie, Issenberg, Petrusa & Scalese, 2010 • Motola, Devine, Chung, Sulivan & Issenberg, 2013 • Paskins & Peile, 2010.
4. Deliberate Practice	• Issenberg, McGaghie, Petrusa & Scalese, 2005 • McGaghie, Issenberg, Petrusa & Scalese, 2010 • Motola, Devine, Chung, Sullivan & Issenberg, 2013.

5.6 Discussion of the results

The discussion of the results is related to the objective of this scoping review, which was to determine simulation education best practices. Four best practices emerged namely; debriefing, identifying learner objectives, integrating simulation into the curriculum and deliberate practice.

The author's opinions from the articles in the scoping review are included and discussed within the broader literature on the topic, adding to the understanding of the best practice.

5.6.1 Debriefing

Debriefing is described as “an activity that follows a simulation experience and is led by a facilitator. Participants’ reflective thinking is encouraged and feedback is provided regarding the participant’s performance while various aspects of the situation are discussed. Participants are encouraged to explore emotions and question, reflect and to provide feedback to one another. The purpose of debriefing is to move toward assimilation and accommodation to transfer learning to future situations” (Meakim, Boese et al., 2013:S5).

The significance of debriefing, being the most frequently mentioned best practice (five or the 13 articles included in this scoping review), reinforces the concept that debriefing is considered an essential component of simulation, Arthur, et al. (2013) describe debriefing as a ‘critical component’ of the simulation experience, where deep learning can occur through the review of students actions and thought processes. It is the stage of simulation when learning is considered to occur (Arthur, Levett-Jones & Kable., 2013; Cantrell, 2008; Motola, Devine, Chung et al., 2013; Wilson & Wittman-Price, 2015), the student bridges the gap “between *experiencing* an event and making *sense* of it” (Fanning & Gaba, 2007:116).

The terminology used to describe debriefing in the scoping review included the following words: feedback, reflective thinking and reflection. McGaghie, Issenberg, Petrusa and Scalese (2010:52), reviewing simulation-based medical education, stated that “historically feedback is the most frequently cited variable that promotes effective learning”. Decker, Sideras, Rockstraw et al. (2013:26) further elaborate saying debriefing “promotes an understanding and transfer of skills and knowledge”. Feedback is defined as the “helpful criticism or information that is given to someone to say what can be done to improve a performance” (Merriam-Webster, [online]). Feedback is therefore essential if effective learning is to occur during simulation, and should be part of the simulation preparation.

Feedback is regarded as an instrument used during debriefing; positive feedback helps students identify what they did well and constructive feedback helps students identify areas that need improvement (Wilson & Wittman-Price, 2015: 220). Dewey (1910) cited in Popova (2014) first suggested that reflective thinking was the key to critical thinking and education. Both Rodgers (2002) and Papadimos (2009) agree

with the need for students to become adept at self-reflection, which leads to critical thinking.

The survey conducted in the first phase of this study indicated that 56.41% (23) of educators who participated in the study did not debrief their students after a simulation exercise. This disjuncture between existing simulation practices in South Africa and the reviewed literature will be explored further in the following Delphi study, and addressed in the resultant programme.

5.6.2 Identifying learner objectives

Identifying learner's or learning objectives in simulation was identified as a best practice in four of the reviewed articles. Motola, Devine et al. (2013) state that defining the student objectives in any educational setting is one of the main components of the planning stage of the activity, as the objectives direct the educator/facilitator in what the learner needs to accomplish. Learning objectives guide the learning and are planned with the end result in mind (Jeffries, 2012a:32; Meyer & Van Niekerk, 2008:68). Kuuskne (2015) defines learning objectives as "statements of what we intend or expect students to learn as a result of our instruction", and describes the students' expected level of performance as well as framing the content and goals of the learning experience within the curriculum. Learning objectives in education are aligned to a specific educational experience within the overall programme goals, culminating in the requirements of the qualification.

Motola, Devine et al. (2013) stress the importance of defining learning outcomes in simulation, as they provide both educators and students with a clear vision of what needs to be learnt and achieved in the simulation, providing the benchmark for the desired outcomes. Wilson and Wittman-Price (2015:77) agree that student learning outcomes are the product of educational experience, and simulation is regarded as a valuable educational supplement. Planning for simulation requires educators to identify student learning needs and then plan goals for the session.

A construct that was also mentioned in the scoping literature review was the range of difficulty of the simulation learning (Issenberg, McGhagie et al., 2005). The student's objectives must reflect this range of difficulty, increasing as mastery of skills

and clinical judgement is developed, and the student moves from being a novice towards becoming proficient and an expert (Benner, 1984).

The International Nursing Association for Clinical Simulation (INACSL) identifies learner objectives as a standard for best practice in their 2013 Standards of best practice (Lioce, Reed et al., 2013), listing the following criteria as valid and appropriate simulation practices: the learning outcomes must address the domains of learning, and correspond to the students' knowledge level and experience; be congruent with the programmes outcomes; be based on and incorporate evidence-based practices; be achievable within an appropriate time frame and to view the patient in a holistic manner.

An important issue to consider in selecting student-learning outcomes, as listed above, is the alignment of the learning objectives to the macro course curriculum, as simulation is not a stand-alone teaching methodology but embedded in the core curriculum. In order to make the learning outcomes achievable in the allocated time, the literature suggests that no more than 3 to 4 learning objectives are usually required, and piloting of the scenario within the time allocation to ensure its appropriateness should be done (Lioce, Reed et al., 2013; Wilson & Wittman-Price, 2015).

Learning outcomes determine the simulation design and what equipment will be needed, and therefore need to be developed with the available NEIs simulation resources in mind.

5.6.3 Integration of simulation into the curriculum

Four of the studies highlighted the integration of simulation into the undergraduate curriculum. Issenberg, McGaghie, Petrusa & Scalese (2005) recommend that simulation should be a required part of the curriculum, and not an optional exercise, to achieve student outcomes. Motola, Devine et al. (2013: e1513) support this concept, reporting that simulation is most effective when part of the standard curriculum and not an "extraordinary additional component". The underlying reason for this is that when simulation is embedded in the curriculum it helps link the theoretical content to the clinical course objectives, providing students with an integrated approach to patient care and diagnosis. In order to align simulation to the

theoretical content of the curriculum, Decker (2008) states that it should be considered during the planning phase or redesign of an existing curriculum.

McGhagie, Issenberg et al. (2010) make the observation that simulation complements other teaching methods such as problem-based learning, clinical learning and other forms of laboratory teaching, and should be included in the planning stages of these teaching methodologies.

The importance of educator training and support for the educator's development is pivotal to successful implementation of simulation methods. This is evident in the results from the survey conducted in the first data collection stage of this study, where simulation was not generally moving beyond task trainer, possibly due to only 11% (5) of the educators who responded having any formal training in simulation. This also prevents simulation from becoming an integral part of the undergraduate nursing curricula.

The view that simulation integration into the curriculum will take a few years to achieve is understandable. It is an expensive education intervention and time must be spent training educators and using the equipment properly and effectively, then increasing the use to include other courses and educators, thus keeping it curriculum appropriate and meaningful to students and educators.

5.6.4 Deliberate practice

Deliberate practice was listed three times as a best practice in the articles reviewed, but is not a commonly used term in nursing education (Clapper & Kardong-Edgren 2012). Deliberate practice is the optimum manner in which to achieve clinical skills competency, in a shorter period rather than through the exposure of students to traditional clinical hours (Issenberg, McGaghie et al., 2005). Deliberate practice involves repetitive, focused performance of a skill, with immediate feedback resulting in an improvement of skills through an intentional effort (Botma, 2014). McGaghie, Issenberg et al. (2011:710) performed a meta-analytic comparative review between traditional clinical education and simulation based-learning with deliberate practice, and declared the outcomes of the two practices when combined as "powerful, consistent and without exception … superior to traditional clinical teaching for the acquisition of a wide range of medical skills". Under a facilitator or teacher's

guidance, deliberate practice offers critical and vigorous skills assessment and specific feedback to the student (Issenberg, Mc Gaghie, Petrusa et al., 2005; Motola, Devine et al., 2013). Learning occurs when the student making errors in their skills performance and the facilitator, recognising the errors, provides meaningful remediation, thus supplying the safe environment in which the mistakes are allowed to occur (Clapper & Kardong-Edgren, 2012).

Ongoing assessment during the repetitive practice provides the student with constructive feedback, highlighting areas for improvement. The goal of deliberate practice is continual, specific skills improvement until competence is achieved (Issenberg, McGhagie et al., 2005; Motola, Devine et al., 2013).

Jeffries (2012) makes the observation about deliberate practice that students engage better with skills training if they have well-defined objectives, rigorous and precise education measures in place and support from a facilitator, such as in deliberate practice.

To include deliberate practice effectively in simulation, adequate time for skills practicing must be allocated within the curriculum, with facilitators present to give the students the required feedback (Motola & Devine, 2013).

5.7 Discussion

The objective of this scoping review was to describe what the literature determines as simulation education best practices. Best practices in this study were defined as a set of preferred simulation education practices and procedures that are perceived to obtain improved student learning. For best practices to be effective they need to be contextually relevant, meaningful and implementable by the educator. The course curriculum defines what methods of teaching and learning will be required and they must be planned for accordingly to maximise student learning. The simulation objectives therefore must align to the course and curriculum goals, as simulation is not a separate teaching methodology. As stated by an educator in the survey conducted in the first stage of data collection in this study: “At present (simulation) is done on a needs bases which leads to overcrowding of programs”.

Simulation specialists have advocated for the embedding of simulation into the curriculum during curriculum planning stages (Starkweather, Kardong-Edgren & Ward, 2008; Decker, 2008; Motola, Devine et al., 2013, NLN, 2015). To ensure that this occurs, educators need simulation knowledge to know what to embed in the curriculum and how to align the theory outcomes to the simulation outcomes.

Debriefing as a simulation education best practice concept may require a paradigm shift for nurse educators towards becoming a facilitator of learning, rather than teachers being content focused. Nursing education, at present, remains mostly teacher centred (Sun, Liu & Wu, 2014), with content laden curricula and large student numbers (Ndawo, 2015). It may be difficult to change teaching mind-sets in this education environment, with a large percentage of educators retiring from NEIs in the next 10 years (Rosseter, 2014). Introducing simulation best practices and reflective learning into post-graduate educator training will help to bring about the teaching and learning changes that are needed. Identifying educators interested in simulation and making context relevant best practice training available to them, with on-going support, would also be a way of promoting simulation practices, especially debriefing and deliberate practice.

Simulation has been introduced successfully into a few NEIs in South Africa, mostly within universities. These simulation champions have faced the same challenges to the integration of simulation into their curricula, and therefore the researcher deemed it important to gain their perceptions of the four best simulation practices and how they use them in their teaching and learning environments.

Deliberate practice for skills mastery was not discussed in the survey that is presented in the previous chapter of this thesis, but it is the researcher's assertion that it is not fully understood or being implemented in the undergraduate programme, and therefore it was also explored in the Delphi study for more clarity on how it is being implemented.

5.8 Limitations of the review

The principle limitation to this scoping review was the limited number of published articles on best practices in simulation education. There are very few studies that report clear research methodologies, with clear and robust findings on simulation best educational practices that improve student outcomes in simulation based learning.

5.9 Conclusion

The researcher and her research assistant reviewed and included 13 articles in this review, identifying four best practices which are: debriefing, identifying learning objectives, integrating simulation into the curriculum, and the use of deliberate practice. Each best practice is described as per the literature and will be further explored in the next chapter, which is a Delphi Study exploring how experienced educators, using simulation in nursing, perceive these best practices and apply them in their simulation-based education.

Chapter 6 Delphi Survey

In the previous chapter simulation best practices were determined through a scoping review. This chapter addresses the second part of the second research objective: "What are the nurse educators' perceptions of simulation best practices?" A Delphi study was selected as the method of choice for exploring the expert educators' perceptions.

The information from the Delphi study will help inform the development of the programme, by providing practical and relevant insight into how the best practices should be included in the programme, in order to ensure its relevance to nursing education in South Africa.

The methodology design of the Delphi Survey is described in Chapter 3, this chapter reports on the questionnaire and findings.

6.1 Introduction

The Delphi Survey was selected as the method of choice for developing a consensus view on what expert educators in South Africa's perceptions are of the best practices. The scoping literature review conducted in Phase 2a informed the content for the first Delphi questionnaire. There is a dearth of literature on simulation best practices in undergraduate nursing in South Africa, and limited literature relating specifically to nursing best practices in simulation, hence the decision to include a Delphi Survey in this research.

The Delphi Survey provides insight and individual expert judgement on a specific phenomenon (Powell 2002). The phenomenon in this study was identified as perceptions of best practice in simulation when applied to undergraduate nursing curricula. The panel of experts were nurse educators who have been using simulation in their nursing curricula for a minimum of two years.

In a Delphi Survey the researcher formulates the data collection rounds through the development of a series of questionnaires asking for the panellists' responses. The expert panellists are given controlled feedback from the prior questionnaire, including details of the group's collective opinion. This allows the panellists the chance to

amend or retain their opinion in light of their collective view (Keeney, Hasson & McKenna, 2001; Robinson, Leighton, Logan, Gordon et al., 2014). The selected experts do not meet and are unknown to each other, with the researcher liaising with the panel of experts individually via the postal service or electronic mail, thus minimizing the effect of the possibility of an expert's persuasive behaviour altering an opinion (Keeney, Hasson et al., 2001; Hanafin, 2004; Polit & Beck, 2008:327).

6.1.1 Meaning of consensus

The aim of a Delphi Survey is to reach consensus on a topic, and failure to interpret the meaning of what constitutes consensus prior to the start of data collection could be regarded as a methodological weakness of a study (Powell, 2002). It is the level of consensus that determines which items will be retained or discarded as the rounds unfold (Keeney, Hasson & Mckenna, 2005), and importantly, the point of termination of the Delphi Survey (Diamond, Grant, Feldman, et al., 2014).

The literature describes different types of consensus in a Delphi Study (Diamond, Grant, Feldman, et al., 2014; Powell, 2002). The most common consensus measure is the setting of a predetermined level of agreement, for which inclusion of items will occur into the next round (Powell, 2002). Another common consensus measure is the level of group stability of responses between rounds (Powell, 2002; Von der Gracht, 2012:1527). This Delphi study focused on the *perceptions and experiences* of nurse educators, and asked the participants to elaborate on their responses in round two rather than to modify their answers to achieve a consensus, thus it deviated from the traditional Delphi study and can be considered a 'modified' Delphi study (Fletcher & Marchildon, 2014:9).

6.2 Purpose of the Delphi Survey in this study

Although best practices in simulation have been described in the scoping review, experts using simulation in the South African context may express a difference of opinion in their execution of simulation, due to possible local issues and their own interpretations of the simulation best practices.

6.3 Developing the Delphi Survey for this study

Four best practices were determined from the scoping literature review; these topics are represented as the broad headings in the Delphi Study, the headings are: Debriefing as a best practice, the importance of clearly identifying learner objectives as a best practice, the integration of simulation into the curriculum, and the inclusion of deliberate practice. The publications that were included in the scoping review were reviewed to determine the educational practices on which the researcher wanted a further perspective. The formulation of questions was guided by the scoping review, and the survey conducted in Phase 1, and verified with an expert reviewer prior to being circulated.

Where there appeared to be a disconnect between the published literature and survey responses, questions were formulated to determine how South African nurse educators, considered as experts in simulation education, use the best simulation practices in their own NEIs. The aim of the Delphi questionnaire was to elicit the participants' own experiences and perceptions of what the literature had identified as education simulation best practices.

Round One of the Delphi Survey

The questionnaire consisted of 18 questions (see Annexure F). The questionnaire was divided into the following sections:

Questions 1- 5 addressed the demographic details of the participants.

Part 1: addressed the best practice of debriefing in simulation.

Part II: addressed the best practice of defining clear learner objectives.

Part III: explored the concept of integration of simulation as a best practice.

Part IV: asked about deliberate practice in simulation.

Part V: related to student outcomes.

All correspondence was done via email, and participants (n=7) replied within one month from the initial questionnaire being emailed to them. Responses were analysed according to the type of question asked. Responses were ranked according

to the rating scale on the questionnaire. A 5 point Likert scale was allocated a value and analysed using quantitative methods:

0. Didn't answer
1. Strongly disagree
2. Disagree
3. Neutral
4. Agree
5. Strongly agree.

The data were analysed using the mean and median, and percentages if relevant to the question being asked. Results of the Delphi Survey's round one questions are represented below in Table 6.1: Demographic details of the Delphi Study participants (n=7)Table 6.1 – Table 6.14: Results from using simulation:

Table 6.1: Demographic details of the Delphi Study participants (n=7)

Age of participant	**University or College**	**Highest education level**	**Years in simulation**	**Province**
44 yrs	University	MSc (Social Science)	4	Free State
Not declared	University	PhD	2	Gauteng
59 yrs	University	PhD	7	Free State
55 yrs	University	MSc	2	Gauteng
40 yrs	University	MSc	2	Free State
57 yrs	University	PhD	3	Eastern cape
51yrs	University	MSoc Sc. Nursing	4	Western Cape
Mean: 51 years		**PhD x3; MSc x4**	**Mean 3.4 years**	

The mean age of six of the educators that participated in the Delphi study was 51 years, (one participant did not declare her age). Rispel & Bruce (2015:117) reported the average age of nurse educators in South Africa as 41.5 years in 2014, similar to statistics from the USA and Australia where the average age of faculty members in nursing education was 46 and 44.8 years respectively (Institute of Medicine, 2011; McDermid, 2012). The average years in simulation based education is 3.4 years, which reflects the newness of simulation teaching and learning as an education

methodology within nursing education in South Africa, and may not be aligned to international years of simulation experience.

6.3.1 Part 1: Debriefing as a best practice

The participants were in agreement (Table 6.2) with the aim of debriefing being to allow the students to reflect on both their positive and negative actions during simulation and to enhance their self-confidence.

Table 6.2: Aim of debriefing as a simulation best practice (n=7)

Q #6. The aim of debriefing as a simulation best practice							
	Strongly agree	Agree	Neutral	Disagree	Strongly disagree	Didn't answer	Median
To enhance leaner self confidence	5	2					3.5
To close the gap between expected learners' performance and actual performance	3	2	1	1			1.5
To summarise learning that should have occurred	2	3			2		
To investigate the bases for a learner's performance gap	3	1			2	1	1.5
To identify learners' attitudes skills and knowledge through discussion	6	1					
To allow the learners an opportunity to consciously reflect on their actions and verbalise consequences of both their positive and negative actions	7						

Question #6 was asked in the Delphi study as there was a disconnect between the survey findings and the findings of the scoping review. The majority of educators (56%) who responded to the survey in Phase 1 answered that they did not routinely debrief students post simulation, indicating that the aims and benefits of debriefing are not widely known amongst the educators in the NEIs that responded.

The expert panellists are in agreement with the literature indicating that debriefing encourages self-reflective thinking in students, which is a "conscious consideration of meaning and implication of an action, which includes the assimilation of knowledge, skills and attitudes with pre-existing knowledge" (Decker, Sideras, Rockstraw et al., 2013). The implications of not debriefing in simulation could mean that students are not able to develop their clinical reasoning skills and communication

skills in a safe and collaborative environment, which are both vital elements to ensuring confidence and competency.

Question #7 addressed the practices of the expert panellists in regard to debriefing, and established what debriefing practices are being used with success by the expert panellists

Table 6.3: Constructs of debriefing (n=7)

Q #7. Debriefing includes the following features:					
	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
A discussion on observed clinical skills, knowledge deficits, level of self-confidence, and student feedback of the simulation experience	6	1			
A discussion on both the learners' positive and negative observed actions	4	3			
Focused instruction to address the learner's knowledge gap	3	1	1	2	
❖ (Participant 5) Depends who is initiating the discussion. If a student explores the aspect themselves – fine – but it must not come from the person doing the debriefing. That is dealt with in class or elsewhere. ❖ (Participant 7) During debriefing the student should re-assess their own perceptions, skills and knowledge. It is not the place for filling up knowledge and skills deficits; (if necessary) this should be readdressed in the classroom.					

The panellists agreed (mean 4.87) that the debriefing session is a discussion between the students and the facilitator. The term 'discussion' implies a two-way communication pathway in a safe environment, where the students feel they can admit to knowledge deficits or lack of action without being judged, and explore possible alternative approaches to patient care amongst their peers.

Participant 5 raised an interesting issue about the focus of the debriefing session being student-directed, addressing the students' learning outcomes, with the facilitator guiding the conversation, and not teacher-led with the macro curriculum in mind. Both participants 5 and 7 made the comment that the debriefing environment is separate to the classroom setting, where the teacher addresses knowledge gaps, the teacher imparts knowledge and students are not required to interact with the process of gaining the new knowledge.

The researcher will address the roles of facilitator of learning and teacher in the resultant programme, as clarity on these roles and the different educational spaces

will encourage educators to allow students to explore their knowledge and application of knowledge in debriefing.

The scoping review indicated that learning objectives guide both the choice of simulation design and the debriefing process, and importantly it is the learning objectives that guide the facilitator in the debriefing discussion (Dieckman, Friis, Lippert & Østergaard, 2009; Fanning & Gaba, 2007; Motola, Devine et al., 2013). The literature also indicated that the learning which occurs during debriefing is guided by the learning objectives through pre-definition of what aspects of the simulation experience are focused on in debriefing.

Table 6.4: The role of learner objectives in debriefing (n=7)

Q #8. The role of learner objectives in the debriefing process					
	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
Do you agree with the statement that learner's objectives should guide the debriefing process.	2	3	2		
❖ (Participant 3) It depends on the intervention, objectives should be considered as a minimum requirement and the student should be able to use their own strengths such as communication skills to influence a favourable outcome. ❖ (Participant 7) It depends who sets the outcomes, the student or the educator.					

The panellists indicated a level of agreement (mean = 4) with the literature on the role of the learner's objectives in debriefing. Participant 3 mentions students should be able to use their strengths and communication skills, with the debriefing facilitator channelling the student's strengths to achieve the learning objectives.

6.3.2 Part II: Importance of clearly identifying learner objectives as a best practice.

This question was asked of the panellists in order to clarify the practice of student pre-briefing or preparation for the programme, exploring what the educators believe is an acceptable amount of time for student preparation. Literature (Lioce, Reed et al., 2013; Motola Devine et al., 2013; Wilson & Wittman-Price, 2015:77) highlighted the importance of learning objectives in simulation, but did not cover in detail when the learning objectives should be given to the students. The responses from the participants varied considerably, with no actual measurement or guidelines being evident, which was congruent with the literature.

