A qualitative study on 6th year medical students' perceptions of and self-reported competence in clinical practice after receiving Resuscitation-Based Simulation training.

STUDENT: Marvin Jeffrey Jansen
Bachelors of Technology: Emergency Medical Care
JNSMAR029

SUPERVISOR(s): Rachel Weiss
MBChB, MPhil(Ed)
Heike Geduld
MBChB MMed FCEM(SA)

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Declaration:

I, Marvin Jeffrey Jansen, hereby declare that the work on which this thesis is based is my original work (except where acknowledgements indicate otherwise) and that neither the whole work nor any part of it has been, is being, or is to be submitted for another degree in this or any other university.

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Abstract

Background: Despite practicing resuscitation skills in a simulation environment, medical students often express anxiety about having to participate in patient resuscitation in the clinical environment. This fear can lead to an unwillingness to initiate or participate in resuscitations, and a decreased confidence in their skills. Exploring the perceptions of final year medical students can provide valuable insight for improving the current simulation programme at the University of Cape Town.

Aim: The aim of the study is to explore 6th year medical students' perceptions and self-reported competence for clinical practice after receiving Resuscitation-Based Simulation training.

Methods: During this research project three focus group interviews were conducted with sixth year MBChB students at the University of Cape Town (UCT) Clinical Simulation Centre. The interviews were audio-recorded, transcribed and analysed using a Grounded Theory approach.

Findings: Analysis of the data identified several common themes. Final year medical students perceive that resuscitation-based simulation training is valuable in that it provides a safe non-threatening environment in which to learn, the foundational 'hands-on' knowledge necessary for resuscitation, and opportunities to receive feedback on their learning. They also expressed that Resuscitation-based simulation training increased their confidence to participate in resuscitation during clinical practice, and improved their technique. However, the final year medical students have a reluctance to lead during resuscitations in the clinical environment, and expressed a need for more exposure to resuscitation both in the simulation training and the clinical setting.

Conclusions: Final year medical students' feedback regarding their experience of the resuscitation based simulation training programme at the University of Cape Town provided valuable insight into current strengths and gaps. This feedback is useful for developing the simulation programme to be more aligned both to students' needs and the clinical reality, in order to prepare them for managing resuscitations in the clinical environment.

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Acronyms and Abbreviations

ACLS	Advance Cardiac Life Support
BLS	Basic Life Support
BVM	Bag-Valve-Mask
COREQ	Consolidated Criteria for Reporting Qualitative Research
CPR	Cardio Pulmonary Resuscitation
DP	Deliberate Practice
FG	Focus Group
FHS	Faculty of Health Science
HPCSA	Health Professions Council of South Africa
MBChB	Bachelor of Medicine and Bachelor of Surgery
OSCE	Objective Structured Clinical Examination
PBL	Problem-based learning
RBST	Resuscitation-Based Simulation Training
SBME	Simulation Based Medical Education
SDL	Self-Directed Learning
UCT	University of Cape Town
VR	Virtual Reality

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Chapter 1
Background

In this chapter the researcher discusses the background relevant to the study. Furthermore the researcher provides insight to the significance of the study and the researcher's motivation for conducting the study. Finally, an overview of the chapters is provided.

1.1 Background to the problem

For the intention of providing the reader with a greater understanding of this research project, a brief definition of some of the terms used in this project is needed.

Resuscitation can be defined as the 'restoration to life or consciousness of one apparently dead, or whose respirations had ceased'.(1) For the purpose of this research project, the term resuscitation refers to Cardio Pulmonary Resuscitation (CPR) 'a procedure to support and maintain breathing and circulation for a person who has stopped breathing (respiratory arrest) and/or whose heart has stopped (cardiac arrest).'(1)

The clinical environment or clinical practice is defined as 'relating to or based on work done with real patients; or relating to the medical treatment that is given to patients in hospitals, clinics, etc.'(2)

Perception is defined as 'the way you think about or understand something or someone'.(3) For the purpose of this research project, the research projects intends exploring the way final year medical students at UCT think about or understand resuscitation-based simulation training (RBST).

Self-reported competence or perceived competence refers to 'a psychological construct based on self-evaluation of one's effectiveness or capability in a specific context. It is defined as one's awareness, beliefs, expectancy, or understanding of abilities, skills, or capacities to be effective in interactions with the environment'.(4) It is not measured competence, but it

is nevertheless an important component of one's ability to practice medicine. A patient resuscitation is already a psychologically charged event, and a lack of self-reported competence could impact of one's willingness to respond as well as the level of participation and/or leadership invested in the response.