Table 6.5: Learning objectives as a best practice (n=7)

Q #9. The learning objectives are delivered to the learners prior to the simulation allowing for the learner to prepare: Please comment on what you feel is the most appropriate length of time required for learner preparation in your experience.
Participant 1: A week should be long enough for students to prepare for a scenario.
Participant 2: Depends on many factors. A junior student should be allowed more time than a senior student, who should be able to use their initiative, clinical acumen and experience to institute the correct intervention with a minimal time to prepare – this is consistent with the skills of a registered nurse.
Participant 3: 2 – 4 weeks
Participant 4: It will vary from learner to learner but no less than 6 hours per scenario.
Participant 5: It depends on content level but as soon after the content is taught the better.
Participant 6: Depends on various factors complexity of scenario and level of students.
Participant 7: You cannot put a time value to preparation, it is essential that the content is covered in full before the simulation.

Brackney and Priode (2014) and Page-Cutrara (2015) comment on simulation research focussing on the simulation procedures, resulting in little known about the pre-briefing stage of simulation. Brackney and Priode (2014) call it the learning sequence, suggesting that learning starts occurring in the preparation or pre-briefing stage of simulation. Pre-briefing includes the review of student objectives and the orientation to the simulation manikin and guidelines for the scenario (Meakim et al., 2013; Page-Cutrara, 2015).

Two participants mentioned the degree of difficulty and student's level of training. Issenberg, McGaghie et al. (2005) agree that the learning objectives must reflect the difficulty index of the simulation in order to develop clinical judgment in the more senior students. Senior students, therefore, may need more time for preparation for all possible outcomes of the simulation, with rationale and judgement evident. Page-Cutrara (2015) makes the observation that it should be the needs and expertise of the student that decides the pre-briefing approach, rather than the dictates of the scenario. If the objective of the simulation activity is to promote learning, rather than assessment, an extended preparation time will assist the student to become more actively engaged with the scenario and therefore participate fully in the simulation (Page-Cutrara, 2015).

Question #10 was designed to elicit the alignment of learning outcomes to the curriculum, as the survey in Phase 1 alluded to the notion that simulation in NEIs at present still appears to be a separate part of the curriculum.

Table 6.6: How to determine learner objectives (n=7)

Q #10. How do you think learner objectives are best determined?
Participant 1: It should correlate and address curriculum outcomes and gaps in clinical settings.
Participant 2: With reference to the scope of practice, safe practice, theoretical content covered – students should be able to integrate biological, psychological and social knowledge.
Participant 3: Not answered
Participant 4: In a group discussion, after the desired outcomes of the simulation has been given, so that learners have time to identify their own gaps and what they want to achieve.
Participant 5: Set out by the curriculum.
Participant 6: Learner objectives should align themselves to the curriculum and year of study.
Participant 7: Start with the program and module outcomes, most of the educators are involved in determining the outcomes of scenario development.

The alignment of simulation via the linking of students' learning objectives to the curriculum is essential in the development of simulation. The alignment of learning objectives throughout the undergraduate curriculum could assist nurse educators to embed different teaching methodologies, such as simulation, for which they perceive they do not have sufficient time, in already full student scheduling, as highlighted in Chapter 4 (Table 4.10).

6.3.3 Part III: Integration of simulation into the curriculum

The answers to question #11, regarding the integration of simulation into the curriculum, showed diverse opinions amongst the respondents, as is reflected in the literature. The literature reviewed identified two approaches to simulation integration. The first approach is embedding simulation throughout the entire curriculum (Issenberg, McGhaghie et al., 2005; Motola, Devine et al., 2013); this approach needs to be planned for either in the planning of curricula or when curricula are reviewed. The second approach to simulation integration is at a single subject course level initially, and then introducing simulation into a second course, once the first subject course is running effectively and nurse educators are trained and feeling

comfortable using simulation. A compelling argument for integrating simulation at curriculum level is to ensure that it is not an optional extra (Motola, Devine et al., 2013).

Table 6.7: Integration of simulation into the curriculum (n=7)

Q #11. Simulation should be integrated into the curriculum at course level rather than in the entire curriculum?					
	Strongly agree	Agree	neutral	disagree	Strongly disagree
	2	1			4
❖ *Participant 4:* Strongly disagreed stating the reason being that if simulation is to develop critical thinking - it should be used throughout the whole curriculum. ❖ *Participant 6:* Strongly disagreed - critical reasoning and the ability to work in teams (High Fidelity Simulation) should be introduced early into the curriculum and be an integral part of undergraduate training. ❖ *Participant 7:* Strongly disagreed – the curriculum should be adjusted around simulation, through an identification of learner needs.					

Three participants wrote comments elaborating on why they felt simulation should be integrated across the entire undergraduate curriculum and not only at course level; the other four respondents felt that simulation should be integrated at a course level.

Two of the panellists approached integration of simulation from the perspective of developing critical reasoning and thinking throughout the curriculum from the junior years in student nurses training, therefore they indicated that simulation should be used in both first and second year. A course approach to simulation integration relies on individual educators using simulation, often without the support and collaboration of the other departmental stakeholders. Integration of simulation across the curriculum is resource and equipment dependent: different courses require different simulation equipment and designs. This was highlighted in the survey, with educators using task trainers' predominantly in the first year and higher fidelity simulation in the 3rd and 4th year of the programme.

Results from the survey indicated that NEIs do not have an integrated plan for simulation, but it is done on an individual level resulting in overcrowding of programmes.

Table 6.8: The inclusion of learner's performance evaluation in simulation (n=7)

Q #12. To fully integrate simulation into the curriculum do you believe that the learner's performance evaluation must be a feature of simulation?			
	Yes	No	Not answered
	6		1
❖ *(Participant 5)* It depends on the objective of the simulation – is it a learning experience or is it an assessment? The two can't be mixed. Students can't relax and experiment and gain confidence if it is an assessment.			

Simulation learning supports both formative and summative assessment and evaluation (Lateef 2010). Formative assessment in simulation provides feedback and fosters student learning and procedural skills improvement, whereas summative evaluation provides a measurement of student outcomes and achievement (Sando, Coggins et al., 2013). Results from the survey, stage one, indicated that the students' performance during simulation is not routinely graded (61.90%), which is congruent with responses from the Delphi respondents.

Evaluation and assessment in simulation will be included in the programme to optimize simulation learning and to ensure that educators are able to use simulation for assessment and evaluation. The ability to use simulation for assessment will also ensure its integration into the curriculum for learning and assessment, which is a practice of the simulation experts at present.

Participant 5 raised the point that simulation for assessment or learning must be decided on and communicated in the learner objectives during pre-briefing and student preparation prior to the simulation. Learners need to prepare for assessment in simulation in a different way than for learning, as the concept of simulation being a safe space for learning is not valid in simulation assessment. Students would still need to be orientated to the environment, the manikin and simulation design, prior to any assessment occurring.

Table 6.9: Accrediting of simulation hours

Q #13. Should simulation credits/hours be a required course component for undergraduate nurses?		
	Yes	No
	6	1
❖ (Participant 2) Students should be proficient at a minimal level before allocation to a clinical area. This requires a minimum of credits/hours prior to the clinical placement to implement the skills. ❖ (Participant 4) …. a more standardised approach on learning can be established and every learner can have the same experience. ❖ (Participant 6) Being a requirement will ensure that all students are exposed to the same learning experience, and it will help develop simulation in the curriculum through increased use.		

Question #13 asked the panellists to further explore the question that was asked in the survey (Question 14) “Does simulation count towards clinical hours required for registration?” Respondents in the survey indicated that 61.79% of the survey respondents do replace clinical hours with simulation hours, with the average number of clinical hours being substituted as 15.2% of the total required number of undergraduate hours required from students. The respondents in the survey, the Delphi panellist and the authors of the articles on simulation are all in agreement with the idea that simulation hours can replace clinical hours.

The researcher agrees with the idea that simulation and clinical hours can be interchanged. The challenges of providing optimal clinical learning experiences in traditional clinical sites have been mentioned previously namely: shortened hospital stays of patients, the competition for student placements, and challenges with a shortage of clinical facilitators, which all adversely affect student teaching in the clinical environment (Jeffries, 2005; Murray, 2011; NCSBN, 2015; McNelis, Fonacier, Mc Donald & Ironside, 2011). Simulation offers all students a standardised patient experience, in a controlled environment, where clinical reasoning is encouraged, as discussed by participant 6 above.

The NCSBN (2015) study came to the conclusion that up to 50% of traditional clinical hours could be substituted with simulation under certain conditions. The conditions listed in the study include the formal training and support of educators using simulation, in simulation pedagogy including debriefing techniques, and using best practice guidelines or standards. The study did not make any recommendations as to how many clinical hours would equate to simulation hours, but a combination of

both clinical experiences and simulation experiences are important in developing student nurses' confidence and ability.

Question #14 explored the barriers to integrating simulation into the curriculum (Table 6.10). The respondents were asked to rank their perceptions of the listed barriers on a scale of 1 to 7, where 7 was the most relevant barrier to integrating simulation, and 1 was the construct with the lowest effect on simulation integration. The results highlighted the need for the required resources to be in place for simulation to be integrated in the curriculum; resources include adequate space for students to participate and observe in the simulation plus technology. Human resources were ranked as the second most prevalent barrier to simulation integration, with the lack of staff training preventing effective integration of simulation based learning.

The scoping review discussed the benefits of simulation integration but did not explore barriers. The constructs in this question are compiled from the literature (Nestel et al., 2014; NCSBN, 2015, Wilson & Wittman-Rose, 2016) and the researchers own perceptions of what may be barriers for educators. Results from Phase 1, the survey, indicated that 75% (32) of the respondents cited a need for simulation educator training as their biggest barrier to integrating simulation. The Delphi panellists ranked educator training three, with the most noteworthy barrier to simulation integration being the lack of resources, space and technology.

Table 6.10 : Barriers to integrating simulation

Q #14. Barriers to integrating simulation in the undergraduate curricula Ranking scale: 1 - indicating the lowest barrier and 7 - the biggest barrier									
	Participants responses							Total	Median
A. Staff inertia	4	6	4	6	7	1	3	31	4
B. Organisational barriers	7	2	5	3	4	2	6	29	4
C. Pressure of clinical demands	2	2	3	3	3	3	4	20	3
D. Perception that simulation is less valuable than clinical practice	1	3	6	5	2	6	1	24	3
E. Staff not being trained sufficiently to fully embed simulation into their curricula	5	2	7	5	5	4	2	30	5
F. Lack of resources, space and technology	6	2	3	3	6	7	7	34	6
G. Large student numbers and issues of rotating students through the simulation encounter	3	2	2	4	1	5	5	22	3

This difference in opinion between the educators in the survey and the expert panellists might be due to the fact that the Delphi panellists had received some training in simulation, as determined by the definition of expert, and therefore training was no longer an issue for them.

For further development of simulation in the NEIs attention must also therefore be paid to the NEIs resources, equipment, space, environment and training, as the experts indicated that without these challenges being addressed, simulation would not be used to its fullest capacity.

6.3.4 Part IV: Inclusion of deliberate practice in simulation

Deliberate practice was identified as the fourth simulation education best practice. The survey did not include deliberate practice as a question, and therefore the researcher included it in the Delphi to explore the methodology from a South African perspective. As stated by Kardong-Edgren et al. (2010), deliberate practice is not a commonly used methodology or educational term in nursing curricula.

Question #15 and #16 were asked to determine the panellists' level of understanding of deliberate practice and whether they included it in their curricula. McGaghie and Issenberg (2011) agree that combining simulation and deliberate practice could yield better student outcomes, but they acknowledged that implementation of deliberate practice created organizational difficulties, such as time availability within the curriculum to incorporate skills development at this level. There was a difference of opinion related to the inclusion of deliberate practice (DP) in simulation, and this is evident in the responses to question # 15 indicating that the participants had varied views on what constitutes DP.

Table 6.11: Use of deliberate practice in simulation

Q #15. Please indicate if you use deliberate practice in your simulation environment?		
	Yes	No
	4	3

Table 6.12: Definition of the term ‘deliberate practice’

Q #16. What do you understand by the term ‘deliberate practice’?	
Participant One	DP is a method where mastery of a skill is obtained, through deliberately practicing a skill, paying attention to where performance needs improvement.
Participant Two	I don’t (understand the term DP)
Participant Three	Demonstrations are done and the student is given the opportunity to practice either under supervision or with peers.
Participant Four	Standards that must be upheld according to current policies and best practice.
Participant Five	Repetition of a motor skill to achieve mastery.
Participant Six	Repetition of a skill under supervision till mastery is obtained.
Participant Seven	Practicing the same experience and increasing the difficulty gradually.

Question #15 and # 16 indicated that there is a lack of consistency in responses as to what DP involves, and a resultant split in whether DP is included or not in their programmes, but this might be linked to the lack of a group understanding of the definition of DP. This was further explored in round two.

Question #17 discussed DP as a valuable educational methodology for high stakes skills that occur rarely or critical incidents which need to be managed competently (Kinsman, Cooper et al., 2011; Scalese, Obeso & Issenberg, 2008). Simulation plus deliberate practice is possibly a better approach to learning those skills that are not often seen by students but require students to be competent in managing the condition if seen in clinical practice.

Table 6.13: Deliberate practice for high stakes skills

Q #17. Rather than teaching a large number of skills that are rarely used or practiced, students should become experts in high-use skills using deliberate practice.						
	Strongly agree	Agree	Neutral	disagree	Strongly disagree	Not answered
	2		3	1		1
❖ (Participant 4) It should be a combination of both. ❖ (Participant 5) Students forget most of what they learn in any case – so make sure that they have the basic and commonly used skills and knowledge. ❖ (Participant 6) It is important for students to be competent in the high risk rarely used skills						

Question #17 was asked to assist in determining the focus of skills development, whether this should be on generic skill mastery or on high stakes skills seldom seem, which are equally important in achieving practice ready nurses on registration (Buykx et al., 2011; Cooper, Buykx et al., 2011).

This question was further explored in round two as there was a difference of opinion from the respondents.

6.3.5 Part V: Discussion on simulation experiences

Question #18: What in your opinion is the greatest result in relation to student outcome, which you have noticed since using simulation?

This question was asked of the Delphi panellists as there was a difference of opinion between the respondents in the survey and the literature with regard to how simulation can address the students' affective learning domain, or non-skills (communication) learning. The survey indicated that communication skills cannot be taught using simulation.

Table 6.14: Results from using simulation

	Level of frequency
Confidence	4
Teamwork	3
Communication	3
Desire to learn (Correct knowledge gaps)	3
Patient safety	2

Experts were in agreement that simulation boosts student confidence, through the provision of a safe working environment. Good communication skills in a clinical environment can reduce the level of stress that a student may experience in a situation, as well as improve the management of the patient, but many nursing curricula focus on theory and skills acquisition and not on the non-technical skills of communication and teamwork (Kutzin, 2010).

This question confirmed that the non-technical skills, such as teamwork and communication, are perceived as a positive benefit to using simulation. The difference in opinion between the experts and the survey respondents may be due to the prevalent use of task trainers in the NEIs for skills training, and indicates a need for knowledge awareness of other types of simulation that increase the use of students' communication skills.

6.4 Round Two of the Delphi Survey

In round two, where lack of clarity was not achieved in round one, these constructs were explored further. Specific broad-based questions were asked, as the researcher wanted to develop further understanding of the different interpretations of the terms that were not clarified in round one (Annexure G).

The analysis of this round was done using template analysis, which can be used when an open-ended question is asked on a written questionnaire (King, 2014), with codes being predefined due to the nature of the research question (Waring & Wainwright, 2008). The codes were predetermined and sub-themes identified for more specific aspects of simulation best practices that were not addressed in round one of the Delphi Survey, with the aim of understanding how they can be incorporated into the undergraduate nursing curriculum.

Round two questionnaires were sent to all 7 of the experts who responded to round one. The researcher received 4 responses for round two.

6.4.1 Debriefing in simulation

Question One: What is understood by the term debriefing?

All the participants agreed that debriefing allows for reflection, communication skills, and reinforces learning.

Theme 1: Reflection: All of the experts highlighted the role of student reflection in the debriefing process. Participants' narratives are indicated below.

- *Reflecting on their (students) own practices*
- *Reflect on the simulation – what went well or where to improve*
- *Allows time for the students to reflect and identify their own strengths and weaknesses*
- *Reflection on their (students) performance during the simulation – bringing the learning experience together.*

Theme 2: Communication skills:

- *Allows a chance for students to practice their communication skills within a group and to manage their frustrations with other team members*
- *An opportunity for them to reflect on their team communication skills during the simulation.*

Theme 3: Reinforces learning that occurred:

- *Students identify what went well in the simulation, and reflect on where the possible knowledge gaps exist*
- *Time to reflect on their own competencies.*

This theme highlights the importance of addressing the concept of reflection in the simulation programmes as traditional didactic teaching does not promote reflection on learning in the classroom. The resultant programme will use the concepts identified in this question to assist educators to develop their students own reflective skills, and hence take more responsibility for their own learning.

The facility for students to be able to practice their communication skills in a safe environment in a team situation is invaluable in nursing and medical education. Student nurses need to be able to communicate clearly and respond accordingly to the team decision making, but this skill is often not a priority in the present content based curricula.

6.4.2 Defining learner objectives

Question Two: Do you design your scenario to meet your learner objectives, or do you determine learner objectives extrapolated from an existing case based study?

The responses to this question indicated that the panel all derive their simulation learning objectives from the course content and the course objectives, in order to ensure that the simulation learning experience is aligned with the course module being taught.

Learner objectives are guided by the course content – scenario objectives are based on the course content.

Learner objectives are derived from the course objectives, it makes no sense to have objectives outside of the course module, this will affect the congruency of the simulation to the theory.

The involvement of the content specialist, in the design of the simulation scenario, to ensure the alignment of the student's learning objectives, is discussed by one of the experts in the following statement:

Simulation scenarios must articulate with the learner objectives, therefore the theory lecturer needs to be involved in the scenario development

6.4.3 Integration of simulation into the curriculum

Question Three: Do you consider it important to integrate the use of simulation into the planning phase of curriculum development or can it be added after the curriculum is approved – please give the reasons for your answer.

All participants agreed that if a curriculum was in the planning stages, simulation should be integrated at that level to ensure it is aligned and articulates well with the student learner objectives.

One of the panel mentioned that simulation is both time consuming and resource dependent, and integration into the curriculum at the planning stage would assist in the planning for simulation.

If the curriculum was not in the development phase then it is important to properly link and slot simulation into the course content, otherwise it will lose its value.

6.4.4 Deliberate practice (DP)

Question Four: In round one there was a lack of consensus about what the respondents understood about the term Deliberate Practice. In round two the question was asked in the following manner:

Deliberate practice is defined as: "not merely mindless repetition of a certain task, but a focused approach to training aimed at reaching a well-defined goal" (Issenberg, McGaghie, et al., 2002).

The panel was asked if they were in agreement with this definition, and how they interpret and include the concept of deliberate practice in their simulation practice.

The answers given in this round confirmed that Deliberate Practice was not performed routinely. The participant's responses are indicated below.

- DP is gaining skills through repetition and not just mindlessly doing a specific skill
- DP is a good idea, but not practical as time does not allow for it. We encourage our students to practice skills but we don't call it DP
- We practice skills but not focused as in DP.

The difference of opinion about the definition of DP confirmed the researcher's initial opinion that this was a new concept in simulation, and had not yet been integrated into simulation in South Africa. This would need to be addressed in the programme in a practical manner that would assist simulation educators to implement DP.

6.4.5 Use of simulation in rare/critical situations

Question Five: Addressed the use of simulation to improve undergraduate student nurses competency in rare but critical situations, or whether simulation time should be spent achieving mastery of the common nursing skills that nurses use throughout their careers.

The participants' responses indicated that if a nurse is competent in generic skills they would be able to apply their skills and critical thinking competencies to the patient, thus being able to initially manage the patient in a critical state. Therefore, these two concepts are not exclusive situations and the associated management and process can be talked through.

6.5 Round Three of the Delphi Survey

The researcher decided that group stability had been achieved in the previous two rounds and the aim of the Delphi survey had been satisfied, and therefore no third round was required. The aim to explore the perceptions of nurse educators, who are considered experts in simulation education, of the four best practices identified from the scoping review was achieved.

6.6 Conclusion

Simulation best practices were described in the scoping literature review. In this phase, the researcher wanted to explore the perceptions of the South African educators who are using simulation best practices, and establish how they have included the practices in their working environment.

The Delphi Survey highlighted the differences between nurse educators who have possibly not had simulation training and educators who have experience and training. The differences were noticed specifically in the inclusion of debriefing in simulation and the use of deliberate practice for skills training. The expert simulation educators are using debriefing in simulation according to the best practice standards of linking learning objectives and encouraging students to reflect on their actions, and through discussion to identify the student's strengths and weaknesses, but also enhancing their self-confidence.

Reflective practice as used in debriefing is an education strategy that can be used across all aspects of the undergraduate nursing curriculum, and not only in simulation (NLN, 2015; Wanonis, 2015). The reflective process encourages students to think critically about their actions and to develop a critical awareness of their actions and knowledge base, which is essential in nursing. There is an evident need to assist educators to become facilitators of learning through student self-reflection, in simulation and in the classroom environment.

Deliberate practice was not well understood by the Delphi panellists and this will be addressed in a practical manner that educators can use in their curricula in the resultant programme.

The limitations of this Delphi Survey are identified as the absence of participants from the nursing college sector, and the lack of round two responses from 3 of the original sample of seven participants in round one. The researcher considers the results as a true representation of the expert nurse educators' perceptions and application of simulation best practices in the undergraduate nursing curriculum.

The results offer guidelines on a programme for developing simulation in nursing education institutions in South Africa, which can be developed based on the principles of effectiveness and acceptability.

The next chapter further explores the four best practices, relating them to the conceptual frameworks used in this study.

Chapter 7 Phase 3, part 1: Development of a conceptual framework for the programme

This chapter defines the conceptual framework for the development of a simulation programme, and addresses the first part of the third research objective. The data collected in phase 1 were analysed and integrated into the conceptual framework for a simulation programme.

The chapter includes a description and application of the blended learning and constructivist approaches, which were used in the design and delivery of the programme.

7.1 Importance of a conceptual framework

Parahoo (2006) differentiates between a theoretical framework and conceptual framework in the following manner: a theoretical framework is a specific framework or theory that underpins a research study, while a conceptual framework draws on various theories, frameworks and findings to guide the research. Maxwell (2005:52) describes the conceptual framework of a study as a "system of concepts, assumptions, expectations, beliefs and theories that supports and informs the research". The conceptual framework, therefore, describes the key factors, concepts and variables, and the relationship between them, and is regarded as the plan or model of what the researcher intends to design and is developed by the researcher specifically for the programme (Miles & Huberman, 1999, as cited in Maxwell, 2005:52; Ravitch & Ragan, 2011).

7.2 Conceptual framework

The conceptual framework consists of a number of components as represented in Figure 7.1. The environment of the NEIs in South Africa forms the overarching context for the study. Elements of the NEIs that are considered in the framework are related to the available resources and education needs of both the educators and students. The NLN/Jeffries simulation framework is considered a scientific base for the development of simulation education, and was therefore selected for the

development of the conceptual framework. Piaget's constructivist learning theory plus principles of andragogy were incorporated in the conceptual framework. The researcher's own experiences and observation also guided the development of the framework and are applied throughout the thesis and resultant programme.

The programme is delivered via a blended learning platform, as determined by the results from a survey of nurse educators as their preferred method of delivery.

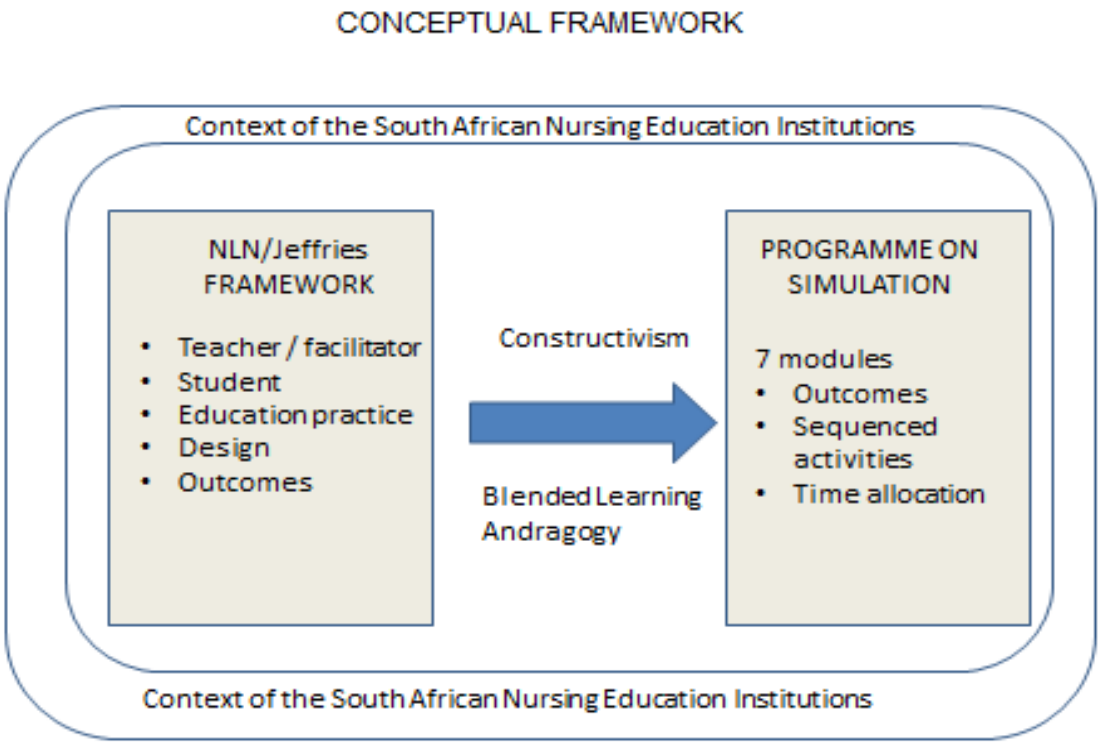

Figure 7.1: Conceptual framework for the resultant learning programme of this thesis

7.3 Researcher's own experience as an element of the conceptual framework

The researcher's experience and the literature indicate that although there appears to be enthusiasm for simulation in nursing education, educators appear reluctant to include the methodology in their curricula (Khamis, Satava, Alnassar & Kern, 2015; Wilford & Doyle, 2006; Wilson & Wittman-Price, 2015), and often express their need for training in the simulation methodology.

A blended format allows the programme participants to work at a time that is convenient to them, and is consistent with adult learning theory. This sentiment was expressed by educators who were polled for their preference on the mode of delivery for a simulation educational programme; 78% (29) of respondents indicated that they would prefer the blended learning format, with 21% (8) preferring a face-to-face delivery method. The limited available training in South Africa, at present, is conducted at a central location, requiring educators to take time off work, at often-busy times in the academic year, as student schedules leave little time for being out of the office for an extended time.

7.4 NLN/Jeffries Simulation Framework

The NLN/Simulation Framework (Jeffries & Rogers, 2007) was developed as a simulation guide that defined educational variables and principles. The framework is valid, reliable and evidenced-based, and provides a scientific basis for simulation teaching and learning. The framework guides simulation design, and provides educators with five essential components that are essential for planning a “consistent and empirically supported model to guide simulation design and to assess learner outcomes when using simulation” (Jeffries, 2012b:26).

The five components of the framework are: facilitator, participant, educational practices, simulation design characteristics and outcomes (Figure 7.2), which are described in detail in the following section, identifying how they relate to and influence the four simulation education best practices.

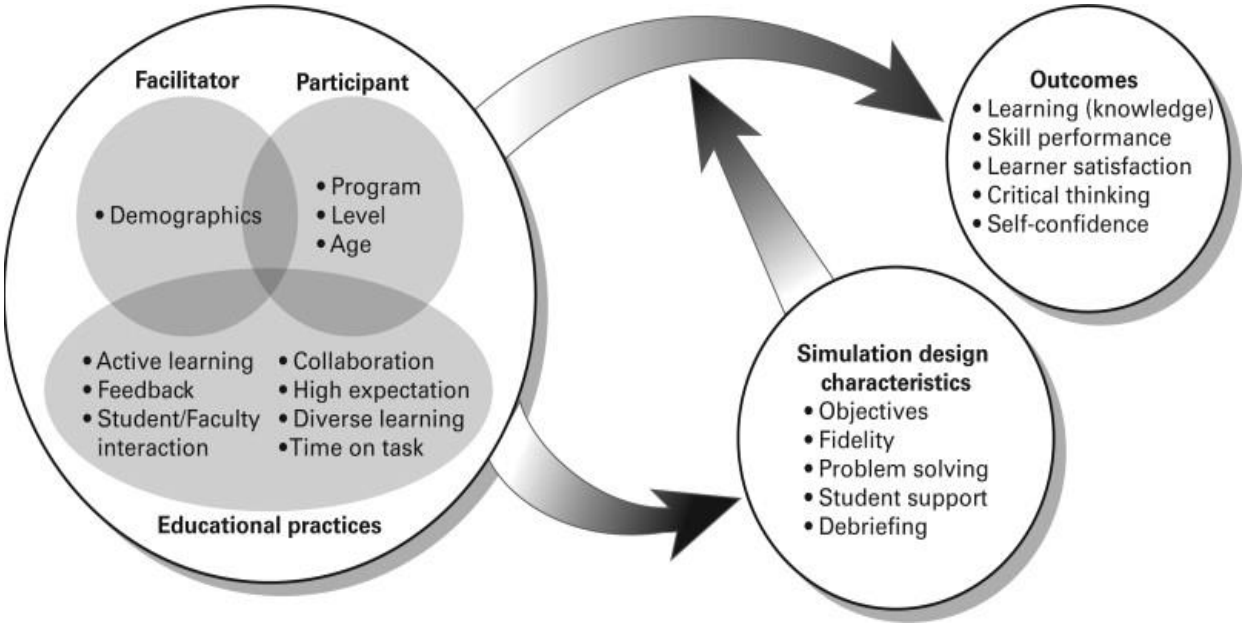

Figure 7.2: National League of Nurses Simulation Framework 2005 (used with permission)

Table 7.1: NLN/Jeffries Simulation Framework as applied to the programme describes the components of the NLN/Jeffries Simulation Framework, and links it to the identified best education simulation practices and how it is anticipated they will be applied in the programme.

Table 7.1: NLN/Jeffries Simulation Framework as applied to the programme

Components of NLN/Sim framework	**Identified from the best practices survey and the published literature**	**Application of the construct in the programme**
1. The facilitator Knowledge of simulation as a learning methodology	• Teaching vs learning • Teacher vs facilitator • Debriefing practices	• Highlight reflective practices for learning • Design a module discussing debriefing
Design a scenario	• Use of free online templates	• Include a module on the design of a scenario for implementation
Decide on learning outcomes	• Align to macro curriculum • Align to theory content • Important for determining simulation design • Range of difficulty of learning objectives	• Design a module for the Identification of learning outcomes specific to simulation • Learning needs identified first as they influence the choice of simulation design • Programme participants to conduct a needs analysis of the course and students' possible education gaps so that simulation can be used to further learning • Bloom's taxonomy for range of difficulty
2. The simulation participant/student	• Simulation is active learning, with students taking responsibility for their own learning	• Self-reflective learning and the identification of own strengths and weaknesses • Include the preparation of students for simulation pre-briefing and environment orientation • Discuss the process of debriefing for the students, emphasizing mutual respect, sharing and a safe space concept
	• Students' year of study	• First and second year are more task more orientated, senior years need complex patient scenarios – Benner's Novice to Expert principles
3. Education practices: Feedback Diverse learning styles High expectations of students Time on task	• Reflective practices and debriefing • Kolbs learning styles • Learning objectives should be challenging but achievable in the allocated time for simulation	• Module on debriefing • Include in module on learning objectives
4. Outcomes	• Were the learning objectives achieved? • Kirkpatrick's outcomes 1. Reaction - student satisfaction 2. Learning - skills performance and competency 3. Behaviour – application of knowledge into the clinical setting 4. Results – student successes and organizational success due to the implementation of the programme changes, over time.	• Module on assessment and evaluation • Include evaluation instruments for student performance and simulation experience for the students to comment
5. Simulation design	• Different types of simulation • Simulation fidelity – equipment, environmental and psychological fidelity	• Include data from the participants' situational analysis • Ask for a review of what resources NEIs have and design a simulation around these resources – make the scenarios individual to accommodate access to different resources

7.4.1 The teacher/facilitator

Facilitators and educators are essential to all educational experiences, as they guide critique and evaluate both the learner and the learning. Nursing education is still predominately teacher-based, rather than facilitator-based indicating that a shift in educator thinking needs to occur to facilitate a more student-centred learning approach congruent with simulation. In simulation the educator needs to transition from the role of educator or teacher to a facilitator of learning, and to get students to engage with self-reflective practices (Billings & Halstead, 2016).

The facilitator needs to have knowledge of simulation as a learning methodology, and be able to design scenarios, decide on learning outcomes and liaise with content specialists to ensure the students achieve their expected outcomes and alignment to the curriculum. Data from the survey, conducted in the first phase of this study, showed that 12% of the respondents had attended a training or workshop on simulation, which could indicate the reason for simulation not being fully realised in the South African nursing education context.

Training in simulation assists the educator to shift from using manikins for task training, predominantly for skills competency, to more complex patient scenarios that final year student nurses need to manage on registration as a professional nurse. Simulation training develops educators' confidence and an awareness of simulation scaffolding properties needed to meet their students' learning needs, for example, developing complex simulation scenarios as students reach the more senior levels of their undergraduate programme.

The programme needs to address the needs of the facilitator as outlined (Table 7.1) in the NLN/Jeffries Simulation Framework, prioritising the transition of educators from teachers to facilitators of learning, highlighting the importance of reflective practices in simulation and debriefing. When educators have knowledge of simulation practices they allow students to self-reflect on actions and their knowledge during the simulation. The trained educator creates a safe, non-judgemental space that allows students to express their opinions trusting in the facilitator and not expecting the teacher to tell them the correct answer.

7.4.2 The student

Simulation is an active, student-orientated learning activity. When students are actively engaged in their learning they learn to think critically about their actions (Billings and Halstead 2012). Students participating in simulation-based learning are active participants and take responsibility for their own learning, through the identification of their own knowledge gaps, which often occurs during the debriefing stage of the learning experience.

The preparation of students for simulation is important for them, in order to achieve the maximum benefit of the learning experience. Pre-simulation briefing includes an orientation to the equipment, and an explanation of the different roles of the participants in the simulation. Clearly defined student objectives are given to the students prior to the simulation, as they guide the students' preparation for simulation, and also assist the students to recognize their own learning gaps and knowledge deficits on completion of the simulation, which they would then need to address.

Student challenges, such as anxiety and stress, may be evident in simulation, due to the idea of being watched and being scrutinized by their peers and educators (Cato, 2013). These feelings of anxiety and stress can impact student learning, but can be overcome by both the establishment of a safe learning environment, and a comprehensive orientation to the simulation experience and the objectives of the activity by the educator.

7.4.3 Educational practises in simulation as per NLN/Jeffries Simulation Framework

7.4.3.1 *Feedback*

Motola, Devine et al. (2013) discuss debriefing and feedback as a best education practice, and refer to the two concepts synonymously, but the researcher's assumption in this study is that there is a difference between the two concepts. Feedback is defined as the "helpful criticism that is given to someone to say what can be done to improve a performance" (Merriam-Webster, [online]). Feedback is a process used during debriefing; positive feedback helps students identify what they

did well, and constructive feedback helps students identify areas that need improvement (Wilson & Wittman-Price, 2015:220).

Debriefing is described as a process that bridges the gap between experiencing an event and making sense of it (Fanning & Gaba, 2007). In order to achieve depth to student learning a process of self-reflection is encouraged. Data from the scoping review in this study listed debriefing as the most important part of simulation, and stated it is where the majority of student learning occurs during simulation (Cantrell, 2008; Motola et al., 2013; Wilson & Wittman-Price, 2015).

Debriefing provides the facilitator with an opportunity to provide feedback to students. Feedback can be given during the simulation activity, but is conducted more commonly at the end of the scenario, allowing the student to reflect on the experience, with the facilitator encouraging problem solving and not allowing the student to become reliant on the facilitator for the "next step" in the process (Jeffries, 2012:30).

The importance of debriefing as an essential part of simulation was strongly agreed on by the experts in the Delphi Survey, while the results of the survey indicated that 56% of the respondents did not accommodate debriefing in their simulations. This indicates a lost opportunity for student learning to occur, and needs to be addressed in the programme, as the lack of debriefing could relate to the lack of formal training for nurse educators using simulation.

The static use of task trainers across the undergraduate nursing curricula, together with the low rate of high fidelity simulation, is indicative of a more didactic teaching style, which doesn't encourage students to use self-reflection for learning. Both Rodgers (2002) and Papadimos (2009) agree that students need to be adept at self-reflection, which leads to critical thinking, but this requires educators to approach teaching and learning from a different perspective. Critical thinking in medical and nursing education is important in the process of making patient diagnosis and scientific enquiry, and thus needs to be part of the learning process.

7.4.3.2 *Diverse learning style*

Educators are often aware of the student's different learning styles, which include students being visual, auditory/verbal, reading/writing and kinesthetic learners, but due to large student numbers, and their experience and comfort with didactic teaching style, a variety of learning styles cannot always be accommodated in the classroom. Students might also be accustomed to being passive participants in their learning. A shift in the educational approach, from a didactic lecture style of teaching by the educators, towards a more student centred approach such as simulation, would allow the students to make mistakes in a safe environment without fear of being judged or compromising their academic progression. A student shift is also required to make students more responsible for their own learning and skills competency.

7.4.3.3 *High expectations of students*

Simulation learning outcomes, which were identified in the scoping review as an educational best practice, should challenge and stretch students. Simulation should have no more than four well thought out and clear student objectives guiding the scenario, and should be delivered to the student before the simulation, allowing the student to prepare for the simulation. Adequate preparation time can lead to the student delivering high standards of clinical reasoning during the simulation (Wilson & Wittman-Price, 2015).

Students are also expected to maintain a high standard of professionalism when in simulation. Professionalism in simulation refers to their preparedness for the simulation, dressing as they would for a clinical experience, respecting the manikin and other team members. Students adhere to the principles of creating and ensuring a safe environment for open discussion, and maintain confidentiality of issue discussed in simulation and debriefing.

7.4.4 Outcomes

Educational programmes are developed around predetermined outcomes, answering the question of what the participants will achieve or gain on completion of the programme. This is also true of simulation in the undergraduate nursing

curriculum. Simulation outcomes include: i) participant outcomes, ii) patient outcomes and iii) systems changes. The Delphi panellists referred to student outcomes, but the researcher's opinion is that that these concepts need to be explored, and the outcomes expanded to include patient outcomes and systems changes. The three levels of outcomes are discussed below in the context of Kirkpatrick's quality assessment model (Jeffries, 2012, Wilson & Wittman-Price, 2015:330).

Participant outcomes (Kirkpatrick's level 1 – *reaction*): The NLN/Jeffries Simulation Framework (Figure 7.2) refers to learner satisfaction, the participants' reaction to the experience, did they enjoy the learning, did their self-confidence improve. This has been the most extensively researched aspect of simulation (Jeffries, Kardong-Edgren et al., 2015; Riley, 2015), with students reacting positively to the experience. The researcher makes the observation that when students are learning and enjoying themselves, they engage with the subject and become active participants in the learning process.

Kirkpatrick's level 2 refers to *learning* and corresponds to the NLN/Jeffries Simulation Framework of knowledge and skills performance, assessing students learning outcomes in terms of cognitive, skills performance and psychomotor development, determining the knowledge gained, skills improvement and an increase in critical thinking skills.

Learning in simulation can occur at many levels – from skills training to the complexity of simulation scenarios, which help to develop clinical judgment in students, whereby they learn to apply learnt knowledge to patient diagnoses, manage the patient accordingly and intervene when necessary.

Patient outcomes (Kirkpatrick's level 3 – *behaviour change*): that result from simulation, refers to how students have applied what they have learnt in simulation to the clinical setting. The translation to practice of improved behaviours results in improved student outcomes and improved patient outcomes. Translational science is the resultant patient outcomes change that can result from simulation (McGaghie, Issenberg, Petrusa & Scalese, 2010). These outcomes are difficult to define, as studies to determine improved patient outcomes are difficult to design and execute in a rigorous manner. This is the next research field opening in simulation education.

Organizational outcomes (Kirkpatrick's level 4 – *results*): The overall success of the programme resulting in organizational change. This stage of the process typically occurs after a long gap from level 3, as the programmes need to be allowed to run effectively and develop according to feedback from participants and stakeholders in the education environment (Rouse, 2011). The questions asked are did simulation improve, for example, patient safety and outcomes.

7.4.5 Simulation design characteristics

The design describes the type of simulation being used for learning, including simulation equipment and simulation fidelity, or authenticity. Simulation design is primarily guided by the learner objectives, as discussed in the previous chapter.

7.4.5.1 *Simulation fidelity*

Simulation fidelity is a concept that is used to describe the different types of simulation, and the degree to which the simulator is able to replicate true physiological realism. Fidelity in simulation should be viewed as a multidimensional construct (Curtis, Diaz, Granadas & Feldman, 2012), and not only in terms of high, medium or low equipment fidelity. Fritz, Gray and Flannigan (2007) agree that the fidelity of the simulation experience extends beyond the concept of technology or equipment fidelity, to embrace the fidelity of the environment and the psychological fidelity of the experience. Environmental fidelity refers to the setting and how closely it replicates the actual setting, for example, a casualty cubicle. Psychological fidelity refers to how well the students are prepared for the experience, allowing them to be able to suspend disbelief in order to maximise the learning opportunity.

7.5 Constructivist Learning Theory

Constructivism is described as an educational theory that has multiple perspectives: the role of context and that of cognitive development, described by Piaget (Hussain, 2012), as well as the social aspect of development, as advocated for by Vygostsky (Hussain, 2012). "Constructivism proposes that learning is neither a stimulus response nor a passive process of receiving knowledge" (Yilmaz, 2008:165), but an active process, which is social in nature, with students actively participating in the

teaching process (Hussain, 2012): learners guide their own learning, and the instructor takes a less important role in the delivery of course content. Leonard (2012) makes the relevant observation that it is not necessary for all new knowledge to pass through the instructor first. The educator becomes a coach, catalyst and facilitator of learning.

Both the social constructivist theory and the cognitive constructivist theory are relevant to this study, as the assumption is made that knowledge is determined by social constructs, ideologies and values, and then developed within a social group into new knowledge and ideas – learners are not empty vessels but have the ability to intellectually pose questions, problem solve and construct theory from previous experiences (Yilmaz, 2008). The constructivist theories all agree that the premise for constructivism is that new knowledge or meaning is discovered and created from past experiences.

Constructivist teaching requires the teacher to create learning opportunities that allow and encourage students to challenge and question their own and each other's assumptions, in a safe environment (Aminch & Asl, 2015). The teacher takes on the role of a facilitator of learning, and needs to consider the students' prior experiences and knowledge for learning to occur. Constructivism is therefore both learner- centred and collaborative in nature (Leonard, 2012; Yilmaz, 2008).

Technology and laboratory work, such as simulation-based learning, are aligned to constructivist learning, as technology adds creativity, collaboration, critical thinking and global awareness to the classroom through the internet, virtual reality and the use of social platforms (Parilla, Penninger et al., 2008). Specifically, in the senior undergraduate nursing curriculum, where groups of students come together to problem solve often complex patient scenarios, the senior students have the ability to self-reflect, critique and analyse actions and decisions, based on their previous experiences, skills training in clinical skills laboratories and knowledge.

7.6 Constructivism and Andragogy

Constructivist learning is aligned to the principles of adult learning (andragogy). The central idea in constructivist learning is that new knowledge is constructed by linking new knowledge to past experience and knowledge. Adults are more confident than younger students, and often more willing to engage actively with their peers in the subject matter.