1.1.1 Training for Patient Safety

Patient safety which is a multi-faceted issue is at the centre of global healthcare and has been prioritized by many international healthcare organisations. The report 'To Err is Human" identified human errors and systems failures at the core of compromised patient care.(5) Medical education institutions need to ensure that their training adequately equips the students with the skills and knowledge required to operate in an effective manner. Clinical practice is an integral part of medical practitioners and medical schools need to ensure that students entering clinical practice are competent and confident in executing their skills in a safe and effective manner. Poor knowledge and skill retention can negatively impact the quality of resuscitation skills in the clinical environment. (6)

Despite the lack of standardization in resuscitation skills training, simulation based medical education (SBME) has been shown to decrease risks to learners and patients in undergraduate, post graduate and faculty development, improve learners' competence, self-reported competence, and increase patient safety. (7,8)

1.1.2 Simulation Based Medical Education (SBME) at UCT

While SMBE training in procedural skills has been offered by individual departments at the Faculty of Health Science (FHS) for many years, two recent developments have raised the profile of SMBE at UCT. Firstly, a multidisciplinary OSCE was introduced for final year MBChB students, known as the "Exit OSCE". Secondly, a costly upgrade to the UCT Clinical Simulation Centre (CSC) was done, resulting in a well-equipped, multidisciplinary training space with low, medium and high fidelity manikins

and equipment and increased opportunities for self-directed learning (SDL) and scenario based learning.

The cost and resource associated with SBME is significant and it is justified to enquire what this training contributes to graduate's perceived preparedness for clinical work.

1.1.3 Resuscitation based Simulation training curriculum at UCT

The University of Cape Town, Faculty of Health Sciences which offers the MBChB programme implements a student-orientated Problem-based learning (PBL) curriculum.(9) This was done to align with the outcomes based curriculum MBChB competencies of the university, and aims to produce a self-directed, lifelong learner who is competent at various levels of healthcare and who manages his/her patient holistically.(9)

Since this study focuses on the student's experiences throughout the curriculum, it is necessary to provide an overview of the learning activities both in and outside of the simulation setting.

The MBChB (Medicine) curriculum at UCT is 6 years of study, followed by 2 years internship and 1 year of community service.(10)

The MBChB spans across a preclinical and a clinical phase. During first year to the third year, students have little exposure to the clinical environment, and the curriculum draws on lectures, group tutorials, role-plays and the more decontextualized activities. During the clinical phase (third year to sixth year), the students are introduced into the clinical learning environment. This exposes them to real patients who are being treated by medical personnel many of which are not familiar with the medical curriculum at UCT. This introduces a degree of unpredictability to their learning, because the patients are not 'standardised' from one student group to another or from day to day. Students may be required to participate in the/ or initiate the resuscitation of a patient at any time during their clinical years regardless of when they had their resuscitation training.

The resuscitation based simulation training (RBST) follows a longitudinal approach, as the RBST spans across the MBChB programme.

During the first year of the MBChB programme, the students participate in a basic life support (BLS) training course which consist of BLS Cardio Pulmonary Resuscitation (CPR) training. During this training, emphasis is placed on performing effective CPR. The course makes use of low fidelity mannequins and acts as an introduction to simulation based medical education. At this stage of the RBST, students follow a very protocol based approach to performing skills.

During the second year of medicine programme, no RBST training takes place.

In the third year of medicine programme, the students are introduced to the medium fidelity simulation trainers and more emphasis is placed on team dynamics, practical skill acquisition in a simulated environment and exposing to patients in the clinical environment. This training is not limited to resuscitation but includes additional procedural skills such urinary catheterization, blood culture collection etc.

During the fourth year of study, The MBChB students rotate through a two week rotation of acute care. The rotation starts on a Monday with one day of lectures and videos outlining the foundational concepts of resuscitation, followed by practical hands on practice time with task trainers and medium fidelity mannequins with the emphasis being placed on practical skills acquisition and improving team dynamics when partaking and/or leading a resuscitation of an adult patient. This is followed by three days of working in the emergency care centre. On the following Monday, the students return to the UCT Simulation Centre to complete an Objective Structured Clinical Examination (OSCE) assessment. From the fourth year the students are working in the wards during other rotations, and this exposes them to the possibility of participating or leading in a resuscitation situation. The chances of the students encountering a resuscitation in the clinical environment varies between hospitals and within departments.

During MBChB year five, the students return to the UCT Simulation Centre for one day of lectures and hands-on resuscitation based scenario training with emphasis on the acute management of tachycardia’s and bradycardia’s,

establishing intravenous access (external jugular vein , femoral vein, or central venous catheter), and managing a difficult airway. The students continue to work within the clinical environment within various departments.

In the sixth year of the MBChB programme at UCT, the students return to the UCT Simulation Centre for one day to revise the management of cardiac arrest of an adult patient as well as endotracheal intubation for the difficult airway. The students also continue to rotate through the clinical environment within the various departments. At this stage, the students are expected to be able to integrate the knowledge and skills gained through their years of study and apply it towards managing a patient in a holistic manner. Towards the latter part of the year, the students partake in a summative assessment in the form of a multidisciplinary OSCE examination, part of this assessment is a resuscitation OSCE which requires the students to manage a patient in cardiac arrest. During this assessment, the students are examined on the ability to identify a patient in cardiac arrest, initiate basic life support (BLS) management, and act as a team leader within the context of performing advance cardiac life support (ACLS) when additional assistance arrives within an emergency room environment.

From this information, it is clear that most of the scheduled learning on resuscitation is protocol-based procedural training during the 4th year with 1-day sessions each in 5th year and 6th year. At the same time, there is the ongoing risk of being exposed to an emergency situation in other words, where they may be the first responder to a resuscitation situation

1.2 Motivation

Patient safety is at the centre of many health organisations and medical education institutions need to rise to the challenge to bring their part in ensuring quality healthcare and competent healthcare providers.

As a healthcare educator who has used simulation based medical education as a teaching methodology for a number of years, I (the researcher) have always been interested in the students' perceptions of SBME and in particular the simulation applicable to the resuscitation environment.

Resuscitation within the acute setting requires integration of protocols, practical, and clinical reasoning within a highly charged setting. While it is possible to measure the competence of individual's ability to perform CPR and the other components of resuscitation, it is for more difficult to gauge the preparedness for participating or leading a resuscitation in a clinical environment.

As a registered Emergency Care Practitioner (ECP) I (the researcher) have worked with a variety of pre-hospital and in-hospital settings and perceive that a general sense of anxiety and a feeling of being unprepared is often present. It is for these reasons that I intended exploring the perceptions and self-reported competence for clinical practice of final year medical students after receiving RBST.

Furthermore, I (the researcher) believe that the experience of final year MBChB students' can provide essential feedback for developing a more comprehensive, aligned and formalised RBST component utilizing SBME as its pedagogy.

1.3 Aims and Objectives

The aim of the study is to explore 6th year medical students' perceptions and self-reported competence for clinical practice after receiving Resuscitation-Based Simulation training.

In order to achieve this aim, the objectives are:

1) To evaluate 6th year medical students' perceptions of the current Resuscitation based simulation curriculum within their training.

2) To evaluate the impact of resuscitation based simulation on the self-reported competence of 6th year medical students relevant to clinical practice.

1.4 Summary

The aims and objectives of the qualitative study will be accomplished under the following chapters:

Chapter two the literature on Simulation-Based Medical education and the transition from the classroom to the clinical environment, outlines the current resuscitation based simulation curriculum at UCT, and explores Kirkpatrick's four level evaluation model.

Chapter three describes the research methodology, the rationale for using focus group interviews, and the ethical considerations when conducting this study.

Chapter four describes the findings and discussion of the study interpreting the findings and relating them to the greater context.

Chapter five provides a conclusion to the study, describes the limitations of the study, and includes the researcher's recommendations.

Chapter 2

Literature Review

2.1 Simulation-Based Medical education (SBME)

Within the industries of aviation and aerospace, simulation has been well established as a tried and tested approach to teaching.(11) This has transferred to many other industries including the military, business, and medicine.(12)(13)(14)(15)(16) As a result the use of simulation technologies within medical education has been ever-increasing.(17) *"Medical simulation is defined as "a person, device, or set of conditions which attempts to present (education and) evaluation problems authentically. The student or trainee is required to respond to the problems as he or she would under natural circumstances. Frequently the trainee receives performance feedback as if he or she were in the real situation."*(17) A broader definition is "any educational activity that utilizes simulation and seeks to replicate clinical scenarios."(11)

Ideally, the simulation environment affords the participants' the opportunity to practice in a safe space, where participants are able to make mistakes and learning is optimised. As a result many medical schools incorporated simulation into their curriculum and has established simulation centres.(18) Despite this, the implementation of simulation training curricula within South African medical education has been slow.(19) One of the reason for the slow reception of SBME in South Africa is the cost associated with establishing a simulation programme. (19) Research shows that the cost of one high fidelity simulation manikin including the necessary system could be in the region of USD 200.000 excluding the costs associated with replacing skins, artificial body fluids etc.(11)

Despite the cost associated with SBME, there are many advantages which SBME affords medical schools including:(20)(21)

- Decreased risks to patients and learners
- Opportunities to interact with rare and complex clinical scenarios
- Customised clinical scenarios based on student needs as opposed to patient availability
- In depth, immediate feedback during debriefing
- Continued and repeated opportunities to practice
- Multiples students can interact with the same scenario, providing similar learning opportunities
- Hands-on practice for invasive procedures
- Errors can be allowed to continue to an uninterrupted conclusion
- The ability to use real medical equipment
- Increased transfer of training from the classroom to the real clinical scenario, and
- Undesirable interference is minimised.