The idea that new knowledge is created in an active manner, by the learner, is central to constructivist learning and the concept of online learning, where learners can engage with the subject matter and their peers at a time that is suitable for them and within their own work and home environments. Korr, Derwin, Greene et al. (2012), in their article on blended learning and andragogy, highlight the importance of the concept of *relevancy* to adult learners. Relevancy does not only apply to the course content, but also to the relevancy of the programme to the adult learners' life-style, meaning the physical and time constraints that adults often experience due to commitments outside of their learning environment. A blended curriculum offers the students flexibility to manage their time according to their other commitments.

7.7 Blended Learning Theory

A blended programme was selected for the delivery of this programme, as determined by the educators when polled for their preference for mode of delivery for a simulation education programme.

Blended learning is still an evolving teaching methodology (Korr, Derwin et al., 2012), which uses multiple approaches to course content delivery, namely a combination of both online and face-to-face interaction between learners and the teacher/facilitator (Hughes & Quinn, 2013:422). Korr, Derwin et al. (2012:2) define blended learning as "an extension of the learning experience that combines traditional classroom time meaningfully with online learning activities, where authentic engagement is embedded into a substantial portion of the weekly online work". Stein and Graham (2014) describe blended learning as having three common themes namely: the combination of instructional delivery modalities, including the use of technology for the delivery of the course content; secondly the use of a combination of instructional

methods, learning theories and pedagogical approaches; and thirdly both face-to-face and online learning (e-learning) used in combination in the programme.

The Council on Higher Education's paper on *Distance Education Programmes in a Digital Era: Good Practice Guide* (2014) makes the observation that learning programmes historically have tended to be restricted to face-to-face contact and paper-based distance learning programmes (Council on Higher Education, 2014).

The use of blended learning, using computers and online platforms is increasing as a teaching methodology, due to the influence of technology on education systems (Cloete, 2014:33). As universities and colleges increase the use of the internet as repositories for digital teaching and learning materials (Makhdoom, Khoshhal, Algaidi et al., 2013), the influence of technology will continue to gain more momentum in education.

The advantages of blended learning are: adult learners require flexibility in their learning schedules, as they often have additional responsibilities to both their work and family; blended learning programmes encourage students to interact with each other in the virtual environment, via chat rooms or news forums, in their own time, which is convenient to themselves. Technology has the ability to close the gap between the educator and the student (Walker, 2013) and revolutionize the education platform - but an essential element to this transformation is the absolute requirement that educators have the necessary pedagogical training, to be able to integrate educational technology into their classrooms.

With the development of internet capacity in South Africa and in Higher Education, e-learning has the ability to create "new avenues for thinking, which is important when introducing new learning technology", such as simulation, into any specific learning context (Kistow, 2011:116). In today's connected society where technological developments make the acquisition of information easy and rapid, the use of a blended programme was considered the most appropriate format for the delivery of this programme by the educators who responded to the poll.

In addition to the points discussed above, NEIs are facing challenges of increased student numbers and limited classroom space. The blended learning platform decreases the demand for face-to-face contact between students and educators, by

communicating and delivering course content, via an online platform. The exposure of educators, as participants to online learning, in a blended learning programme could lay the foundation for their further enquiry into this mode of delivering education, and the development of more online courses. The researcher hopes that the blended learning programme will create a community of nurse educators that will have the resources to share their own experiences beyond the programme, as simulation is a developing pedagogy and will only become contextually relevant if educators share their own challenges and successes with their colleagues and peers.

7.8 The integration of constructivist learning in a blended learning programme

Table 7.2 (below) highlights guiding principles of constructivist education combined with andragogy principles and their application in the resultant programme.

Table 7.2: Integration of constructivist learning in a blended learning programme

Constructivist principles	**The application of principles in the programme**
1. Learning is an active process,	• Participant engagement occurs both online and in the face-to-face environment. •
2. The design of the programme must empower students to learn.	• The blended learning programme allows the participants to structure their learning around their other work and family commitments.
3. Students want to learn content from different perspectives, to gain a better understanding of the problems and to be able to apply alternative strategies in solving the problem.	• Blended learning engages with the participants on different platforms. Using content and text, in the classroom, to online hyperlinks and reading references. to develop the depth of knowledge required by the participants.
4. The learning experience must be relevant to the student own work environment	• The introduction to the programme will outline the course content, aims and expected outcomes, and assignments that are expected from the participants, to ensure the programme's relevancy to their needs. • The introductory module will require participants to identify their learning needs and how simulation can help them identify their students' learning objectives. • The programme will be designed to address the individual participants' simulation needs.
5. Instructional activities must support the principle that students construct meaning from the learning activities and then are able to develop new knowledge.	Construction of meaning and knowledge: • A glossary of simulation terminology and current educational practices in simulation will help participants contextualise simulation in their own practice.

Constructivist principles	The application of principles in the programme
6. Knowledge is constructed within a social context, and must encourage students to explore other social contexts, and viewpoints. The learning environment itself becomes a social context.	• The programme will relate to the participants' educational environment, discussing contextual issues and sharing issues, successes and challenges, with the other participants, in the online chat room. • The ongoing assignment is designed for the participants to design and share a simulation scenario with the group, which will be relevant and implementable in their own NEIs. • Blended learning is a collaborative learning environment, where the participants are encouraged to share viewpoints, and strategize together both online and in the classroom setting.
7. Learning material must encourage students to challenge their previous perceptions, and be able to argue or debate both positive and negative points of view.	• The programme is designed to challenge the students' teaching styles to move away from didactic teaching to learner centred, reflective practices. • An on-going simulation project, of a high or medium fidelity simulation, will encourage thinking about complex patient scenarios and how best to engage their own students in critical thinking and developing clinical reasoning. • The on-going projects will be peer evaluated by the group, for discussion and critical appraisal, from both a student and a facilitator perspective.
8. The learning content must engage the student in solving both complex problems and simple problems.	• The process of simulation scenario design is a complex procedure, and will be included in the programme. The weekly modules will address aspects of scenario construction, allowing students to conceptualise the process and thus be able to apply the process to their own students' learning needs.
9. Reflection and articulation of what has been learned is encouraged throughout the learning process and on completion of the programme.	• Debriefing in simulation has been identified as a best practice and an integral part of the learning experience. The participants in this programme will be encouraged to self-reflect on their own learning, individually and in a group. • The use of online, reflective discussions will enhance the participants' process of self-reflection. • The participants will plan for debriefing in the contact session, when they have the opportunity to run their simulation scenarios.

7.9 Contribution of the conceptual framework to the programme

The conceptual framework provides a logical approach to the programme development. The important elements that are included in the programme are discussed and aligned to each other. The elements of the programme are discussed within the conceptual framework, providing the reader with the reasoning behind their inclusion.

7.10 Conclusion

This chapter examined the theories and frameworks that form part of the conceptual framework for the programme design. The frameworks and theories provide the reader with an understanding of the process and logic used by the researcher in the development of the programme.

It includes the NLN/Jeffries Simulation Framework in detail, as the educational foundation that informs the resultant programme. The constructivist learning theory has been discussed in relation to both simulation learning and educator training.

The next chapter examines the development of the programme, using the theories and frameworks and embedding them in an instructional design for delivery of the course content.

Chapter 8 Phase 3, part 2: Designing the Programme

This chapter provides an overview of the development of the blended learning programme, and addresses the second part of the third research objective. The programme is based within the conceptual framework described in Chapter 7. The ADDIE (Assessment, Design, Development, Implementation and Evaluation) instructional design model was selected for the design of the programme, and is described in this chapter, relating the steps in the design process to specific elements of the programme.

8.1 Instructional Design

An instructional design is defined as “a systematic process that is employed to develop education and training programmes in a consistent and reliable manner” (Reiser & Dempsey, 2007:11), and a “systematic approach to solve an instructional problem” (Davies, 2013). The aim of this study was to investigate the use of simulation in nursing education in South Africa, and to develop an educational programme for nurse educators wanting to learn how to apply and integrate simulation into their classrooms and nursing curricula.

The design development and material required for the programme require an analysis of the learning needs, and the systematic development of instruction, to ensure the quality and relevance of the programme. The instructional design process is often portrayed as linear, but it is frequently iterative and inter-related; developed from the learning needs analysis, setting of learner goals, the development of the instructional material and activities, to the delivery and evaluation of the learning programme (Smith & Ragan, 2005; Christopher, 2011).

A benefit of using an instructional design model is that instruction is improved as the subject matter is presented in a structured manner, and therefore the learning experience is delivered in a more effective and interactive manner (Piskurich, 2006).

8.2 ADDIE instructional design

One of the most popular instructional design models (Ferriman, 2013) is the ADDIE model (Assessment, Design, Development, Implementation and Evaluation). The generic ADDIE model is usually found at the core of any instructional design (Forest, 2014; Instructional Design Central: [online]) and can be adapted for specific design programmes, creating congruency between goals, objectives, strategies and evaluation of the resultant programme (Sezer, Yilmaz & Yilmaz, 2013). The model is iterative in design, with evaluation of each stage leading to a re-analysis and possible modifications being made where appropriate (Bates, 2014). An in-depth discussion of each of the stages (analysis, design, development, implementation and evaluation) is given in Table 8.1, explaining the application of the ADDIE model to this education programme for simulation training using a blended learning programme.

Table 8.1: Application of the ADDIE model in the programme

ADDIE Model stages	**Description**	**How applied in the programme**
Analysis	Examination of the requirements to develop an education programme. Determination of the intended audience and the learning education needs that can be addressed using simulation.	Covered in Module 1: Participants will need to identify the nursing course and student group for which they will develop a simulation scenario during the programme. This stage will also include an assessment of the simulation resources that are available for simulation in each participant's NEI.
Design	The course content learning activities are identified. The design stage must be logical and sequential.	The simulation design is developed over the 7 weeks of the programme, using the simulation education best practices. This stage includes the planning for the simulation, which will include the scheduling, consumables required and timing and sequencing of the simulation activity. Each participant designs and develops a simulation activity, using his/her NEI's resources and specific course content, and presents this in Module 7.

ADDIE Model stages	Description	How applied in the programme
Development	This is the stage where content is decided on and learning activities are assembled and materials to be used in the programme. The development of assessment instruments is also considered at this stage.	Specific aspects of simulation are addressed and developed in each module: Module 2 - learner objectives for the simulation will be identified. Module 3 –integration of simulation into the curriculum Module 4 - development of debriefing strategies is conducted. Module 5 - inclusion of deliberate practice in simulation and skills training is discussed and planned. Module 6 - assessment instruments will be evaluated and the development of a relevant simulation instrument by each participant will be undertaken.
Implementation	This stage involves the review and testing of the programme, including the use of equipment and other technologies being used in the programme.	The implementation will be via the 'moodle' learning platform. With weekly modules and assignments, and participation in chat rooms. The participants' simulation projects, scenarios and running of the individual scenarios will be implemented, and reviewed by all group participants in Module 7. Module 7 will be a two day contact session/workshop.
Evaluation	This stage determines whether the programme has achieved its intended objectives.	Formative course evaluation will be conducted via weekly assignments that will need to be completed by each participant. The course coordinator will therefore be able to assess learning that has occurred and possible knowledge gaps. The programme will be reviewed and modified according to suggestions. The participants will be asked to complete a course evaluation questionnaire at the end of the programme.

8.2.1 Analysis stage

The analysis stage is the most important stage, as it forms the basis of all decisions made in the development of the programme. This stage was conducted in phase 1 of this study. In this stage the program developer becomes familiar with all aspects of the potential programme. The target audience is identified and its training needs, possible constraints to learning, and the pedagogical considerations for the

programme are examined. Broad educational goals and specific learner objectives are identified in this stage of planning, defining what skills the participants required to learn. The delivery of the instructional material is also considered in this stage; an online poll indicated that a blended learning programme was the delivery method of choice (Piskurich, 2006:31; Instructional design, [online]; Instructional design expert.com, [online]).

8.2.2 Design stage

The design stage is the stage when the blueprint is developed, and is based on the findings from the analysis phase. The platform or learning management system for the programme delivery is also decided upon. Moodle® was selected for this programme, due to its presence in higher education; it offers students the facility to work in asynchronous, time as well as having a chat room and assignment submission facility, and importantly, Moodle® is open source software and participants will be able to gain access for the duration of the course.

8.2.3 Development stage

In this stage, a detailed course outline is developed, and content is planned and refined. The students' existing knowledge is aligned to the learning outcomes and desired goals of the programme (Instructional design expert.com, [online]).

Flow charts (Figure 8.1) are created to guide the development process, ensuring all elements in the programme are addressed. A storyboard (Figure 8.2) is created to determine the layout and navigation of the e-learning classroom (Instructional design expert.com, [online]). The master plan of the content sequencing is then explained (Table 8.2).

8.2.3.1 *Developing a course outline*

The following aspects of the programme are addressed in this stage:

- Logical sequencing of the content
- The associated activities
- Timing for the learners to work through the programme

- Development of the Programme Content

Programme Objective = To provide nurse educators with the knowledge and skills to be able to integrate simulation into their curricula, to meet the needs of their students.

The broad goal of the programme was considered as a first step in the development of the course outline, and the guiding principles for the programme were then decided upon. The guiding principles were derived from the scoping review and the associated literature on the best practices in simulation education, as well as the conceptual framework, which includes the principles from the NLN/Jeffries Simulation Framework, constructivist learning and blended learning. The factors and constructs considered in the development of the course outline are depicted in Table 8.2.

An evaluation and review of the programme is done throughout the programme development stage to ensure the relevance and applicability of each module; this was done by a nurse educator involved in using simulation. Once the programme is completed and loaded on to the electronic platform, the entire programme is reviewed by subject experts to ensure that the objectives of the course and training objectives are relevant and met, through an analysis of the content material, evaluation methods. E-learning experts evaluate the programme's delivery and the navigation and flow of the electronic classroom (Instructional design expert.com, [online]; Instructional design central: Addie Model, [online]).

8.2.3.2 *Flowchart (Figure 8.1)*

A flowchart is a graphic representation of the programme, indicating the sequence of the programme, decision points for inclusion of material or content, and the start and end point of the programme (Le Loup & Ponterio, (2015), [online]). A flow chart offers the reader a visual explanation of the flow and processes involved in the design of the programme. Once the need for the programme, and the goals and objectives are decided upon, then the platform for delivery of the programme, and the actions and activities for the delivery of the course content are added to the flow-chart. Assessment of learning is included as it must tie into the course or module's objectives (e-learning design and development, [online]).

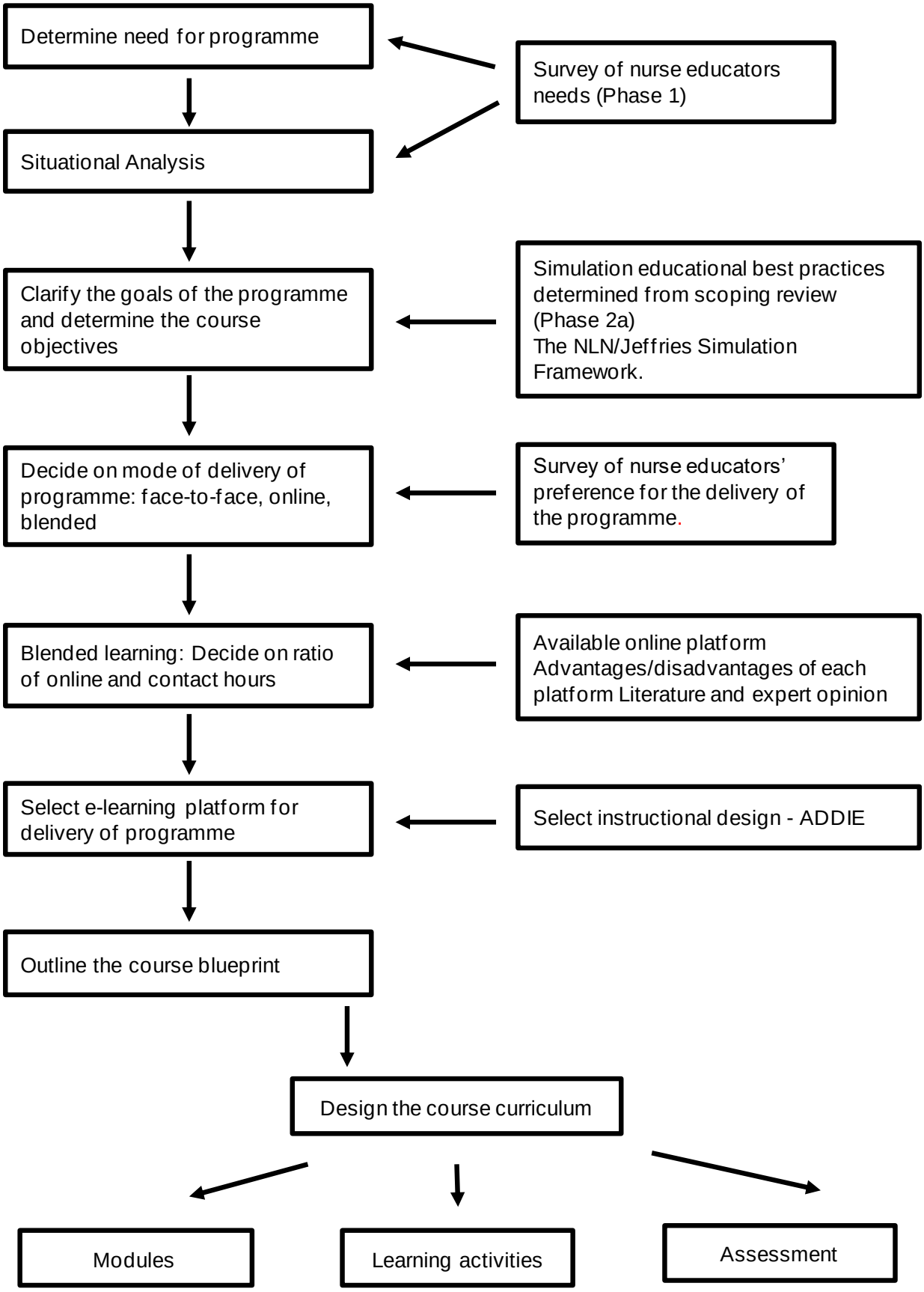

Figure 8.1: Flowchart of the programme

8.2.3.3 *Storyboard (Figure 8.2)*

A storyboard in e-learning refers to the course content or a typical 'lesson plan', providing a blueprint and foundation for the programme. The storyboard includes the visual and text elements of the online programme. Attention is paid to the navigation elements of the online platform, directing the participant to various aspects of the screen and online interaction that is embedded in the programme.

The storyboard provides an overview of the sequence of the content delivery and illustrates how the course content develops throughout the programme.

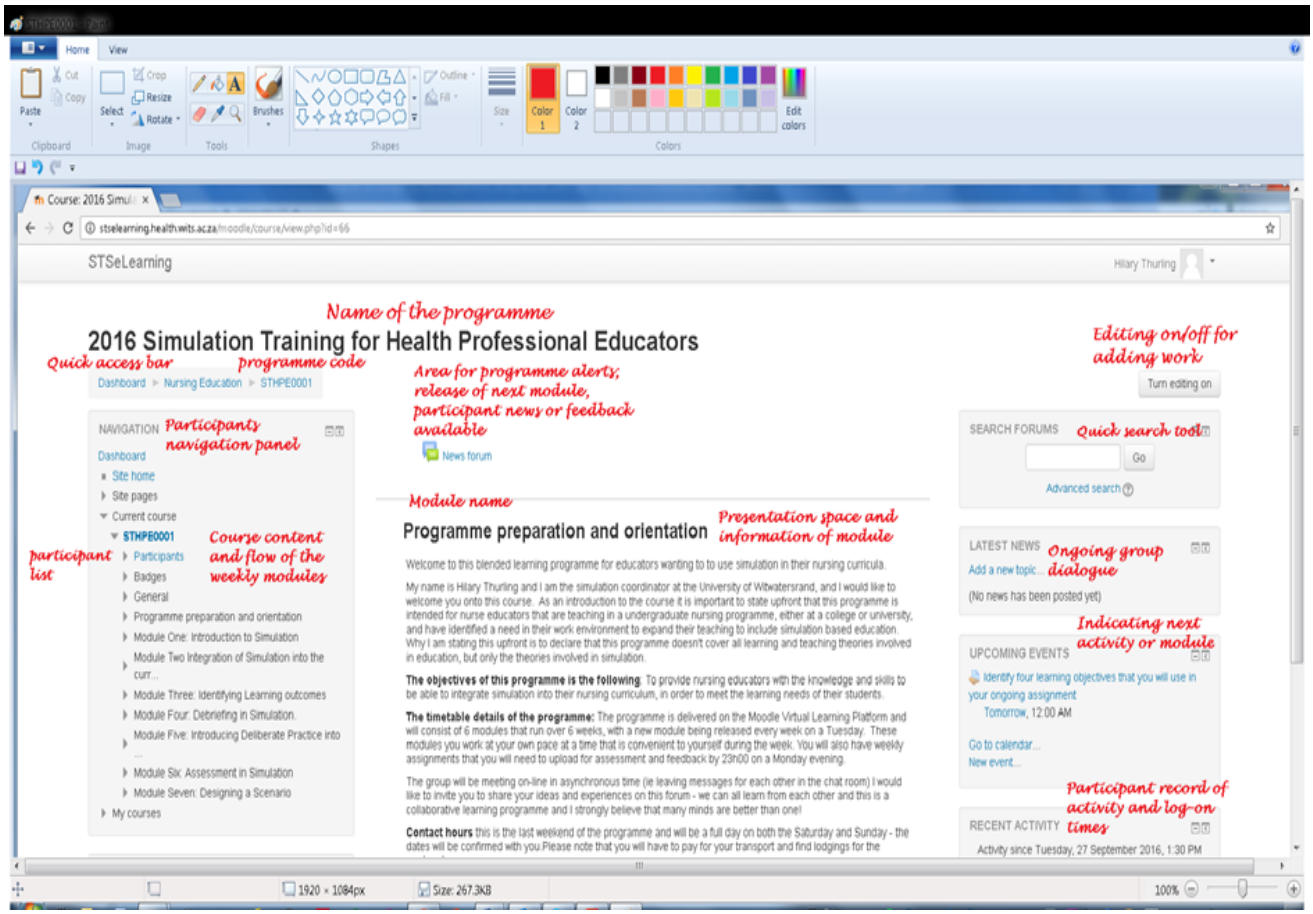

Figure 8.2: Storyboard template

The sequencing and justification of the course content follows in Table 8.2and Table 8.3 respectively.