During simulation based training, scenarios are formulated with the intent to engage the participants in way that mimics reality to various degrees.(11) The degree to with which reality is replicated is known as the fidelity, and can be broadly classified into low fidelity, medium, and high fidelity. SBME can take many different forms including ‘computer-based virtual reality, simulation computer-enhanced manikins, part-task trainers, simulated patients and procedural skills simulation’(22) and can incorporate high fidelity simulation manikins that are capable of talking, breathing, secreting artificial fluids, and respond to clinical interventions.(23)

Patient safety is a global healthcare concern and medical training facilities need to ensure that their training effectively equips their students with the appropriate knowledge and skills to perform their duties in manner that is safe and effective.(24) However due to the burden of chronic disease within South Africa and Africa,(25) increasing student numbers, and the ethical concerns of performing

skills on patients , students are infrequently exposed to training in acute adult or paediatric emergencies and other conditions. (26)(24) This can creates opportunities for patient safety to be compromised if these students are expected to perform without the necessary skills and knowledge to safely perform these clinical skills. (27)(28)(24)

A meta-analytic comparative review between the effectiveness of traditional clinical teaching methods, in particular the Halstedian “see one, do one, teach one” and Simulation-Based Medical education (SBME) with deliberate practise (DP) was conducted. The results showed that SBME with DP is superior to traditional clinical teaching methods in accomplishing specific clinical skill acquisition outcomes across a wide range of skills and specialities including central venous catheter insertion, advanced cardiac life support (ACLS), laparoscopic surgery, thoracentesis, and cardiac auscultation.(29)(30)

However, it is crucial that practise is deliberate and the criteria for deliberate practise are:(17)

- Well defined learning objectives
- Highly motivated learners with good concentration
- Appropriate level of difficulty
- Informative feedback from educational sources
- Rigorous, reliable measurement
- Monitoring and error correction
- Evaluation and performance that can reach a level of mastery standard where learning time may vary but expected outcomes are identical(31) and
- Advancement to the next level.

To optimise SBME, it is important to integrate the SBME activities and deliberate practise into the existing curriculum which may include the existing educational activities, appropriate clinical experience, problem-based learning, theoretical lectures and many others. This means that a SBME curriculum has to be a well thought-out event

rather than a hap-hazard add-on to the existing curriculum that lacks planning and scheduling.(29)(9)

Additionally, SBME has been successfully implemented to achieve the learning objectives when used in conjunction with existing education activities.(29) However, SBME should not be conducted in isolation from the clinical environment with the intention of simplifying the learning process as oversimplification can hamper with deep understanding. (32)(29)

2.2 Transition to clinical practice

The goal of medical training institutions is to ensure that medical students are provided with the necessary learning environments as well as the appropriate assessment opportunities.(11) Within the clinical practice environment, various clinical skills competencies are required; these include an understanding of the ethical implications of patient management, the necessary procedural skills, clinical reasoning skills, an appreciation for team work, managerial skills, problem solving skills, diagnostic skills, critical thinking skills, amongst others.(11,33)

The “See One, Do One, Teach One’ approach is no longer considered ethically or practically viable.(11) Due to an increase in student numbers, the burden of disease within the South African health care system and shorter in-patient stays. This has resulted in decreased opportunities for medical students to access patients in the clinical environment.(11) This concern is not limited to the South African Health Care system but has global implications regarding the scarcity of skills that medical graduates currently possess. (34,35)

The transition from the Simulation Centre to the real clinical environment is the process where participants take the knowledge and skills acquired through SBME and apply it in the clinical environment.(36) Research has shown that internal medicine residents trained using SBME have an improved compliance to

treatment protocols when treating cardiac arrest patients, when compared to more educationally advanced residents.(37) Furthermore when looking at task trainees, trainees who have mastered central venous catheter insertion through SBME have been shown to experience a decreased amount of significant procedural complications when compared to trainees who were not exposed to SBME.(38) During surgery, Virtual Reality (VR) simulation training has been shown to directly correlate to improve patient care.(39) In the field of obstetrics and gynaecology it has been shown that neonatal outcomes are improved when participants are exposed to SBME when treating complicated shoulder dystocia births.(40)

In conclusion, SBME has been shown to decrease risks to learners and patients in undergraduate, post graduate and faculty development, improve learners competence and confidence, and increase patient safety.(7,41)

2.3 Kirkpatrick's four level evaluation model

To understand the importance of exploring the confidence levels of the students as opposed to evaluating competence, one needs to discuss the Kirkpatrick model, and in particular Level 1.

The Kirkpatrick model provides a framework to assess the response and impact of educational activities. (8) These levels include;

Level 1: Reaction – This level seeks to evaluate how the students react to the educational activity. This level evaluates the student's perception of the educational activity. Despite level 1 not evaluating the acquisition of new skills it is beneficial because student motivation is crucial to the success of the educational activity and there is increased knowledge acquisition when students are motivated by the activity through seeing the relevance of it. (42)

Level 2: Learning- This level seeks to evaluate what knowledge was learned.

Level 3: Behaviour- This level seeks to evaluate whether the student's behaviour was changed in the workplace.

Level 4: Results- This level seeks to determine what organisational or patient benefits resulted from the educational activity.

There is evidence that simulation training results in increased participant satisfaction, self-reported knowledge and improved performance. (42) While often considered less significant than other domains of educational evaluation, reaction (often referred to as affect or perception) is an important aspect of an educational intervention and is an important surrogate measure for the acceptability of an educational intervention. (43)

Although no directly correlation can be made between self-reported competence and clinical competence, the importance of evaluating the reaction of participants (Kirkpatrick level 1) when evaluating educational activities is still important in curriculum development, as it impacts on their willingness to participate in the subsequent training activities.(43)

Chapter 3

Research design and methodology

This chapter will discuss the research design and research methodology in greater detail. The aspects of sampling, data collection and analysis, ethical considerations and validity, trustworthiness and reliability will also be included in the discussion.

3.1 Qualitative Research Methodology

Research in medical education seeks to increase the knowledge and level of understanding of the learning and education process by conducting investigations.(44)

The qualitative research methodology has established itself as a valid research methodology within medical education.(44)(45) Pope and Mays(46) described qualitative research as *"the development of concepts that help us to understand social phenomena, in natural (rather than experimental) settings by giving emphasis to the meanings, experiences and views of participants".*

Grounded theory which was originally proposed by Glaser and Strauss in the 1960's was designed to satisfy the rigour applied by the quantitative paradigm through applying a systematic approach for analysing qualitative data.(47) The grounded design is widely used in medical education research(48) and seeks to develop a theoretical explanation of a social phenomenon through data collection and analysis of primarily qualitative data(47). The design makes use of an iterative approach, which involves cycles of almost simultaneous data collection and analysis, which in turn informs any subsequent rounds of data collection.(47)

The sampling process within grounded theory research is done on theoretical grounds. The study sample is not finalised prior to commencing the data collection process, instead participants are selected as the data analysis progresses, with the intention of

selecting the participants best suited to expand, challenge, or confirm an emerging theory.(47) The sampling process continues until a point of saturation is accomplished. Once a point is accomplished where no new themes are generated from the ongoing data analysis, saturation is reached.(47)

During the data analysis of grounded theory research, constant comparisons for similarities or differences are made amongst emerging themes.(47) The process starts off by incidents or issues that are grouped together into themes or categories through a process known as open coding. When the major themes have been identified, connections between the different categories are explored, this second level of coding is known as axial coding. Data analysis is complete once the theoretical formulations create a thorough understanding of the phenomenon being studied.

3.2 Focus Group Interview Methodology

The focus group interview is a well-established data collection technique within qualitative research methodologies.(45) Focus group interviews were first described Paul Lazarsfeld and later refined by Mertel & Kendall in 1946 (45)(49), and can be described as:

> *".. . group discussions organized to explore a specific set of issues ... The group is focused in the sense that it involves some kind of collective activity .. . crucially, focus groups are distinguished from the broader category of group interview by the explicit use of the group interaction as research data"* .(50)

The usage of focus group interviews within medical education has rapidly increased within the 21st century.(45) This popularity of focus group interviews in medical education can be partially attributed to the fact that medical education as a field of inquiry seeks to pursue " scientific, social, and cultural questions related to medical training and practice as well as issues relevant to health professions more broadly".(45) Focus group interviews as a data collection method is

concerned is concerned with how people make meaning from their experiences in their world.(45)

Focus group interviews seek to provide a broad understanding as opposed to a quantitative representation. Within a focus group interview, the researcher seeks to gain a greater understanding of the insights, attitudes, and/or opinions of the research participants regarding a particular area of interest. (19) The manner in which the focus group participants interact with each other can influence the data, and as a result the participants should feel comfortable to openly and freely contribute in the focus group discussion.(51)

Focus group interviews can be particularly beneficial when conducting research within an area that is poorly understood or the topics are ill-defined,(52) and can be used before, during, or after other research.(45) Despite the versatility of focus group interviews, there are instances where focus group interviews may not be the most appropriate such as when dealing with topics of a sensitive or personal nature, or instances where large power differentials between the research participant and facilitator or between research participants themselves.(53) To ensure that the research participants of this study do not feel intimidated by the focus group moderator (Mr M Jansen), it was made clear during the recruitment process as well as before commencing the focus group interviews that the focus group moderator is not an examiner in the final year exit OSCE examinations and that any information will be treated in the most confidential manner.

Sampling within focus group interviews is of crucial importance to ensure that the outcomes of the research are met. The researcher needs to make strategic decisions about the focus group participants an whether the participants are best suited to “fit with the questions” and “fit with the phenomenon” that is being investigated.(45)

Convenience sampling was used as the research believed that the group of final year medical students were a homogenous group in

terms of their experiences' related to RBST and the clinical practice environment.

Generally researchers agree that there is no set number for the amount of focus group interviews that need to be conducted, but rather that the number be determined by the amount of focus interviews it takes to reach saturation.(45) However Crabtree and Miller(54) recommend at least four to five focus group if focus group interviews are the only data collection method. Similarly Barbour(53) recommend that a minimum of three to four focus group interviews be conducted. It is for this reason that three focus group interview was conducted during this investigation as saturation was accomplished.

The number of participants within the focus group is dependent on the research context and topic under investigation. (45) The groups should have enough participants to allow for varying opinions and attitudes but to the same extent be small enough to allow each participant to fully participate and be heard.(45) Generally the number agreed upon by most researchers is between six and ten participants per focus group. (45)(53)(54)

The role of a moderator in a focus group interview is a challenging one and the moderator needs to display good interpersonal skills, be adaptable and be non-judgemental.(45) These attributes contribute to creating an environment where participants interact with open and honest dialogue.(45) The degree of active participation in terms of control and direction provided by the moderator depends on the research outcomes and moderator style.