Table 8.2: Sequencing and content of the programme

Participant preparation and orientation

Objectives guiding the development of content

- Welcome and introduction to the programme
- Outlines participants' entry requirements
- Objectives of the programme
- Time table and contact hours

Module 1: introduction to simulation

Objectives:

- Discuss the NLN /Jeffries Simulation Framework
- Become acquainted with simulation terminology
- Explore the different types of simulation and be able to relate them to the participants' NEI resources and student needs
- Discuss the barriers to increasing the use of simulation in nursing, participants relating their experiences of simulation

Sequencing of module 1:	Activity	Time allocation
1. NLN/Jeffries Simulation Framework The value of simulation in nursing The increase of simulation use	Reading	90 minutes
2. Chat room: "How have the participants been using simulation in the courses that they teach?"	Online chat	120 minutes
3. Assignment: to conduct a situational analysis of their learning environments and identify areas where simulation will best be used	Written assignment	3 hours individual work

Module 2: Identifying learner outcomes

Objectives:

- Revise Bloom's taxonomy and its application to junior (year 1 and 2) and senior (year 3 and 4) nursing students
- Describe learning outcomes in terms of Bloom's taxonomy
- Link student learning outcomes to different simulation designs

Sequencing of module 2	Activity	Time allocation
1. Introduction – refresher in domains of learning and referring to the participants' students' level of training	Reading	30 minutes
2. INACSL standard of best practice	Reading	30 minutes
3. Quiz on Bloom's taxonomy	Quiz	30 minutes
4. Chat room: "How have the participants been assessing their students learning objectives?"	Online chat	120 minutes
5. Assignment application of knowledge learnt – participants to develop 4 relevant learning outcomes for a simulation scenario	Written assignment	3 hours

Module 3: Integration of simulation into the curriculum

Objectives

- Describe the advantages of integrating simulation into the curriculum
- Identify challenges to the integration of simulation into the curriculum
- Describe the different approaches to simulation integration
- Develop a plan for embedding simulation into your nursing course in the undergraduate curriculum

Sequencing of module 3	Activity	Time allocation
1. Literature review of the different approaches to integration of simulation	Reading	45 minutes
2. Quiz on integration approaches	Quiz	30 minutes
3. Chat room: “Barriers and challenges to embedding simulation in the existing curriculum”	Online chat	2 hours
4. Assignment: Develop a step-wise approach for integrating simulation into the participants own NEIs	Written assignment	3 hours

Module 4: Debriefing in simulation

Objectives

- Define debriefing
- Discuss roles of teacher/educator/facilitator
- Discuss the concept of self-reflection as an instrument for learning
- Review debriefing as an instrument for students’ self-evaluation
- Review a debriefing instrument/template

Sequencing of module 4	Activity	Time allocation
1. Importance of debriefing, giving an example of how a debriefing session is conducted post simulation	Videos x 2	20 minutes
2. Reading/Discussion of the NLN vision for debriefing	Reading	30 minutes
3. Chat room: “Do you think there is a difference between teacher, educator and a facilitator of learning?”	Online chat	2 hours
4. Assignment: Develop a debriefing plan for the participant’s individual on-going project	Written assignment	2 hours

Module 5: Introducing deliberate practice

Objectives

- Define deliberate practice
- Discuss possible ways to introduce deliberate practice into the undergraduate curriculum

Sequencing of module 5	Activity	Time allocation
1. Editorial on deliberate practice, plus an article on how to introduce deliberate practice into the nursing curriculum	Reading	60 minutes
2. Powerpoint on an initiative on introducing deliberate practice into the simulation curriculum	Power point/audio visual	20 minutes
3. Chat room: “How do we get students to practice their clinical skills?”	Online chat	2 hours
4. Assignment: Design an engagement with the reading material and the chat room conversations – required to develop a plan for introducing deliberate practice in the undergraduate nursing curriculum.	Written assignment	2 hours

Module 6: Assessment in simulation

Objectives

- Review simulation assessment instruments
- The development of an assessment instrument for the participant’s on going simulation scenario/project
- Discuss the failure to fail phenomenon in assessment and evaluation

Sequencing of module 6	Activity	Time allocation
1. Evaluation of an online assessment instrument (attached to programme)	Evaluation	1 hour
2. Online search for free simulation instruments	Online search	2 hours
3. Chat room: "Do you think that there are circumstances when you fail students that you believe are not competent, and so you think simulation can help address this element of student assessment?"	Chat room discussion	2 hours
4. Written assignment: Develop or adapt an assessment instrument for the on-going simulation scenario	Written assignment	2 hours
Module 7: Designing and piloting a simulation scenario Objectives • The development of a scenario template • Plan for running/piloting of the scenario • Critically evaluating peers/colleagues scenarios		
Sequencing of the module:	Activity	Time allocation
1. Reading and application of a step by step plan and checklist for the development of a scenario	Reading	1 hour
2. Using the available online template or an alternative free online template to plan a scenario including the following:	Written	3 hours
3. learning objectives, debriefing strategy, consumables required, role players, running time of the scenario		
4. The running and critical evaluation of the group's scenarios	Group work	2 day workshop

Footnote: NLN – National League of Nurses; INACSL – International Nursing Association for Clinical Simulation and Learning

8.2.4 Implementation stage

The purpose of this stage is the effective and efficient delivery of the course content to the actual learners (McGriff, 2000). The course should be piloted or evaluated first, to provide feedback and make any changes that are deemed necessary, before rolling it out to a larger audience (Instructional design.com, [online]; Gardner, 2012).

The use of tests and quizzes in the course are valuable as they provide the course designer with an opportunity to analyse the effectiveness of the learning material during the course.

Once the course has been evaluated, or piloted, and suggested changes made, then all stakeholders are notified that the course is ready to be accessed. The stakeholders include individual educators wanting to learn how to use simulation, and

NEIs (universities and colleges) wanting to develop their simulation laboratories and centres.

8.2.5 Evaluation stage

Although evaluation occurs at every stage of the course, the students are asked, on completion of the course, for their assessment of the learning processes and suggestions for improving the programme. This will be done in a group discussion and the students will be asked to complete an anonymous questionnaire.

Table 8.3: Justification of course content and researcher's comments

Blended learning principles included in the development stage (Pappas, 2014; Knowles, 2011)	**Description**	**Researcher's Comments**
Identify course objectives, course participants and participant requirements All information is provided that the students need to assist them in deciding to enrol on the course	***Objective of the course***: To provide nurse educators with the knowledge and skills to be able to integrate simulation into their curricula, to meet the needs of their student nurses. ***Participant minimum prerequisites for entry onto the course***: The applicant must be self-motivated and an independent learner, as this course will mostly be conducted online. The applicant must be registered with the South African Nursing Council as a registered nurse with an additional diploma in nursing education. The applicant must be working in a Nursing Education Institution and have identified a need for using simulation to assist their students in achieving their learning objectives and goals. ***Computer skills requirements:*** The participants need to have a working knowledge of basic computer skills, which includes the following: Being able to use a keyboard and mouse Using computer applications such as Word, PowerPoint, e-mail. Knowledge of spell check, copy and paste, saving documents and the use of different folders for storage Attaching and sending of documents and folders Ability to perform online research using internet search engines or browsers.	These elements of the programme are found in the "Participant Preparation and Orientation"". The participants are encouraged to give some thought as so how they want to use simulation in their programmes so the learning will be relevant to their needs (individual situational analysis of their own educational needs). As the programme is online, the course tutor can address each participant's needs and questions individually, thus enhancing the relevance of the learning for the participant. Relevant educational theories will be referred to as they arise in the programme. The ability to manage a computer for assignment writing, emails and chat rooms is essential to this course. Listing the minimum computer skills required will assist participants in making the decision to enrol or not – thus reducing the risk of not completing the course. Alternatively, participants can upskill their computer skills prior to registering for the programme in order to be able to fully participate.
Technical and organisational requirements for active participation in the programme An informal learning environment, with required support, and an opportunity to engage with their peers on the subject matter	***Time management and log-in frequency***: A new module will be released every week for seven weeks on a Tuesday. Each module will require the participant to interact with his/her colleagues in a chat room or discussion format. This is an asynchronous programme, therefore, no specific times to log on will be prescribed. Participants will need to interact with their colleagues at least three to four times during the week, to keep abreast of the discussion and content discussed amongst the group.	***Creating an educational environment of sharing and discussion*** The online chat room may be foreign to the participants as a learning environment, but the inclusion of this social media throughout the programme is intended to get educators to share and collaborate with each other. The online classroom requires 'students to take active roles in helping each other learn' (Pallof & Pratt 2001). The survey indicated that 82% of educators don't share their scenarios – meaning that educators are

Blended learning principles included in the development stage (Pappas, 2014; Knowles, 2011)	**Description**	**Researcher's Comments**
	Each module will have an assignment that must submit by 23h00 on the Monday preceding the release of the new module. ***Contact hours:*** A weekend, consisting of both Saturday and Sunday full day (08h00 – 17h00), workshop will be organised for the last weekend of the course. (The date and venue will be provided on application.) All participants will be required to attend the workshop and will need to provide their own transport and lodging costs for the weekend. Teas, coffees and a light snack will be provided during the day. ***Technical and theory assistance will be available during office hours, via email and telephonically.***	creating their own scenarios and re-inventing the scenario "wheel" unnecessarily. The discussion, via the chat room, is intended to create a working group of simulation educators that share ideas, brainstorm and support each other on their simulation journey. If the participants work well in the chat room, they are more likely to use this interactive form of learning with their undergraduate nursing students for their learning. The technical and theory assistance will help prevent participants feeling isolated if they are not coping with certain aspects of the course, leading to a possibility of not completing the completing the programme. The use of chat rooms and the accessibility of lecturers and online assistance gives the participants a sense of social presence, and an engagement of all participants in learning about simulation.
Target group's characteristics and learning requirements Contextually relevant and practical learning, (Knowles et al. 2011)	***Specific target group***: The programme is intended for nurse educators who are registered with the South African Nursing Council with an advanced diploma in nursing education and have the qualities listed above, under the list of minimal requirements ***Identification of learning needs***: Each participant will identify and work on a subject, which they are teaching at present, that will benefit from a simulation learning activity. The participants are to use a simulation modality that is available to them within their own NEI. The participant will then develop the appropriate simulation activity over the seven weeks that the programme is running, and deliver it in the contact session weekend at the end of the course. The other participants will be role players and be active members of the debriefing session, i.e. giving feedback on the piloting of the scenario and run through.	The programme will briefly discuss other educational theories and frameworks, but the focus will be on the application of the constructivist and experiential learning theory in the NLN/Jeffries Simulation Framework. The survey, in phase 1 of the study, indicated that most educators (90.7%) are using task trainers, therefore this programme will require them to develop a more complex patient scenario, using some form of either high fidelity or medium fidelity simulation, that they have available to them in their NEIs. ***Contextual learning:*** The identification by the participants of their and their students' learning needs will assist in making their learning contextually relevant. Each participant can develop a scenario that addresses a societal need that the undergraduate nurses are challenged to resolve. The programme is learner-centred and appropriate for the individual educators. They will be able to apply their own simulation design and use or adapt their colleague's simulation design in their own context immediately.

Blended learning principles included in the development stage (Pappas, 2014; Knowles, 2011)	**Description**	**Researcher's Comments**
The methodological approach is clearly explained. Programme assessment	The design objective of this programme is to achieve an innovative approach to blended learning, which will equip educators to use simulation, in their own learning environments, to address their own students learning needs. A constructivist approach will be used throughout the programme; the following principles of constructivism are addressed: Students are active learners – they define their educational needs, and problem solve, exploring options to solve their education issues. The learning environment encourages participation and collaboration amongst the participants and the facilitator. Knowledge is contextually based and constructed from the participants' existing knowledge and the resources that they have available to them in their NEIs. Assessment of and for learning will occur at the end of each module. The assessment will be focused on the week's module. The participants are required to submit an assignment which will be peer evaluated Peer assessment will be part of the 2-day contact session in module seven. The peer assessment will involve the participants piloting their own scenarios, with the other participants acting as students for each other's scenarios and giving critical feedback to each other, both as a participant and an observer.	An assessment rubric will be available to the participants to guide their approach to the assignment. Written feedback will be sent to each participant to provide him/her with suggestions on his/her work and simulation development. The final assessment will be achieved at the end of the course during the 2-day contact session – all the participants will be given an opportunity to present their simulation scenario and to pilot it within the group under peer review. ***Developing clinical judgement in simulation:*** the development by the participants of a contextually relevant scenario will require the participants to examine a case study from a complexed yet structured manner, which addresses the students' learning objectives requiring them to use clinical judgement in decision making. Peer evaluation will demonstrate the advantages ***of piloting scenarios*** amongst each other before being presented to students. The survey indicated that this is not a regular occurrence, with 82.5% of educators relying on student feedback on their scenarios, and 25% not having any quality checks in place. The sharing and discussion in the contact session will encourage the participants to share scenarios after the course is completed.
The flow of the programme	The programme is seven weeks long, with a module per week and a pre programme introduction that identifies the aims and objectives of the course, who the programme is intended for and the requirements of the participants (time and computer ability). The programme is developed around the identified simulation education best practices.	The modules are the following Programme introduction and preparation ***1. Introduction to simulation*** ***2. Identifying learner's outcomes*** ***3.The integration of simulation into the curriculum*** ***4. Debriefing in simulation*** ***5. Introducing deliberate practice into simulation***

Blended learning principles included in the development stage (Pappas, 2014; Knowles, 2011)	**Description**	**Researcher's Comments**
	Each module is designed to build on the module before, thus guiding the participant's development of a contextually relevant simulation scenario that will have immediate application in his/her teaching environment.	***6. Assessment of learning*** ***7. Designing a scenario***
The modules	1. Introduction to simulation	Participants are asked to look at how they have been using simulation up to this point. This provides them with a baseline of previous knowledge and experiences for the development of their simulation skills. This is also the topic of discussion for this week, sharing what the educators have been doing, and finding common ground. The NLN/Jeffries Simulation Framework is introduced to provide an idea of the concepts and elements of simulation design that need to be considered in simulation. The assessment is designed to promote analysis, by the educators, of what their courses require from simulation and start thinking about the different types of simulation and what will assist them in using simulation.
	2. Identification of learner objectives	The educators will be familiar with identifying student objectives, and Bloom's taxonomy. The focus on this module will be on developing specific simulation objectives, limiting them to no more than 4 objectives that are appropriate to the student level, using Bloom's to guide the learning objectives. The assignment makes up part of the ongoing project, identifying the four learning objectives for their scenario. The nurse educators collaboration will provide the forum for participants to discuss their own challenges and successes in increasing the amount of simulation being used in their NEIs.
	3. The integration of simulation into the curriculum	This is a broad subject that can be perceived to be beyond individual educator's influences, and therefore my approach to the concept is to provide a literature review for the participants to gain a broad understanding of two different approaches to the integration of simulation into the nursing curricula. The assignment links the courses to simulation activities, and who could assist them in their NEIs (simulation champions) in getting simulation embedded in the curriculum.

Blended learning principles included in the development stage (Pappas, 2014; Knowles, 2011)	Description	Researcher's Comments
	4. Debriefing in simulation	The focus of this module will be on facilitating learning and shifting away from the teaching mode. Allowing students to self-reflect on actions both individually and in a group, thought processes and identifying learning that has occurred as well as possible knowledge gaps. Introduce the concept of self-reflection How do we get students to self-reflect on actions? The DASH evaluation instrument will be included in this module, to provide another aspect to debriefing from a student's perspective. The assignment asks the participants to think how they can approach debriefing to encourage self-reflection by the students, what questions can they ask and how will they get everyone's involvement. This assignment will be a generic document that they will be able to build on as they do more simulation in their NEIs.
	5. Introducing deliberate practice into simulation	Deliberate practice is explained via the use of definitions, and an example of how a nursing department has introduced deliberate practice using student's self-videos for assessment. The chat and assignment (essay) asks the question "How do you get students to practice their skills?"
	6. Assessment of learning in simulation	There are two aspects to this module. Firstly, the assessment of student learning, and secondly, the assessment/evaluation of the simulation session from a participant's perspective. The focus on student learning assessment will relate to the learning objectives and how best to assess them. The module also discusses simulation as a formative or summative assessment instrument. Evaluation of the simulation course and simulation experience is also discussed, as it allows for refinement of the scenario and a quality control measure. Assessment in nursing often appears to be a non-exact science, due to the many elements involved in testing clinical skills. This will be the subject of the chat this week: "What are the educator's experiences, challenges and successes?" The assignment in this module is to access two online assessment instruments and to write a critical review on each one.

Blended learning principles included in the development stage (Pappas, 2014; Knowles, 2011)	**Description**	**Researcher's Comments**
	7. Designing a scenario	This module is the realisation of the scenario in the ongoing project. A template is provided to guide the process for running and piloting of the scenario. This will take place during the contact session – all scenarios will be delivered to the participants by the designing participant. The process will include pre-briefing (student preparation), discussion on the learning objectives and how they have guided the simulation, running time of the scenario, props and moulage required and consumables. Roles must also be identified. A plan for a debriefing session must be included, which will be conducted after the running of the scenario.
The process for identifying struggling participants	A challenge in online programmes is the feeling of isolation that students might experience, especially if they feel that they are not keeping up with the work load. The 'compulsory' chat room and interaction on social media will help identify the at-risk participant, as this student often does not engage with her peers in the exchanging of ideas and work related discussions. (Curran, 2013) The feedback on weekly assessments will be comprehensive, with a view to identifying and assessing weak areas that might need to be followed up with an email or telephone call.	On registration into the course, the course coordinator will phone the participants and introduce herself, leaving contact details, both an email and a cell phone number, where the coordinator can be contacted for any problem arising.
Available resources	Online resources include the following: Online databases such as Google Scholar, pub-med etc. There are numerous free online nursing simulation resources that are available, including the Nation League of Nurses site, Society of Simulation in Healthcare and the George Washington simulation repository. The discussion among the participants is a valuable online resource – collaborating and sharing of ideas.	The planned assignments during the course are designed to encourage the participants to explore the online resources and to apply them to their learning. ***Voicemails - a weekly video message*** summarising the previous week's topic, what the next module will be introducing and what the expectations for the week are. Discussing the trends that are emerging in the simulation programme reinforces the sense of community amongst the participants, as well as assisting each other with ideas for discussion. Listing of ***online resources*** to assist participants to access knowledge and not having to re-invent the wheel such as NLN, SIRC, INACSL, University of Washington, LAERDAL etc. Participants that live in the vicinity of the university that hosts the programme are invited to be part of simulation planning, development and

Blended learning principles included in the development stage (Pappas, 2014; Knowles, 2011)	Description	Researcher's Comments
		debriefing sessions that take place on the weekends or evenings, to further engage with the course coordinator and simulation practices.
Course evaluation	Course evaluation for both assessment of learning as well as course evaluation. Course evaluation will include the content, the delivery method, presentation of course material and participant support. This will be conducted in an open discussion and a written format. Course evaluation is part of the quality control measures that are essential to the improvement and relevance of the programme,	This will occur on completion of the contact session. A 'debriefing' open discussion session will be conducted, where the aim of the course will be revisited, and the course content in relation to the participant's needs will be discussed. Discussing how the participants will use the programme content in their classrooms will assist in summarising what was gained from the course. Ideas on what was good and what could be improved in the course will be discussed, and alternatives explored. A written anonymous course evaluation will also be conducted before closure.

Chapter 9 Phase 4: Expert Review, Overview of the Study, Conclusion, Limitations and Recommendations for Further Research

This final chapter begins with the expert review, which addresses the fourth research objective. This is followed by a brief overview of the research question, aims and findings, discussing whether the research objectives were achieved. The limitations and recommendations for further research are also discussed in this concluding chapter.

9.1 Expert review of the programme

The aim of an expert review is to provide an objective analysis of the programme (Mayer, 2009), drawing on the expertise and knowledge of pre-selected individuals who will be able to identify issues that the end users (participants) of the programme might experience when they use the product or service. The expert review can be regarded as a programme audit, which is usually carried out by multiple evaluators, ideally 3-5 reviewers, who work independently of each other and submit their critical analysis of the programme to the developer (Sauro, 2016). The expert review addressed the fourth objective of the study which was “To evaluate the programme through expert review”.

The advantages of including an expert review in the design of a programme are the following: it offers independent feedback to the programme designer, the review system is cost effective and time effective, the selection of the reviewers offers a greater scope for review (Sauro, 2016). In this study, two nurse educators, an e-learning specialist and a simulation end user were asked for their review.

An expert review can either take the form of a written document or be conducted through an interview; a checklist is often not regarded suitable for an expert review due to its rigidity, and lack of provision for an in-depth explanation, understanding and variations of the context by the reviewers (Gitsham, 2016, Quesenberry & Jarret, 2007). On completion of the expert review, the programme designer needs to

consolidate the comments from the reviewers, review suggestions and amend the programme accordingly to improve the usability of the programme.

The points the experts need to consider before the review commences are: Who is the programme intended to be used by? What is the context of the programme and what are the programme's objectives?

The reviewers are people that may hold specific knowledge about the subject or the issue that the programme addresses; they might also be representative of the end users of the programme. This programme was reviewed by four experts from representing different approaches to the programme to provide a comprehensive review. Therefore, the researcher purposefully selected the reviewers for their various expertise.

> Reviewer A was an e-learning expert with a PhD in the field of e-learning
>
> Reviewer B was a nurse educator with an MSc who has had vendor training in simulation
>
> Reviewer C was a nurse educator with an MSc who has had no formal training in education, but is wanting to use the methodology in her undergraduate nursing course
>
> Reviewer D is an emergency medicine care practitioner, who is involved in simulation training.

The experts selected for the review panel all received the programme online, and were asked to comment on their field of expertise. The researcher developed an expert review guide (Annexure H). The guideline explained the goal of the programme, the target population, the history and the context of the programme. The reviewers could either submit a written report or engage in an interview. Three written reviews were returned and one semi-structured interview was conducted.