3.2.1 Focus group sampling strategy

The selection criteria for participants were 6th year MBChB students currently enrolled at the University of Cape Town (UCT). The focus group was directed at the perceptions and self-reported competence for clinical practice after receiving resuscitation based simulation training.

The participants were recruited by sending an email invitation to participate in the study to the entire 6th year MBChB class of 2015 at UCT. This invitation outlined the purpose and scope of the study, the risks and benefits of the study, the duration and venue of the focus groups, and reiterated that the study would not affect students grades and that the researcher (Mr Jansen) would not act as an examiner during the final 6th year exit OSCE examination.

The focus group interviews took place at the University of Cape Town, Clinical Skills Centre, lecture room, in Cape Town South Africa. The seating was arranged in a circle and the focus group interviews were audio recorded.

3.2.2 Survey population and sample size

The participants for the focus group interviews were sixth year medical students from the Faculty of Health Sciences, at the University of Cape Town (UCT). There were a total of 189 students sixth year medical students enrolled on the MBChB programme for 2015. The students were invited to participate via email. A total of nineteen participants responded and partook in the research project spread across three focus group interviews (see table below). The reason for selecting sixth year medical students under the heading "Target population (units of analysis)".

Table 2: Number of Focus Group participants

Focus Group (FG)	Number of participants
FG 1	10
FG 2	5
FG 3	4

The focus group size was determined by a literature search as well as the availability of the focus group participants. The focus group interviews were conducted during the latter part of the year, around the same time as final year medical students prepare for the "Exit

OSCE"; this coupled with numerous disruptions due to student protest might have contributed to the low student response rate. Despite this, thematic saturation was accomplished.

3.2.3 Target population (units of analysis)

The target population were 6th year MBChB students currently enrolled at UCT. The participants have the shared social experience of being medical students exposed to the resuscitation-based simulation training offered through the UCT Simulation Centre. Due to the longitudinal approach of the RBST offering at UCT, it was important to select students who have been exposed to the entire simulation training though the UCT Simulation Centre.

Additionally, sixth year students present the most appropriate sampling target population for the following reasons:

1. They have been exposed to clinical practice, albeit supervised.
2. They have been exposed to Resuscitation-based simulation throughout their studies.
3. They are nearing the completion of their undergraduate studies and will be practicing independently upon completing of their studies.

The researcher team believes that these students are best equipped to comment on the contribution (if any) that Resuscitation-based simulation made on their self-reported competence for clinical practice, and that their perceptions around resuscitation-based training are valuable in that it reflect how they experienced the curriculum rather than how it is written down in documents.

3.2.4 Focus group process, data gathering and analysis

The transcription of the focus group interview audio recordings was done by an independent individual, who is not involved with the research participants or research project, these transcriptions was checked for accuracy by the researcher.

The data analysis was completed by the researcher team and followed a grounded theory approach which included open coding, axial coding, and selective coding.

The transcription was compiled using Microsoft Word 2010 by an independent person and thoroughly checked for accuracy by the researcher. Non-verbal communication was documented and transcribed.

The data were analysed by the researcher according to the grounded theory analytic process which includes:

- Open coding
- Axial coding

The data was manually coded by each member of the research team individually. Subsequently to manually coding the data, consensus was sought from the research team and themes were generated.

The data analysis process was completed through five stages namely:(19,48)

• Familiarization stage-this stage includes listening to the audio recordings, reading transcriptions and getting a feel for the data.

• Identification of thematic framework stage- this stage includes highlighting concepts, writing notes and ideas until categories emerge.

• Indexing stage-during this step comparisons were made between the data by highlighting and rearranging quotes.

• Charting stage- during this stage quotations were drawn from the data and placed under appropriate themes.

• Mapping and interpretation stage- During this stage, the range and nature of the phenomenon was mapped, associations between themes is explored with the view to find possible explanations for the findings.

Validity can be defined as 'the extent to which the instrument measures what it is supposed to measure'.(55) A comprehensive literature review was completed during the design phase of the study instruments; this was done to strengthen the validity of the study.

The trustworthiness of the focus group interviews was strengthened through establishing between the categories and the focus group questions.

Reliability is defined by Goodwin as "the extent to which a measurement instrument yields consistent, stable, uniform results over repeated observations or measurements under the same conditions every time". (56) The reliability of the focus group interviews were enhanced by the consistent method applied in the interviewing procedure, by using the same facility and the same facilitator for all the focus group sessions.

3.3 Ethical Considerations

This study was presented to the Research Ethics (HREC) Committee of the UCT Faculty of Health Sciences (FHS) for approval and subsequently approved with the HREC Ref no: 623/2015. An additional approval for "Research Access to students" at UCT was sought and approved before commencing the research project.

The researcher has no influence on the academic results of the final year medical students and does not act as an examiner in any summative assessments. This information was provided to the participants during the recruitment process and on the day of the focus group interviews, this was in

aid of providing in non-threatening environment in which to conduct the focus group interviews.

All participants were required to give consent for the data they provide to be included in the study. This consent would be voluntary in nature and students had the opportunity to withdraw at any stage during the research project with no repercussions to themselves.

The confidentiality of the research participants was maintained by assigning a number to each participant during the focus group any reference to a participant was made via the assigned number.

The data was stored on a password protected hard drive. Only the primary researcher and his co-supervisors had access to this file.

The researcher is not involved in any 6th year medical students' assessments, and this will be made clear when recruiting any participants.

Finally there are no financial biases which the researchers need to declare and all efforts was made to ensure that personal biases do not influence the process or results of the study.

3.3.1 Risk to participants

The research team did not anticipate any risk to the participants partaking in the study due to the nature of the phenomenon under investigation. Also, the research team ensured that all participants understood that they could withdraw from the study at any stage with no repercussions to themselves.

3.3.2 Benefits to participants

The results of the study benefit the participants and current and future medical students at the UCT. Additionally, participants of this study had the unique opportunity to express their opinions regarding a component of the training they received during their studies.

Chapter 4

Results and Discussion

4.1 Introduction

During this chapter the results of the focus group interviews are presented. Three focus group interviews were conducted to explore what 6th year medical students' perceptions and self-reported competence are for clinical practice after receiving Resuscitation-Based Simulation training at the University of Cape Town clinical skills centre.

4.2 Consolidated Criteria for Reporting Qualitative Research (COREQ)

A 32-item checklist is proposed by Tong, Sainsbury, and Craig(57) when reporting focus group interviews known as the consolidated criteria for reporting qualitative research (COREQ). The criteria consist of three domains, namely research team and reflexivity, study design, and analysis and findings. The COREQ criteria will be used when reporting the findings of the focus group interviews of this study.

4.2.1 Team and Reflexivity

The three focus group interviews' were all conducted by the same facilitator, the researcher and recent academic staff member at UCT, registered as an Emergency Care Practitioner with the Health Professions Council of South Africa (HPCSA). The facilitator conducted a pilot focus group with a group of fourth year MBChB students to determine appropriateness the focus group questions. The facilitator made use of pre-determined questions and ensured that the environment was comfortable and non-threatening to the research participants by providing an air-conditioned venue and by explicitly stating that the researcher is not involved as an examiner in the 6th year exit OSCE examinations.

The researcher (M. Jansen) was assisted with the data analysis of the focus group interviews by the research supervisors. The primary supervisor is

Head of Division at the UCT Clinical Skills Centre and has previous experience facilitating focus group interviews; she is currently completing a PhD using qualitative research methodologies and focus group interviews. The researcher team did not believe that the relationship between the research participants and the primary supervisor would have influence as the contact between the two parties is minimal during the course of the latter part of their studies, and it was made explicit that the results of the study would have no effect on their grades.

The co-supervisor is a joint appointment academic staff member at UCT and registered as an emergency specialist with the Health Professions Council of South Africa (HPCSA). She is actively informed with medical education and holds the position of clinical head of education for Emergency Medicine at the Emergency Care Institute of South Africa, and is currently completing a PhD within the realms of medical education.

Despite the researcher being a lecturer at the UCT Clinical Skills Centre, the direct teaching contact between the lecturer and the research participants was very minimal as the resuscitation based training was conducted primarily by emergency care registrars. The researcher joined the academic staff of UCT at the being of 2015, when the research participants commenced their 6th year of study. That being said, the research participants and researcher were familiar and comfortable with each other. The research participants were informed that the focus group interviews data were intended for completion of an MPhil study and that the research would not affect their grades in anyway (see Consent Form).

4.2.2 Study Design

In this section the theoretical framework, participants' selection, focus group interview setting and data collection will be discussed.

The rationale for using focus group interviews is that it is a semi-structured discussion with a group of people regarding a particular area of interest through the synergy between the focus group participants.(57) Themes are generated through a process of systematic data analysis.

The participant selection is an important consideration when conducting focus group interviews.(19) Participants should be comfortable with each other as well as with the focus group facilitator.(51)

The participants for these focus group interviews were sixth year medical students from the Faculty of Health Sciences, at the University of Cape Town (UCT). The students were invited to participate via an email. A total of nineteen participants spread across three focus group interviews were conducted. Sixth year medical students were selected because of their exposure to the resuscitation medical simulation offered at UCT as well as their exposure to clinical practice.

Table 2: Number of Focus Group participants

Focus Group (FG)	Number of participants
FG 1	10
FG 2	5
FG 3	4

The focus group interviews were conducted in the air conditioned UCT clinical skills centre lecture room. The seating was arranged in a circular manner and were audio recorded. The participants were familiar with this venue. Light snacks including water and juice were made available throughout the interviews to ensure that the participants remained comfortable during the duration of the focus group interviews. Each participant was provided with a visible number; this number was used before the participant spoke as well as when the participants addressed their fellow participants.

The purpose of the study was explained during the email invitation as well written informed consent forms were completed prior to commencing the focus group.