The criteria that were used for the expert review were based on: The Interaction Design Foundation guidelines for conducting a Usability review (accessed on https://www.interaction-design.org/literature/article/a-quick-guide-to-conducting-a-usability-review). An e-learning expert was included in the panel to provide feedback on the programme from an instructional design/e-learning perspective

Table 9.1: Interaction Design Foundation criteria (2012)

Criteria used	**Questions asked**
Step One Define the programme	• Who are the end users – this was included in the information letter to the experts • What are the aims of the course – this was also included in the information letter • Linkages between the learning objectives and the programme objectives
Step two Walkthrough each of the stages in the programme. • Is it clear what the user must do? • Is their feedback to let the user know how they are doing?	• The usability of the e-learning platform and the navigation keys • The flow of the content modules • The relevance of the modules to the programmes goals • The relevance of learning material to the assignments • The assessment and feedback strategies for the assignments.
Step Three Overall evaluation	• Evaluation or scoring of the expert reviews feedback

The guidelines for an expert content reviewer for the programme included, but were not limited to, the following:

- Delivery method of the programme
- Discussion about the programme design
- The usability of the e-learning platform, including navigation of the site
- Overall view of the course content and relevance to nursing education
- Linkages between the learning objectives and the objective of the programme
- The flow of the content modules
- The use and variety of learning material
- The relevance of the learning material to the assignments
- The assessment strategies for the assignments
- The intended plan for tutor support and peer support in the programme
- Any other topics or issue that you feel will be of benefit to the programme designer

The responses from the reviewers are presented below, in section 9.2, with the action taken by the researcher in reply to the comment (Annexure I, Annexure J and Annexure K are the transcripts of the expert reviews). The changes that were recommended were evaluated and implemented as recommended.

9.1.1 Data analysis

The reviewers' comments were analysed, using a thematic analytical approach to data analysis. Waring and Wainwright (2008) describe template analysis as the use of a priori or predetermined codes, which were established from the review guidelines developed by the researcher. Therefore, the findings are related to the questions asked in the expert review guidelines. Overall, the reviewers gave positive feedback about the programme, mentioning that it would meet its objectives.

9.2 Findings and comments

The programme in Chapter 8 reflects the changes made by the researcher from the findings of the expert reviewers.

9.2.1 Programme design

The e-learning expert made the following comments about the programme design:

The educator expert reviewer said that the programme design was not "cluttered and not over instructional", and that the "flow was logical". She raised an issue about the quizzes being technically a bit confusing, but she did say as she worked her way through the programme they did become easier to manage.

Three of the expert reviewers commented on the use of two options in the chat rooms. One option reading "click here to enter the chat room now" and the other option reading "use more accessible interface". The researcher asked the Moodle instructor, who assisted with the design about this feature, but it appears that this is embedded in the programme and either option will get the participant to the chat room. This could be identified as a limitation of the e-learning platform as it does have the potential to create confusion; the suggestion was made to advise the participants of the options.

“The layout is good with a good font size, all of which facilitates easy reading of the programme”. Although she also made the comment that the headings needed to be aligned and to make the quiz heading capital letters to differentiate them from the answers.

A question that she raised was the use of only single attempts for the quizzes, and asked the question would it not be more beneficial to allow multiple attempts to facilitate the participants’ learning? This was included in the programme on the recommendation.

9.2.2 Delivery method of the programme

All the reviewers said that the delivery was good and that it would address an education need to train and upskill educators, without taking them out of their working environment.

The nurse educators and the simulation expert expressed concern about the level of computer skills required to manage the programme. One of the nurse educators, who felt that she wasn’t fully computer literate, did say “It is nice that all the module’s follow the same pattern so once you have learnt how to do it in the first module you should be OK”. The comment was made that there was technical support available, but only during “office hours”.

The simulation expert made the comment that the participants would have to be “self-regulated and self-motivated” due to the blended learning delivery method. This is addressed in the chat room activity that will be observed by the researcher, and contact will be made with a participant if required, to assist with them staying on track for completion.

9.2.3 Usability of the e-learning platform, including the navigational keys

The e-learning specialist made the comment about the back arrow not being visible, but the participants could use the computer back arrow. This was noted and added to the instructions in the pre-programme information.

Two of the reviewers commented that the consistency in the layout of the programme facilitates management of the navigation keys that must be learnt in the first module in order to proceed.

9.2.4 Overall view of the course content and relevance to nursing education

The nurse educator made the comment that some of the videos in the programme, although interesting, were too “high tech”, and showed high fidelity simulations that might be off putting for educators in more under-resourced areas. No South African videos are currently available, and the researcher acknowledges there is a need to develop more context specific videos for future blended learning programmes in healthcare education. One of the objectives of the programme is that each participant develops a scenario during the programme appropriate to his/her NEI’s simulation resources. The videos are intended as an illustration and an overview only.

This theme was elaborated on by the simulation expert who mae the comment that “there is a common misconception in simulation that it is all about the technology”. He suggested the inclusion of the Beaubien and Baker (2004) article on the use of low fidelity simulation for team training – which the researcher has included in the programme.

The simulation expert also said that the simulation content was relevant to simulation development. He made a comment if and asked the programme was intended for academics and lecturers in universities and nursing colleges, whether the programme would be transferrable to clinical preceptors and clinical educators in clinical practice where skills-based training is happening. The researcher’s opinion is that the constructivist and experiential framework underpinning the programme allows the participants to relate simulation to their own clinical experiences and student needs.

All the reviewers, who were considered content experts, commented positively on the modules, which were based on the best educational practices for simulation, with the addition of modules on assessment and scenario planning. One of the expert reviewers made the comment that *“the programme gets you to what you need to know to develop simulation quickly and therefore keeping your interest going”*

another said *"you feel that you can do this as it's not too complicated (which I thought it was)".* The researcher appreciated these comments as it was her intention to make a relevant simulation programme that is accessible to nurse educators.

The simulation content expert suggested the inclusion of a glossary of terms or a link to the Society for Simulation in Healthcare (SSH) online dictionary. The INACSL best practice 'Terminology' was embedded in the Introduction to Simulation module.

9.2.5 Linkages between the learning objectives and the programmes goals.

The content and simulation specialists agreed that this was achieved in the programme. Two of the reviewers made the comment that the development of a scenario by the end of the module, which would be peered reviewed, was the most positive aspect of the programme, making the programme immediately useable in the educator's work place.

9.2.6 Flow of the modules

The suggestion was made to re-organise the flow and change the debriefing module for the learning objectives as it was felt that this would be more logical from a scenario development perspective. The researcher initially had the order of the modules in the order of appearance in the scoping review findings – the researcher agreed with this comment and changed the order.

9.2.7 Use and variety of learning modules

The comments in this section were positive - the use of videos, quizzes plus the inclusion of research papers provided a variety for the participants. One of the educators suggested that the researcher include a bank of relevant reading material for the participants. This was not included in the programme as the researcher wants the participants to engage with the freely available online material. This engagement involves searching, retrieval and assessment of online resources, providing rigour and relevance to their own work environment. The researcher is also of the opinion that online, blended learning will be increasingly the preferred delivery method of

educational content in higher education, and the participants would need to be able to guide their own students in data searches and information retrieval.

One of the educators commented that she liked the use of guided questions and examples of discussions included for the chat room. She felt that this would encourage the participants to join in, and she commented that she may have felt reticent to talk in the chat room, as she wouldn't have known what to say, but the guided questions alleviated this anxiety.

9.2.8 Use of assignments for learning

The reviewers commented positively on the use of assignments as part of the scenario development "it is a good aspect of the programme that the assignments are part of the whole and linked to the final presentation".

Another comment was on the attachment of the assessment rubric to guide the participants' approach to the assignment; the comment was made "*the inclusion of marks for participation in the chat room is interesting as it will get the participants to talk to each other and share their own experiences, hopefully it won't only be the negative aspects that nurses tend to dwell on*". The researcher will monitor the discussion and, if necessary, guide the discussion into a more constructive direction.

The simulation reviewer commented that the objectives of the assignments were not clearly outlined in the programme.

The researcher took heed of the comments and suggestions made by the expert reviewers to improve the programme and to increase its relevancy to its objectives.

9.3 Overall review of the study

Simulation is an education methodology that offers students experiential clinical learning that is conducted in a safe environment and replicates many aspects of the clinical setting. Simulation is not a single methodology; it has many learning tools that enhance clinical nursing education, such as human patient simulators for complex scenarios, standardised patients for communication and interviewing skills, and task trainers for skills competency.

Simulation has grown in popularity, in both nursing and medical programmes, due to ethical issues around patient safety, supervision of students in clinical sites, the shift away from passive learning to student centred experiential learning methods, and the need for collaborative and inter professional learning in the health sciences. Despite the literature describing the benefits of simulation increasing student confidence and skills acquisition, the survey, conducted in the first phase of this study, determined that nurse educators feel challenged in fully integrating simulation in their curricula, without training.

This research was a systematic, multi-method process that led to the development of the simulation programme for educators. The research question that was asked was “What simulation programme would best address the needs of nurse educators in the undergraduate nursing programmes in South Africa?” The multi-method approach to data collection, triangulated the findings, providing completeness to the findings. An understanding of the present simulation practices was established, the literature provided insight into simulation education best practices and the expert simulation educators’ perspectives were also gathered and included in the programme.

A blended learning programme was developed from the literature reviewed for the study, and in response to a poll enquiring from educators what mode of delivery for the programme would best suit their learning needs and schedule. The programme was developed using a constructivist and experiential framework, based within the NLN/Jeffries Simulation Framework, reviewed by both simulation and education experts, and revised on their recommendations and discussion.

The research question guided the process and the selection of data collection methods that addressed the objectives of the study:

9.3.1 Research objective one

To identify the current use of simulation in the 4-year nursing curricula in SA nursing colleges and universities.

A validated survey, “The use of simulation in Nursing education: National (NCSBN) Survey” (Hayden, 2010), was selected to determine the use of simulation in the South

African undergraduate nursing programmes. The population were all nurse educators situated in a South African NEIs. The realised sample was 51 responses, from eight of the nine provinces in South Africa, and representing both colleges and universities. These findings helped provide an understanding of the context of simulation training in South Africa, and the needs of nurse educators. The results of the survey are presented in Chapter 4.

9.3.2 Research objective two

This objective explored what the international literature determines as simulation education best practices, and how the simulation experts in South Africa engage with the best practices in simulation education. Literature from January 2001 to March 2014 was retrieved and reviewed, from five databases referring to simulation educational practices, with a total of 13 articles included in the final review.

The four education simulation best practices identified were: the importance of debriefing, determining clear student objectives for simulation, integration of simulation into the curriculum and the importance of including opportunities for deliberate practice in the simulation schedule. These identified best practices then provided the basis for the resultant programme, ensuring its relevance to simulation education.

A Delphi Survey provided the means of determining how expert simulation educators, from NEIs in South Africa, perceive the identified best practices from the scoping review, and how they integrate them into their simulation practices. The Delphi questionnaires were developed from the survey and the scoping review. Some of the findings from the survey had alluded to simulation practices in South Africa not being based on the best practices, but the Delphi Survey revealed that the panel of simulation experts are using best practices in their simulation-based education. This confirms that the best practices are relevant, and indicates that there is a need for educators to be developed in terms of these best practices, to ensure the best possible student outcomes.

9.3.3 Research objective three

To explore how to prepare nurse educators to implement a best practice programme to improve their ability to use simulation in the undergraduate nursing program.

The mode of delivery for the programme was determined through an online poll of nurse educators The result was a blended learning programme, which was verified from the literature on blended learning.

The instructional design ADDIE model guided the development of the blended programme. A situational assessment was performed to address the first 3 objectives of the study. The course content was developed based on the four best practices identified in the scoping review, the educators' needs identified in the survey, and the expert educators' perceptions of the identified best practices.

The concepts and philosophies that were used in constructing the conceptual framework for the study were the NLN/Jeffries Simulation Framework, and the constructivist and experiential learning philosophies, thereby ensuring that the programme is based on sound simulation and educational principles that address the needs of the participants.

9.3.4 Research objective four

To evaluate the programme through expert review, consisting of an e-learning expert, a simulation educator and two nurse educators.

The experts selected for the review panel all received the programme online, and were asked to comment on the programme from the perspective of their specific expertise. The researcher developed an expert review guide and asked the reviewers either to submit a written report or engage in an interview. Three written reviews were returned and one expert chose to give verbal feedback in an interview. The changes that were recommended were evaluated and implemented as recommended

The programme does not stipulate what specific type of simulation design should be developed, but is guided by the needs of the educators, the resources of the NEIs and the students' needs. The programme ensures its contextual relevance to South

African nursing programme by accommodating the different facilities, resources and student demographics of the participants' context.

9.4 Contribution to knowledge

The multi-methods of data collection in the situational analysis generated new information about how South African educators are using simulation in their programmes, both from an institutional level and from the educator's perspective. The Delphi Survey provided an insight into how simulation can be used effectively in South African NEIs, and reinforces the notion that simulation is being used according to the best educational practices as described in the literature.

The original contribution of this research and programme to the body of simulation knowledge is that it addresses the demand by educators for contextually specific simulation, providing a practical approach to simulation training that meets the clinical training needs of the educator's students. Furthermore, the blended learning programme offers a relevant delivery system for the educational content that was requested by the educators in the poll, allowing educators to work on the programme at a time that fits their work and family commitments. It is anticipated, by the researcher, that blended learning will be the preferred education delivery mode of choice in universities and colleges for the in-service training of educators, due to work and time commitments.

The inclusion of a topic for discussion in each module, via the chat room develops collaboration among educators in simulation education that is lacking at present in South Africa. The survey indicated only 17.5% of educators share their scenarios thus possibly "reinventing the wheel'" in NEIs, when time for teaching and learning is always limited. The collaboration established in the programme amongst the educators should translate into a community of educators for simulation learning, where resources and ideas are shared, thus promoting the development of simulation in the nursing curricula.

The weekend contact session will bring the programme together, ensuring that the participants of the course not only have the theoretical background knowledge but also the ability to facilitate the practice of simulation learning. The contact session will also cement professional friendships that were started in the online programme.

9.5 Conclusions from the study

The educators who participated in the survey expressed a need for a simulation programme for implementing simulation, stating that although they were using simulation in their curricula the level of simulation remained predominantly at a task training level, due to the lack of training and opportunities to develop their simulation skills.

The lack of collaboration amongst the educators is evident in the survey, and reinforces the notion that simulation is being conducted in silos, contributing to the lack of simulation skills development. The absence of a community of simulation educators in South Africa means that often the process of learning about simulation design and scenario development is conducted individually and unsupported by the NEIs. This leads to frustration, which can impact negatively on the development of educational practices.

The expert evaluation of the final programme indicates that the programme does address the needs of the educators effectively and will equip the educators to use simulation in their work environment with confidence and the support of other educators in their field.

The blended learning platform was well received by the expert reviewers, and it is expected that the participants in the programme will be able to see the value of a blended learning platform from their own perspective, and translate this into providing students with more online learning in the undergraduate curriculum, furthering the concept of student-based education and self-directed learning, where students become more responsible for their own progression in their nursing programmes.

9.6 Suggestions for further practice and research

9.6.1 Education practices

Simulation requires a paradigm shift from a teacher-centred approach to facilitation of learning. It is the researcher's opinion that this aspect of education is multi-faceted, and understanding the dynamics that exist in nursing education today results in educators relying on didactic teaching methods will assist in developing ways for

shifting education focus to a more student focused approach to learning. Research that establishes the barriers and enabling factors would aid this transition. A review of the curriculum for the preparation of nurse educators in South Africa to include simulation and the use of technology in the classroom could contribute to the move away from the didactic teaching methodology toward more student-centred learning.

Expanding the simulation education programme to include insitu simulations in the practice areas, involving the clinical facilitators and the staff from the nursing units, will assist in raising awareness about simulation in practice.

Although this programme is intended for training and skills competency of nurse educators using simulation, using the identified simulation best practices, there is a need to expand this programme and research to include simulation training within medical undergraduate and postgraduate education.

9.6.2 Research

Additional research is required on making high fidelity simulation more relevant to students learning and working in Africa. The resources of the simulation laboratories, and the online scenario development tools are often geared towards resource-rich Eurocentric environments. Further research will allow educators to use the best aspects from each context to create scenarios that are relevant to the context of Africa.

Research is also needed on the development of inclusive and aligned learning outcomes for all professions involved in Interprofessional Education. Role-based biases and the use of communication techniques between the professional groups, including professional jargon and abbreviations, that could be considered exclusionary in practice and simulation, should be investigated further.

The researcher recommends repeating the survey conducted in the first phase of this study, describing the use of simulation in the undergraduate nursing curriculum, in a couple of years for evaluation of the increase in simulation use and the uptake of simulation education best practices.

9.7 Limitations of the study

The scoping review provided the international literature on best practices. Due to the lack of South African literature, data collected was from a small sample, as simulation in South African nursing education is a relatively new education modality, therefore the literature presented and analysed in this thesis may not be representative of education practices in South Africa. The researcher, through her own practices and experience, has attempted to present the literature findings with relevance to the South African nursing education environment.

Although the programme has been designed specifically for the context of South African NEIs, it is uncertain what the uptake will be among the nurse educators, especially in rural areas where the access to technology and broad-band connectivity remains a challenge.

The use of simulation terminology in the survey might have been unfamiliar to nurse educators. This might have resulted in them not responding although the majority of respondents, who did reply to the survey, appeared to understand the simulation terminology.

Although the findings can be generalised to all settings the uneven representation of universities in this study is regarded as a primary limitation, despite the researcher reaching out to the colleges for their perspective and input.

9.8 Summary

The research question that was asked in this thesis was: What education simulation programme would best address the needs of nurse educators for the undergraduate nursing programme in South Africa? It was determined that a blended-learning programme would be the preferred format, in order to meet the work and family commitments of nurse educators wanting to learn about simulation.

A resultant seven week programme was developed, and included modules on the four simulation education best practice that were determined from the scoping review namely: including debriefing and feedback in simulation, the importance of identifying clear learner objectives for simulation, the integration of simulation into the curriculum, and the inclusion of deliberate practice in simulation planning. The

programme addresses the misconception that simulation relies on technology and computer based programmes, and therefore does not focus on any specific type of simulation methodology or fidelity. One of the aims of the programme is for the nurse educator to use the resources that she has available in her NEI, and design a simulation based learning experience based on the education simulation best practices, and specific to her student's needs and her NEI's resources; thereby making the participant's learning context specific and relevant to her own education environment.

The expert panel that reviewed the blended-learning programme gave positive feedback, and all agreed that the programme would meet the needs of the nurse educators. One of the expert reviewers stated "the increase in students in the clinical placement facilities has become a problem, with too many students around the patient's bed. Simulation allows for more than one group to manage the clinical situation … and this programme gets you to what you need to know to develop simulation (skills) quickly and therefore keeping your interest going".

The programme still needs to be further tested and piloted. It is hoped that nurse educators who participate in the piloting will agree with the experts that the programme will encourage educators to share ideas and approaches to increasing the use of simulation within their NEIs creating a network of simulation champions as we integrate and develop simulation within undergraduate nursing curricula.

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Appendices

Annexure A. **Ethics Approval**

M130635M130635

R14/49 Ms Catherine H Thurling et al

HUMAN RESEARCH ETHICS COMMITTEE (MEDICAL)

CLEARANCE CERTIFICATE NO. M130635

NAME: (Principal Investigator)	Ms Catherine H Thurling et al
DEPARTMENT:	Nursing Education Faculty of Health Sciences
PROJECT TITLE:	The Design and Development of a Programme for Simulation Best Practice in South African Nursing Education Institutions
DATE CONSIDERED:	28/06/2013
DECISION:	Approved unconditionally
CONDITIONS:	
SUPERVISOR:	Dr Sue Armstrong
APPROVED BY:	Professor PE Cleaton-Jones, Chairperson, HREC (Medical)

DATE OF APPROVAL: 28/09/2013

This clearance certificate is valid for 5 years from date of approval. Extension may be applied for.

DECLARATION OF INVESTIGATORS

To be completed in duplicate and **ONE COPY** returned to the Secretary in Room 10004, 10th floor, Senate House, University

I/we fully understand the conditions under which I am/we are authorized to carry out the above-mentioned research and I/we undertake to ensure compliance with these conditions. Should any departure be contemplated, from the research protocol as approved, I/we undertake to resubmit the application to the Committee. **I agree to submit a yearly progress report**.

Principal Investigator Signature M130635Date

PLEASE QUOTE THE PROTOCOL NUMBER IN ALL ENQUIRIES

Annexure B. **Survey Instrument**

Simulation practices and Uses

Dear colleague, you are invited to participate in this survey that is examining the use and prevalence of simulation as a teaching tool in either the four year diploma or degree courses. I am a nursing educator undertaking my PhD at the University of Witwatersrand, and my topic is Designing and Developing a simulation programme that is relevant to South African nursing education needs. In order to achieve this I am undertaking a survey, in the first phase of the study, to determine the current practices in simulation by nursing educators at present, which is the survey that follows. This study has been assessed and passed by both the University's postgraduate assessor committee and the Human research for Ethics Committee. I would appreciate you taking 30 minutes to complete the survey as a nursing educator, and return it to me via Survey Monkey. By completing the survey consent is presumed.All returned forms will be anonymous, therefore assuring the anonymity of both yourselves and your Nursing Education Institution. Please feel free to involve other educators at your Nursing Education Institution if they can contribute to the topic being discussed. For any further information please contact hilary.thurling@wits.ac.za.
Your participation is appreciated.

* 1. Which of the following best describes your institution?

- ☐ Nursing College offering the 4 year diploma programme
- ☐ University offering the 4 year degree programme

* 2. Please indicate your registered student numbers in each of the 4 years of study.

First year	
Second year	
Third year	
Fourth year	

* 3. As a nurse educator are you a year coordinator or a subject course coordinator?

	Yes	No
Year coordinator	☐	☐
Subject coordinator	☐	☐

* 4. Please indicate how much traditional clinical time (in hours per year) is associated with each year in the 4 year course.
Traditional clinical hours is defined as having patient contact and providing hands on patient care.

First year	
Second year	
Third year	
Fourth year	

Simulation experiences

This section asks questions about how simulation is used in your Nursing Education Institution, please feel free to discuss your nursing institutions simulation use, with your colleagues as I am wishing to understand the general use and prevalence of simulation in South Africa.
For the purpose of my study the following definitions of simulation are used:

High Fidelity simulation: Patient care scenario that uses a standardized patient or a full body patient simulator that can be programmed to respond to affective and psychomotor changes, such as breathing chest action. Examples of high fidelity manikins include SimMan, Noelle with newborn Hal.

Medium fidelity simulation: Patient care scenario that uses a full body simulator with installed human qualities such as breath sounds without chest rise. An example of a medium fidelity simulator is VitalSim

Task trainers: part of a manikin designed for a specific psychomotor skill. For example an arm for IV insertion practice.

Definitions adapted from Debra Punt (2007) Simulation in Nursing education:113)

5. If you use high, medium fidelity simulation or task trainers in your undergraduate nursing years, please answer the following questions.

Please answer what type of fidelity simulation you use in each year of study.

	High Fidelity Simulation	Medium Fidelity Simulation	Task trainers
First year	☐	☐	☐
Second year	☐	☐	☐
third year	☐	☐	☐
Fourth year	☐	☐	☐

* 6. Using the table below, please indicate the type of simulation utelized in each of the following courses.

	High fidelity	Medium fidelity	Task trainers	None
Physical assessment	☐	☐	☐	☐
Medical/Surgical Nursing	☐	☐	☐	☐
Midwifery	☐	☐	☐	☐
Paediatric Nursing	☐	☐	☐	☐
Community Nursing	☐	☐	☐	☐
Psychosocial Nursing	☐	☐	☐	☐

7. Please describe the amount of time students are in the simulated clinical scenario for each teaching session.

- ◯ 15-30 minutes
- ◯ 31-60 minutes
- ◯ more than 60 minutes

8. Please indicate if the students participate in the simulation experience by observing the simulation being done by their classmates?

	Yes	No
Do students observe the simulation scenario performed by other students	☐	☐

9. Do observing students have a guide or tool to guide their observation?

- ☐ Yes
- ☐ No

10. Do observing students rotate through the same simulation experience and clinical scenario that they observed?

	Yes	No
They participate in the same scenario they have observed	☐	☐
They participate in a different scenario	☐	☐

11. Does your department routinely debrief students after a simulation session?

- [ ] Yes
- [ ] No

12. Do observing students participate in the debriefing session?

- [ ] Yes
- [ ] No

13. Besides using manikins what other types of simulations are being used in your nursing programmes

- [ ] Standardized patients
- [ ] CD rom
- [ ] Internet based virtual programmes
- [ ] Role playing

Other (please specify)

14. Does student time in simulation count towards clinical hours?

	Yes	No
Physical assessment	☐	☐
Medical/surgical nursing	☐	☐
Midwifery	☐	☐
Paediatric nursing	☐	☐
Psychosocial nursing	☐	☐
Community nursing	☐	☐

If you have answered yes, % of clinical time that is now simulation, if possible please comment per year.

15. Please select all the types of learning opportunities offered by your simulation laboratory

- [ ] Practice procedures such as suctioning, foley catheter insertion, medication administration
- [ ] Practice routine assessments such as heart and lung sounds expected in clinical normal and abnormal findings
- [ ] Practice patient scenarios discussed in class
- [ ] practice rare scenarios that students may not see in clinical
- [ ] Practice high risk patient scenarios
- [ ] remediation skills

Other (please specify)

16. Is performance during simulation graded?

	Pass/fail	Objective score/rating	Not graded
Formative	☐	☐	☐
Summative	☐	☐	☐

17. In your opinion what aspects of clinical nursing education must only be learned in a clinical setting?

Departmental Resources

18. Have you purchased commercially made scenarios for your course?

	Text Book	Web site	Simulation packages
No	☐	☐	☐
Yes	☐	☐	☐

19. Do you write your own scenarios?

- ☐ Yes
- ☐ No

* 20. Does your department have a training program for standardized patients?

- ☐ Yes
- ☐ No

21. In what part of the undergraduate curriculum do you use standardized patients as an instructional aid?

- ☐ We don't use standardized patients
- ☐ Communication skills
- ☐ History taking
- ☐ Physical assessment
- ☐ Individual and/or group therapy in the psycho social curriculum

Other (please specify)

22. Have you or your colleagues ever attended a simulation training workshop?

- ☐ All course coordinators involved in simulation have attended a training workshop
- ☐ Some course coordinators involved in simulation have attended a training workshop
- ☐ None of the course coordinators involved in simulation have attended a training workshop.

23. Do you exchange or share scenarios with other nursing colleges or universities offering the same courses?

- ☐ Yes
- ☐ No

24. How is the quality of the simulation session determined?

- [ ] your colleagues are asked to evaluate content prior to running a scenario
- [ ] Pilot tested
- [ ] Students are given an evaluation form at the end of the session
- [ ] None

Other (please describe)

25. Which statement best describes your opinion of the amount of simulation used in your pre registration programme?

- [ ] We should be using more simulation in our degree/diploma
- [ ] We should be using less simulation in our degree/diploma
- [ ] We are using the right amount of simulation in our degree/diploma

26. What are the barriers to increasing simulation in your programme?

- [ ] More departmental lecturers need to be trained in simulation and debriefing.
- [ ] The departmental members do not have enough time to write scenarios
- [ ] More departmental lecturers need to be trained in facilitating simulation
- [ ] Not enough staff are involved in controlling the simulation equipment
- [ ] It is difficult to schedule additional time in simulation lab as other groups are using the lab

Other (please specify)

27. Do you feel as a nursing educator that you are using the simulation equipment as it was intended to be used, and you are happy with your knowledge of simulation?

	yes	No	I need more information on how the manikins operate?	I need more information on simulation practices?
Are you using your simulation equipment as it was intended to be used?	☐	☐	☐	☐
Are you happy with your knowledge of simulation practices?	☐	☐	☐	☐

Other (please specify)

28. Which of the following best describes the geographic location of your programme?

- [ ] Urban/metropolitan area
- [ ] Suburban area
- [ ] Rural area

Annexure C. **Permission from Hayden to use Instrument**

FW: Request to use Survey Intrument.

Hilary Thurling [hthurling@mweb.co.za]
Sent: 23 January 2013 05:58 AM
To: Hilary Thurling
Attachments: NCSBN Prelicensure Simulat~1.pdf (109 KB)

From: Jennifer Hayden [mailto:jhayden@ncsbn.org]
Sent: 22 January 2013 04:57 PM
To: hthurling@mweb.co.za
Subject: RE: Request to use Survey Intrument.

Dear Hilary,
I have attached the survey that I used to assess the use of simulation in prelicensure nursing programs in the US. You may use it for your dissertation research.
Please be sure to cite the survey as belonging to NCSBN in any of your work. I am looking forward to your results.
Best of luck with your research,
Jennifer

Jennifer Hayden, MSN, RN
Research Associate
National Simulation Study Project Director
National Council of State Boards of Nursing
312-525-3709

From: Hilary Thurling [mailto:hthurling@mweb.co.za]
Sent: Friday, January 18, 2013 11:56 PM
To: Jennifer Hayden
Cc: hilary.thurling@wits.ac.za
Subject: Request to use Survey Intrument.

Dear Jennifer,

I hope 2013 has had a good start for yourself.

I wrote to you in September 2012, outlining my PhD proposal, (see below).
I have read extensively and I still believe that your survey instrument you used in your National Simulation Study will be appropriate for my study.
I will be using it in my first phase, in order to determine the "what and how" of simulation in South Africa at present. I would first pilot the instruments in a small
sample of clinical simulation educators to determine the validity for the South African context prior to including it in my study. If you are willing to
share the instrument, at all stages of my study, I will keep you informed of any possible changes required for the South African context and you will be acknowledged as the author for the instrument,
could you also please sent me the citation for referencing?

I have presented my proposal for the International Sanpad Research Committee as well as our National Research Funding board. The feedback has, fortunately been good, and I
am now preparing the next step. I have attached the assessment rubic from the Sanpad Committee for your

Annexure D. **Poll (SurveyMonkey®)**

Opinion Survey on a mode of delivery for a programme for simulation

* 1. Dear Nursing educators.

The study that I am presently involved in, is designing a educational programme to equip nursing educators to be able to use simulation in their NEIs.

The scoping review conducted in my data collection phase of the study identified four best simulation education practices that will be included in the resultant programme. The best practices are: debriefing for learning, integration of simulation into the curricula, identifying learners objectives to be achieved with simulation, and the inclusion of deliberate practice in the students learning activities and schedules.

I have established the need for a simulation programme from both urban and rural nursing colleges and universities.

the question I would like you to give some consideration to is -

"What advice would you give in regards to the mode of delivery of the simulation programme?"

As educators you are aware that the programme could be delivered in a onsite face to face mode, an on-line programme or in a blended format combining both on line aspects and a contact session for the practical aspect of simulation.

I would really appreciate your suggestions and input into this question about the mode of delivery for a programme.

- ◯ Face to face
- ◯ Blended learning (on-line with contact sessions)
- ◯ On-line
- ◯ if you would like to add a comment please go to question 2 Thank you

2. Please add any comment you would like to add to the discussion on your preference. Thank you.

Annexure E. **Invitation to Participate in Delphi Study**

Invitation to participate in a Delphi Study.

Research Title: The Design and Development of a Programme for Simulation best practice in South African Nursing Education Institutions

Student researcher: Catherine Hilary Thurling

Supervisors: Sue Armstrong (PhD), Gayle Langley (PhD)

Dear Participant,

I am inviting you as an educator that has been involved in simulation education in nursing education to participate in the research project described below. I have completed an scoping literature review and establish four simulation best practices in both the undergraduate nursing and medical literature. Your input about the best practices and if you apply them in your simulation education will assist me in developing a simulation programme that can be accessed by nurse educators both in nursing colleges and universities.

What is the research about: As you are aware concerns have arisen over the availability of suitable placement sites for undergraduate student nurses. New teaching methods need to be explored to ensure the relevance of the clinical practice component to today's health science needs. Simulation and the transfer of nursing skills in a simulation laboratory has been considered an answer to the above concerns. This research will explore the current use of simulation in South Africa, and through a scoping review and this Delphi Study determine what nursing educators perceive as best practice. The findings will assist in the development of a contextually relevant evidence based programme for nursing education in the South African undergraduate four year programmes.

Are there any risks associated with participating in this research? No foreseeable risk is anticipated from participating in this study, the study participants will need to spend some time completing the various round of the Delphi study. Confidentiality of study participants will be strictly maintained.

How much time will be required from you? I estimate that the whole process for reviewing the responses to the Delphi study will take approximately 3 months, each round should take between 30 and 60 minutes to complete and we expect to have 2 or 3 rounds.

How will confidentiality be maintained? The findings from this study will be disseminated through presentations and publications and the researcher will ensure that the data are non-identifiable. When summarizing the feedback from the expert panel an aggregate of individual views will be taken, and no identifying information will be included.

May I withdraw from the study? Your participation in this study as a member of the expert panel is completely voluntary, and you may withdraw without any adverse consequences.

If you have any complaints or concerns about the study. The study has been approved by the University of Witwatersrand Ethics Committee. If you have any concerns or complaints about the study please contact The Chair of the Ethics Committee on 011 717 1112.

Who to contact if you have any further questions about the study? Please contact Hilary Thurling, the details are below

Department of Nursing Education
School of Therapeutic health Sciences
Medical School campus
7 York Road
Parktown
011 488 4269

Hilary.thurling@wits.ac.za

If you are willing to participate please can you send me an email, indicating your consent to participate, I will then forward you the first questionnaire.

Annexure F. **Delphi Survey - Round One**

DELPHI ROUND ONE: SIMULATION IN NURSING EDUCATION

Question # 1 – 5	Demographic Information 1. Age 2. Are you situated at a university or college 3. In what South African province are you a nurse educator 4. What is your highest level of education? Diploma/Bachelor's degree/MSc/PhD 5. Years of simulation experience.	
Part 1: DEBRIEFING in simulation		
QUESTION # 6 The **aim** of debriefing as a simulation best practice Please fill in responses below.	Literature reviewed for this Delphi study has identified the following as aims of debriefing. Please indicate your agreement with the statement below. (Strongly agree, Agree, Neutral, Disagree, Strongly disagree) E (below). Is for your any comments, or observations you would like to add:	
	A. To enhance learner self confidence	
	B. To close the gap between expected learner performance and actual performance	
	B. Summarise learning that should have occurred	
	C. To investigate the bases the for a learners performance gap	
	D. To identify learners attitudes skills and knowledge through discussion	
	E. To allow the learner an opportunity to consciously reflect on their actions and verbalise consequences of both their positive and negative actions	
	F. Comment	
QUESTION # 7 **Debriefing** includes the following **features.** Please fill in responses below	The following have been identified as part of the debriefing process. Please indicate if you: Strongly agree, Agree, Neutral, Disagree, Strongly disagree D (below) Is for any comments, or observations you would like to add:	
	A. Includes a discussion on observed clinical skills, knowledge deficits, level of self-confidence, and student feedback of the simulation experience.	
	B. A discussion on both the learners' positive and negative observed actions.	
	C. Focused instruction to address the learner's knowledge gap.	
	D. Comment:	

QUESTION # 8 Pre-determined **learner objective guide** the debriefing process	The role of learner objectives in the debriefing process. Please indicate in: Strongly agree, Agree, Neutral, Disagree, Strongly disagree
	A. Do you agree with the statement that **learner's objectives** should guide the debriefing process?
	B. Debriefing should focus on the participants **pre-set objectives and outcomes** C. Comment

Part II : The importance clearly identifying learner objectives	
QUESTION # 9 Time required for student preparation in relation to identified learning objectives	The learning objectives are delivered to the learners prior to the simulation allowing for the learner to prepare: Please comment on what you feel is the most appropriate length of time required for learner preparation in your experience.
QUESTION #10	How do you think learner objectives are best determined?
Part III : Integration of simulation into the nursing curriculum	
QUESTION #11	Please indicate if you: Strongly agree, Agree, Neutral, Disagree, Strongly disagree with the following statement: Simulation should be integrated at course level rather than in the entire curriculum? Rating: Comment:

QUESTION # 12	To fully integrate simulation into the curriculum do you believe that learner's performance evaluation must be a feature of simulation? Yes/No Please add any comments to add to the discussion
QUESTION # 13	Do you think that simulation credits/hours should be a required course component for undergraduate nurses? Yes or No Comment:

QUESTION # 14	Please rank the following statements about barriers to curriculum integration in order 1 indicating the lowest barrier and 7 the biggest barrier, or indicate N/A (not applicable) A. Staff inertia B. Organisational barriers C. Pressure of clinical work demands D. Perceptions of simulation being less valuable than clinical practice E. Staff not being trained sufficiently to fully embed simulation into their Curriculum F. Lack of resources, space and technology G. Large student numbers and issues of rotating students through the simulation encounter.	Ranking A. B. C. D. E F G.

Part IV : The inclusion of deliberate practice in simulation

QUESTION # 15	Please indicate if you use deliberate practice in your simulation environment? Yes or No
QUESTION # 16	What do you understand by the term deliberate practice?
QUESTION # 17	Please indicate if you: Strongly agree, Agree, Neutral, Disagree, Strongly disagree with the following statement: Rather than teaching a large number of skills that are rarely used or practiced, students should become experts in high-use skills, using deliberate practice. Comments:

Part V : GENERAL	
QUESTION # 18	What in your opinion is the greatest result in relation to student outcomes, which you have noticed since using simulation?

Annexure G. **Delphi Survey - Round Two**

ROUND TWO DELPHI STUDY Nursing Simulation Study

Dear Simulation Experts,
Thank you for completing round one of my Delphi Study for my PhD research titled: The Design and Development of a Programme for Simulation Best Practice in South African Nursing Education Institutions.

This second round of the Delphi is to clarify areas where consensus was not achieved in round one.

I would appreciate it if you could elaborate on the following five points describing what you understand by the following concepts in question 1 – 5.
Once again I thank you for taking the time to participate in this study.

Hilary Thurling
University of Witwatersrand
011488 4269 (Hilary.thurling@wits.ac.za)

Question One: DEBRIEFING in simulation

In Round One there appeared to be outliers as to what was understood by debriefing in simulation.
In your opinion how would you best describe the purpose of debriefing?

QUESTION TWO: Defining Learner objectives

Can you discuss the process of determining your learner objectives for simulation?
Do you design you scenario to meet your learner objectives, or do you determine leaner objectives extrapolated from an existing case based study or scenario?

Question Three: Integration of simulation into the Curriculum

Do you consider it important to integrate the use of simulation into the **planning phase of** curriculum development or can it be added **after the curriculum is approved?** – Please give reasons for your answer.

Question Four: Deliberate practice

Deliberate practice is defined as: "not merely mindless repetition of a certain task, but a focused approach to training aimed at reaching a well-defined goal". (Issenberg SB, McGaghie WC, Gordon DL, Symes S, Petrusa ER, Hart IR, Harden RM. 2002. Effectiveness of a cardiology review course for internal medicine residents using simulation technology and deliberate practice. Teach Learn Med).
Are you in agreement with this definition? How do you interpret and include the concept of deliberate practice in your simulation practice?

Question Five: Use simulation for rare/critical situations

In round one there was no consensus on the use of simulation to teach undergraduate student nurses competency in **rare but critical situations** in order to increase their competency and management of a critical ill, but not routine patient, or whether simulation time should be spent achieving **mastery of the common nursing skills** that nurses will be using throughout their undergraduate course.

What is your opinion on this, please can you elaborate?

Annexure H. **Expert Review Guide**

Expert Review for Blended Learning Programme:

Simulation Training for Professional Educators

Thank you for accepting my invitation to review the above titled programme.

The goal of the programme is the following:

On completion of the programme participants will be able to apply simulation best practices, knowledge and skills to meet the learning needs of their undergraduate students.

The target audience or participants;

Nursing educators working in either a college or university in the undergraduate four year nursing programme

The following assumptions are made by the programme designer

- All participants will be nursing educators wanting to use simulation in their curricula and teaching environment
- The participants will have completed an advanced diploma in nursing education and therefore will have base line knowledge of education philosophies and teaching methodologies.
- The participants are currently teaching in the undergraduate nursing R425 (four year degree or diploma) course and have identified the need to expand their teaching methodologies to meet the changing needs of their students.

History and context of this programme:

A situational analysis was conducted by the programme designer prior to the development of the programme, which included a survey of simulation prevalence, practices and uses in the undergraduate nursing programmes, to establish the need for this programme, a scoping literature review to establish simulation best educational practices, plus a Delphi study to determine how the expert simulation educators are using simulation in their undergraduate nursing programmes.

A survey poll was conducted on line to determine the preferred mode of delivery for the programme, which was as selected as a blended learning programme

Distinctive characteristics of the programme:

The programme is intended to be context specific to the undergraduate nursing curriculum. The participants identify their own education need that they believe simulation will address. The participants then work on developing both their simulation

knowledge and skills over the course of the seven week programme with the end result being a practice ready scenario that has been developed and piloted during the programme.

The asynchronous blended learning platform allows the participants the flexibility to work in their own time, and contact each other in the chat rooms to share and learn from each other.

The programme is focused on the identified four best education simulation practices that were established in the situational analysis. Namely: the importance of debriefing, identification of clear learner objectives, integration of simulation into the curriculum and the inclusion of deliberate practice in a simulation programme.

Your expert review

Guidelines as an expert content reviewer for the programme can include, **but are not limited** to the following:

- Discussion about the programme design

- Linkages between the learning objectives and the objective of the programme
- The flow of the content modules
- The relevance of the content modules to the programme's goal
- The use and variety of learning material
- The relevance of the learning material to the assignments
- The assessment strategies for the assignments
- The usability of the e-learning platform including navigation of the site
- The intended plan for tutor support and peer support in the programme
- Any other topics or issue that you feel will be of benefit to the programme designer

Thank you, I would appreciate it if you could give me feedback on this programme at your earliest convenience

Thank you

Hilary Thurling.

Simulation Training for Professional Educators

Expert Review of Blended Learning Programme

General Comments

1. Thank you for giving me the opportunity to review your programme on simulation training for Professional Educators. This is currently very relevant not only to nursing but other disciplines in Health Sciences.
2. The design and the format of the program has been well thought out and participants can get guidance and help within 24hours with technological problems.
3. As different types of learning have been incorporated into this programme participants will gain experience in communicating differently and learning from different education formats. This shows educators how blended learning can keep the topic interesting.
4. The minimum computer literacy required for managing the programme might be an issue with some participants, but the consistency of the modules will assist them develop their skills.

Programme design / Course Content / Relevance of content to Nursing Education

1. The module design is the same throughout the programme, which provides consistency, and the participants can thus gain experience and competency in the new technological aspects in the programme.
2. The icons in the program are not common ones, but help is available and once familiar with the module flow the participants become familiar with them as they are used consistently throughout the programme.
3. The content in all the modules is extremely relevant to the topic. The content is also at the level understandable by novice simulation users. The references at the end of the various reading material and the inclusion of articles, allows the participants to seek other articles on the topic, which provides a more advanced insight into simulation if required. This allows the participant to advance at a pace that is appropriate for the individual.
4. The programme gets you to what you need to know to develop simulation quickly and therefore keeping your interest going, I think that this programme makes you feel that you can do this as it's not too complicated (which I thought it was).
5. The content of this programme is extremely relevant to nursing education especially when linked to the clinical setting. The increase of students to the number of clinical placement facilities has become a problem, with too many students being present around a hospital bed. Simulation allows for more than

one group to experience and manage clinical situations at the same time through video links and live viewing in a separate room. Also, skills that cannot always be accessed in the clinical setting but essential in the nursing programme can be practiced many times over and corrected in a safe secure environment as well.

6. The use of chat-rooms in the programme is interesting and the inclusion of guiding questions for the chat is important, because participants may be reluctant to talk in the chatroom initially not knowing what to say.

Flow of the content modules/ Relevance to the programme's goals / Variety of learning material

1. The flow of the modules is satisfactory as they start with an introduction and a background, but I suggest the second module, is the module on learning objectives as this is central to simulation design. There are learning objectives in each module, that need to be achieved by the participant and from them the individual can devise their own goals which they would like to achieve.
2. This programme's content is relevant to the programme's goals. This is especially evident in the articles and the different ways that participants can communication with each other in this programme.

Relevance to the learning material to the assignments / Assessment strategies for assignments

1. There is more than enough learning material available for the assignments.
2. The availability of synchronized and asynchronized chat platforms allows participants to gain knowledge in a more non-formal manner, which can be sometimes more valuable than an article.

The usability of the e-learning platform including navigation of the site

1. The e-learning platform is not a commonly used platform but once the participant has registered and uses the programme, it does become easier. Also there is consistency between the different modules with repetitive use of navigation buttons, and the module's follow the same pattern so once you have learnt how to do it in the first module you should be OK.
2. For participants that have used this platform for learning before, these challenges will be minimal.

The intended plan for tutor support and peer support in the programme

1. As stated previously, the availability for correspondence and feedback from the program designer is very effective and efficient. The availability of technical help

is also a positive aspect of this program. Not many programmes give participants feedback or assistance within 24hours.

2. The synchronized chat platform is also unique in that immediate corresponance and assistance is available.

Any other topic or issue that you will feel will be of benefit to the programme designer

1. A glossary with common simulation terms will be helpful for novices so that when terms are stated the participant will have an idea what the authors are describing.
2. Determining the participants' computer literacy will also be useful for the programmer because a certain level of computer literacy is required to navigate the programme.

Annexure I. **Expert Review – Simulation Specialist**

EXPERT REVIEW

SIMULATION SPECIALIST

Reviewer: Emergency medical care practitioner. (BTech EMC). Simulation training: (Drexel 2012) (University of Free State). Invited by Laerdal to join a concept workshop as part of the European Union NESTLED simulation project (November 2015).

The programme's goal was described as: The trainer would be able to apply simulation best practices, knowledge and skills to meet the learning needs of their students

- This programme would assist the trainer in achieving this goal

Reviewers comments:

Scope of the programme and the intended end users: Mention is made of the participants being academics and lecturers situated in the nursing colleges and universities. Simulation based skills training is happening in clinical practice (clinical preceptors, clinical educators, and tutors), can this programme be transferred to clinic based learning?

Participants knowledge of learning theories relevant to practice-based learning and simulation-based learning may need to be supported

What about "Preparation of learners for simulation?" – orientation to the simulation environment and simulators, establishing a fiction contract with learners and briefing learners for simulation.

Delivery method is good – but it does assume that the participants are self-regulated and self-motivated learners.

The development of a scenario as an on-going project is good, as the students will be able to use simulation on return to their classrooms.

Introductory video – is great.

The programme should address the use of low technology simulation to develop and facilitate high fidelity (authenticity) simulation (immersive experiences with suspension of belief). This is a common misconception in simulation education, that it is all about the technology, and it is one of the barriers to the development of simulation. A reference to consider including is: Beaubien J.M and Baker D.P (2004) The use of simulation for training teamwork skills in health care: How low can you go? Qual & Safety in health care 13(1):i151-i156.

The distinction between **collaboration and individual** work required throughout the programme is not clear. Although the assessment rubric mentions collaboration, the details and scope of the collaboration should be clarified. For example is the scenario development individual or collaborative, and if it is collaborative how will the resources and content be decided for presentation?

The inclusion of a **glossary of simulation terms** should be considered, and embedded in the overview to the programme. The INACSL best standard Number One addresses terminology and/or the SSH Simulation dictionary.

Quiz: some of the questions are misleading

> Question 5 (pre knowledge quiz) change wording to: "contextual appropriateness" as answer b) is a function of a)
>
> Question 6 (pre-knowledge) High fidelity simulation refers to simulation technology and realism therefore all options are appropriate
>
> Question 7 Typo delete the word "you"
>
> Question 3 (Module 3) Differentiate between 'high fidelity simulator' and 'human patient simulator"

The programme assignments: The programme has an ongoing assignment that is introduced in the first module, which is a practical education tool, but it is not clear if this is an individual or group assignment. Do the module assignments form part of this ongoing assignment? Each module's assignment needs to have a specific outcome that is linked to the rubric (this was achieved in module four and seven)

Module Six: How does the rubric address omissions and critical safety points? Incorrect drug safety, dose, rate and procedure etc?

Create one comprehensive rubric for the 'on-going assignment" that incorporates the modules rubrics thus making the assignments a comprehensive part of the whole. This will also provide a 'road map' for the participants. Rubric must clearly reflect outcomes for each module.

Assessment: The designer should state upfront if the marks allocated for the assignment are formative or summative.

Debriefing: It is important to consider if debriefing is about self-reflection or guided reflection by the debriefing facilitator.

Deliberate practice: What about including 'mastery learning' as described by McGhagie et al 2010 Medical Education 44:50-63, as complementary to "deliberate practice".

Ethical Issues surrounding simulation: These have not been addressed in this programme, the affective domain of professionalism and how will the participants manage mistakes in simulation are important elements to simulation. Ethical considerations about the realism and authenticity of simulation learning as applied to the real world i.e what the students learn in simulation must replicate what they will do in the clinical environment, should be addressed with the particpants.

Annexure J. **Expert Review – E-Learning Specialist**

Expert Review Feedback

E-learning specialist

The expert reviewer viewed the programme in instructor mode and in student mode two weeks before the feedback

Screen design

Includes the following elements:

- 'white space' – refers to the space that is not written on
- text density
- the use of headings and paragraphs
- text design

Conclusion: The layout is good with a good font size, all of which facilitates easy reading of the programme.

Suggestion: Make the quiz heading capital letters to separate the questions and answers.

Question: For the quizzes, can students try the quiz multiple times and submit their best attempt? It is not clear if this was considered in the programme design.

Navigation

- The side navigation panel is user friendly, with an icon mouse-over function that explains the icons function. It was noted that this function is not available in the body of the programme.
- The icons are used consistently throughout the programme.
- An issue that was noted: it is not possible to navigate between the subheadings via the navigation page without going back to the section heading (This might be a limitation of the Moodle platform, the absence of a 'next button' on the page layout)

Other

Use of Chatrooms

There are two options available to the participants that is confusing. It is suggested that the chatroom be limited to only one option.

Assignment upload

This is consistent throughout the programme

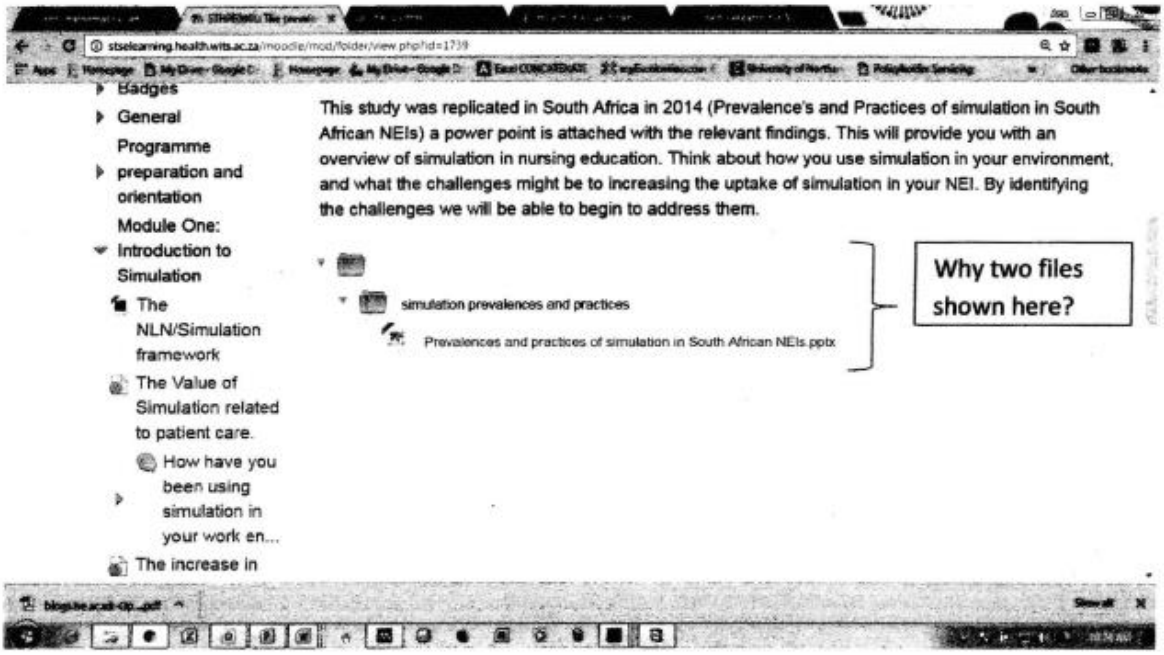
Release of modules and student feedback

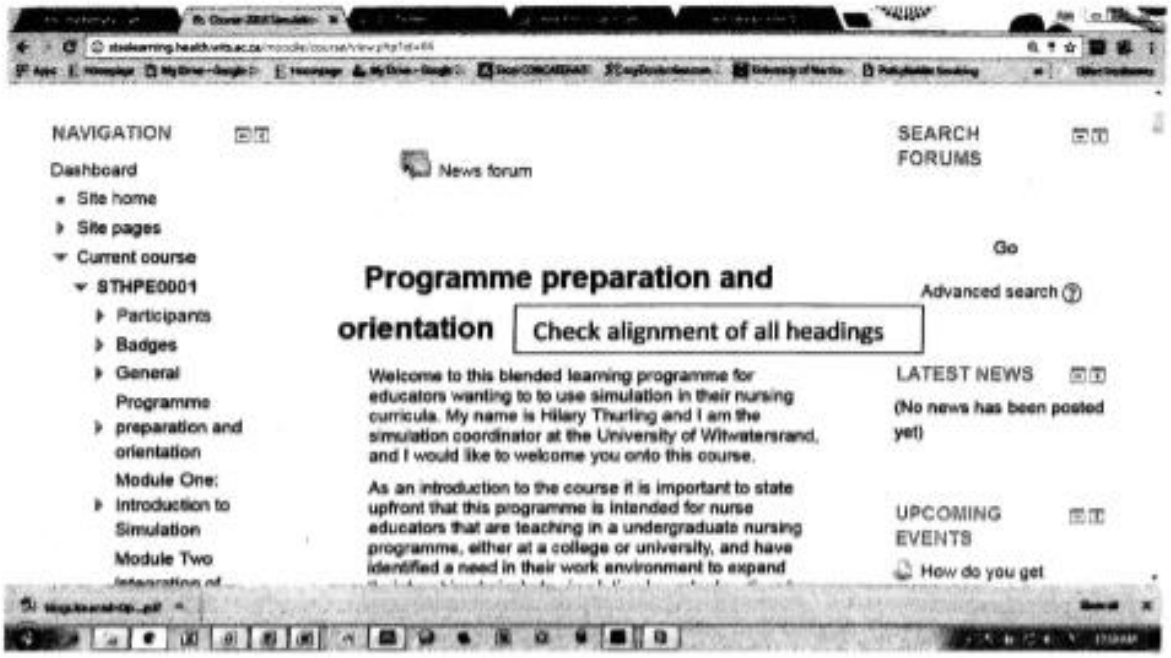
These functions were not able to be assessed as the programme is not yet live.

Overall evaluation of the programme from an e-learning perspective

This evaluation focused mainly on the interface design of the programme, and excluded the pedagogical design and multimedia design of the programme.

Navigation is good, allowing the user to move around with minuum difficulty. The inclusion of the navigation pane allows users to find out where they are and what sections of the course still need to be covered. All the hyperlinks that were tested worked. The screen layout is consistent and text design promotes readability.




NAVIGATION
Dashboard
Site home
Site pages
Current course
STHPE0001
Participants
Badges
General
Programme preparation and orientation
Module One: Introduction to Simulation
Module Two
News forum
SEARCH FORUMS
Go
Advanced search
Programme preparation and orientation
Check alignment of all headings
Welcome to this blended learning programme for educators wanting to to use simulation in their nursing curricula. My name is Hilary Thurling and I am the simulation coordinator at the University of Witwatersrand, and I would like to welcome you onto this course.
As an introduction to the course it is important to state upfront that this programme is intended for nurse educators that are teaching in a undergraduate nursing programme, either at a college or university, and have identified a need in their work environment to expand
LATEST NEWS
(No news has been posted yet)
UPCOMING EVENTS
How do you get


NAVIGATION
Dashboard
Site home
Site pages
Current course
STHPE0001
Participants
Badges
General
Programme preparation and orientation
Tell us about yourself.
Click here to enter the chat
Tell us about yourself.
Welome to the programme
This is the start of your simulation journey and hopefully you are excited about the next seven weeks. We are thrilled to have you on board and would love to hear from you - so please tell us a bit about yourself and what brought you here to this programme, for example what are you most excited about learning over the next 6 weeks, what are your educational needs where are you working etc..
Click here to enter the chat now
Use more accessible interface
View past chat sessions
Why two options??

Annexure K. **Expert Review – Nursing Educator**

Reviewer a nursing educator with a strong interest in simulation but has not received any training.

R = researcher

ER = expert reviewer

R: Thank you for previewing the programme designed for nursing educators who want to include simulation in their NEIs but have not had any formal training in simulation.

Prior to participating in the programme can you tell me what simulation experience you have had?

ER:

R: I am basing our discussion on an online evaluation form but please feel free to add any additional comments about the programme that you feel are important.

To begin: Do you know what the objective of the programme was?

ER: Yes, ……..

R: Do you think that this was achieved?

ER: Yes, I do think that I know more about simulation now than I did before the programme. The development of a scenario is a good idea as this is where I know I was battling – I was using case studies from the hospital and trying to adapt them to our simulation equipment, which didn't really work. I think I didn't understand the importance of learner objectives in simulation, also I was using too many learning objectives which just makes the scenario complicated. Yes …. So this has helped.

R: The programme is designed around what I think is a need for educators to share their knowledge and in simulation scenarios. Is this important to you?

ER: Not always, I like to work out what I need to do therefore I will know it is aligned to our macro and micro curriculum, and it is relevant - but in simulation this is different. It is difficult and time consuming making scenarios and templates so I am happy to share. Simulation is also new we have to learn from each other. The scenarios on the internet are often not relevant and the drugs are different. I'll share but I will need people to share with me. This doesn't often happen in nursing!

R: Chat rooms were purposefully inserted in each template – do you think they will work as a way of getting the participants to get to know each other and therefore more approachable when you need assistance, or a scenario?

ER: In theory it should but in real life…..?

R: Can we discuss the language in the programme? Was it easy to comprehend?

ER: It was easy. It was chatty and familiar, not threatening.

R: And the content was that easy to understand?

ER: Yes, but I think you need to add definitions of what types of simulation there is. I'm not sure about what is high fidelity low fidelity etc, and they are mentioned frequently in the programme.

R: OK that is a good point, I will address that. On another point do you think that the programme is relevant to your educational needs?

ER: That depends on how much work you put into the course, we need to add to the big assignment each week, I think this is where the relevance comes in. You can make it as relevant as you want.

R: So you didn't really feel that the programme would be both applicable to a urban university or a rural college?

ER: Yes, I suppose it is, because you work from your college and with your resources.

R: Can we talk about the modules. Did they flow and build on each other?

ER: Yes they did, although you could really do them in any order. The content was good and overall it gave you a consolidated idea of how to use simulation, which was the aim of the course.

R: What did you think about the visual impact of the programme?

ER: Good, it was easy on the eye, not cluttered the font size was good, there was anything distracting and the reading quality was good.

R: How did you find the navigation buttons?

ER: Very difficult and confusing, initially I couldn't get back to the front of the module easily, I did manage a bit better but it is still complicated. I think that that is a big draw back to the programme.

The chat rooms are also complicated to get into, I think we would be able to see the chat from everyone when you log in, and not have to open every chat singularly we don't have time! That needs to be sorted out. You need to have quite advanced computer skills to manage the programme.

R: Thank you for the valuable comments I will talk to the programme technician.

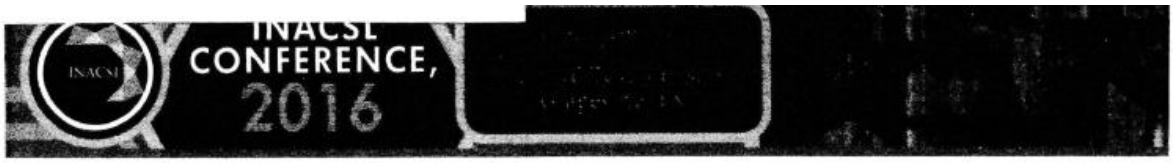
R: Did you experience the same problem with the hyperlinks?

ER: No they were alright

R: Do you think there was enough variety of different teaching eg videos, power points etc?

ER: Yes I like the different was you presented the information. Just a point maybe add an additional reading list for us, it would make it easier for us to get a broader idea of simulation.

Annexure L. **Various Presentations**



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Education Track

Concurrent Sessions 3

Using Video for Deliberate Practice and Summative Examinations

Thursday, June 16 3:35 PM - 4:00 PM Room: Ft. Worth 5/6/7

Co-Author(s):

Sue Armstrong, PhD

Dr, University of Witwatersrand, Joahnnesburg, South Africa

Presenting Author(s):

Catherine Hilary Thurling, RN, MSc, CHSE

faculty, University of Witwatersrand, Johannesburg, South Africa

Deliberate practice is a focused skills effort with the aim being for students to develop skills competency, and performance expertise at an expert level (Pelley [updated] 2013). It requires motivation from the students to intentionally improve their skills beyond their current levels (Clapper and Kardong-Edgren 2012). Student nurse's clinical skills often do not match the required level of proficiency required for clinical practice (Liou, Chang, Chen 2013) Objectives of the study: to get undergraduate nurses to take ownership of their need for mastery of their nursing skills and apply self-directed learning principles to obtaining feedback and additional assistance from faculty when needed. Methods: Undergraduate student nurses were asked to participate in the programme and given a USB flash drive at the beginning of the semester and a list of essential skills that they would need to master for their summative exam. Skills and associated theory were taught in the skills lab. The students were then required to submit a short video of themselves performing the essential skills, explaining their actions and associated rationale throughout the video, for their summative clinical examination – the pass mark being 80% for each skill.
Faculty members were available to correct and give feedback on videos during the semester if the students initiated the contact. The students were also asked to keep a reflective journal of their skills practice.
Results the findings are incomplete at present, but initial findings indicate the students increased their practice and requested more feedback, than they have in previous years.

Integration of Simulation into the Nursing Curriculum: What Does It Actually Mean?

Saturday, 23 July 2016

Catherine Hilary Thurling, MSc, RN, CHSE
Department of Nursing Education, University of Witwatersrand, Johannesburg, South Africa

All authors of this study are Part of the National League for Nurses Simulation Leadership Program 2015, this poster is part of an ongoing project in this programme.

Purpose: The purpose of this study is to determine why there still appears to be resitance from educators to integrating simulation into their curricula. As part of the National League of Nursing Simulation leadership programme we questioned why there was this lack of curricular integration and developed a step wise approach for simulation integration.

Methods: Ethics approval was obtained from the participating Nursing Education Institutions prior to the study commencing. A web based survey was created based on what the literature indicates as possible reasons for limited integration of simulation. The survey was piloted, the aim was to establish educator's views of curricular placement of simulation, including their current uses of simulation, and their thoughts on what common concepts could be included in simulation. Their perceived barriers to curricular integration were also explored using either focus groups or semi structured interviews and open ended questions.

Results: The total sample of respondents was 126 (N=126). 39% of the participants who responded to the survey were novice simulation educators. The barriers to simulation integration were identified as a lack of training and support for the educators.

The reason for wanting to develop simulation in their teaching methods was too improve the learners nursing skills (35%) and the competition for clinical places (33%). Of the total responders 41% stated that they would like to work with a simulation team and (58%) a simulation coordinator to assist them with integration of simulation into their curriculum.

The common themes that were identified by the respondents and could be embedded in all simulation soenarios were the following: Communication skills, patient safety, the nurses scope of practice, understanding diverse cultures, and translating evidence into practice.

Conclusion: ferent nursing education programs reviewed. While this collaboration was the first to create an international comparison table it reinforced the global aspects to educating nursing students. However the question remained of how best to integrate simulation in to the curriculum.

Based on the survey results we identified a step-wise method that begins developing a simulation integration plan where a simulation team would be identified through their interest in using simulation, a course would be selected that would be used to develop their knowledge and simulation skills, as well as scenario development. On-going support and review and evaluation would be essential for the success of this approach for curricula integration.

See more of: Research Poster Session 2
See more of: Research Sessions: Oral Paper & Posters

place in an attempt to negate these anticipated difficulties. The measures included: All selected Nursing Colleges and Universities were sent a letter via email by the researcher informing them of the study and a copy of the survey. The researcher was present at as many nursing functions and conferences as possible, in order to promote the study, and to ask interested nurse educators for their current email addresses as . All contacts were sent follow-up emails and a copy of the survey. Where possible, emails were sent to both work and home email addresses. Prevalence measures: Non-manikin simulation - role playing was used by 90.91% of respondents followed by 54.55% who use standardised patients in their teaching. Computer-based simulation tools such as CD-ROMs and internet-based virtual programmes were only used by 43.18% and 20.45% of educators respectively. High fidelity and medium fidelity simulators are most commonly used in midwifery (36.11% and 50.00% respectively) Debriefing is not routinely performed after simulation experiences in South African Nursing Education Institutions. Of the participants who replied to the question, 43.59% debrief students while 56.41% do not accommodate debriefing. Simulation is most commonly not graded (61.90%) and when it is graded, 26.32% of educators give an objective graded score and 28.95% give a pass/fail grade. 95.23% of respondents stated that they should be using more simulation with only 4.77% stating that they were using just the right amount of simulation in their programme, The percentage of simulation hours substituted for clinical hours ranged from 1% to 30% with the average being 15.2%. The biggest barrier to not using simulation was a lack of training in both simulation techniques and debriefing (75.00%) Conclusion: It is not surprising that the midwifery curriculum has the highest use of simulation, as exposure to clinical emergencies may be infrequent. Therefore simulation-based learning has an essential role to play in the curriculum, to help a nurse gain the necessary confidence and knowledge needed to respond to a given emergency. But the overall results of this study indicate that South African Nursing education Institutions are not using simulation in undergraduate nursing courses optimally this may be due to limited access to high-fidelity simulator by educators as they are often expensive to buy and maintain but also, high-fidelity simulation is a relatively new technology in nursing education and nurse educators might not have been sufficiently trained in the methodology to feel comfortable using the technology thus reinforcing the need to expand context specifi, hands-on simulation training programmes to both universities

EYWORDS:

Simulation (/vhl/simple-search?filter_field_0=subject&filter_type_0=equals&filter_value_0=Simulation) ; Nursing education (/vhl/simple-search?filter_field_0=subject&filter_type_0=equals&filter_value_0=Nursing+education) ; Student nurses

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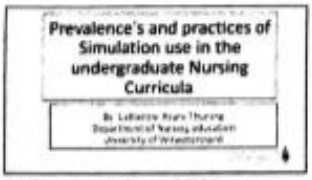

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