The focus group interview facilitator was guided by an interview guide. The purpose of the interview guide is to facilitate discussion. The facilitator welcomed the participants and thanked them for the participation, explained

the purpose, and the confidentiality and the anonymity of the study. The ground rules and the audio recording process was also explained.

The focus group questions was started with the following open ended question:

> *What do you think of resuscitation simulation training that you were involved in at the UCT Clinical Skills Centre during your studies?*

This question was followed by the following questions:

> *What is your understanding of resuscitation based simulation?*
>
> *Would you be more willing to participate in resuscitation during clinical practice after receiving resuscitation based simulation training? Why?*
>
> *How has resuscitation-based simulation contributed to your self-reported competence for clinical practice? What (if anything) does it make you feel able to do?*

In keeping with the grounded theory analytical approach, additional questions were generated through the focus group discussions. These were:

> *So you are saying that you don't feel prepared, what do you think would make you feel more prepare?*

Finally, the following general question was asked towards the end of the focus group interview:

> *Do you have any other comments regarding the resuscitation based simulation training that you received during your studies at UCT?*

The duration of the first focus group interviews was approximately 33 minutes, the second was 23 minutes, and the third was 25 minutes.

The data were collected with the aid of audio recordings and contextual notes were recorded regarding the non-verbal responses. The audio recordings were transcribed by and independent person and thoroughly checked for accuracy by the researcher using Microsoft Word®.

The focus group transcriptions were emailed to the participants to confirm that the transcriptions were accurate, this was done to ensure the trustworthiness of the study.

Finally the researcher read through the transcriptions multiple times, highlighting repeated opinions and making notes. The data was analysed using a grounded theory analytical approach.

4.2.3 Data analysis

The transcription of the focus group interview audio recordings were done by an independent individual, who is not involved with the research participants or research project, these transcriptions was checked for accuracy by the researcher.

The data analysis was completed by the researcher and followed a grounded theory approach which included open coding, axial coding, and selective coding.

The transcription was compiled using Microsoft Word 2010 by an independent person and thoroughly checked for accuracy by the researcher. Non-verbal communication was documented and transcribed.

The data was individually coded by the researcher and co-supervisors; the coded data were placed into themes.

The data analysis process was completed through five stages namely:(19)(58)

- Familiarization stage-this stage includes listening to the audio recordings, reading transcriptions and getting a feel for the data.
- Identification of thematic framework stage- this stage includes highlighting concepts, writing notes and ideas until categories emerge.
- Indexing stage-during this step comparisons were made between the data by highlighting and rearranging quotes.

- Charting stage- during this stage quotations were drawn from the data and placed under appropriate themes.
- Mapping and interpretation stage- During this stage, the range and nature of the phenomenon was mapped, associations between themes is explored with the view to find possible explanations for the findings.

The data was interpreted, which will be discussed under below the heading "Findings".

4.3 Findings and discussion

It was important to report the findings in the background and context with which the research participants intended them. To strengthen the transparency and trustworthiness of the study, the direct quotes of the research participants can be included when reporting.(57) It is for this reason that direct quotes were used when reporting the data.

The findings will be presented under 3 headings in which the themes emerged, namely, value, critique and confidence (Table 1). Contradicting opinions emerged from each of these themes.

An open ended question was asked at the start of the focus group (see annexure). This question sought to encourage the participants to give their opinions and attitudes, prior to being potentially influenced by the additional questions. The table below summarises the findings:

Table 1: Themes generated from Focus Group Interviews

Domains	
Value	**Themes**
	1) Feedback
	2) Foundational knowledge
	3) Safe environment to Learn
Confidence	**Themes**
	4) Lack of confidence in their skills
	5)
	6) Willingness to participate
	7) Reluctance to lead
Critique	**Themes**
	8) Not enough RBST
	9) Protocols don't show how to apply
	10) Not enough opportunities to clinical exposure

4.3.1 Value of SBME

From the data, the first domain that emerged was regarding the aspects of RBST that the students perceived to be valuable. The themes that emerged were; 1) Feedback; 2) Foundation knowledge, and 3) Safe environment to learn.

4.3.1.1 Theme 1: Feedback

One of the themes that the students deemed valuable, that emerged from the focus groups was that the students really appreciated the feedback provided from the RBST. This feedback can be provided by peers, the manikins, and or the instructors, this was voiced as follows*: "Uhm the nice thing about it is that you get critiqued afterwards by your peers as well as by the tutor that is overseeing .. uhm ..so you get to reflect back on what you have done in that situation that was wrong what you can do next time and change about it."*

This view was supported a participant from FG2 who made reference to the high fidelity simulation manikin, which provided live feedback regarding his quality of CPR, but also eluded to the fact that the exposure to this manikin was very limited, this was voiced as follows: *"And Uhm I also prefer uhm we only got it for our last session but the actual simulation doll for me was… I only had it last and I'm already in my practice of doing it maybe not deep enough or not bagging right enough so for me that would've been nicer done at the start that we know at our first introduction to resus that we know how deep to go and then practice on the other dolls afterwards ."*

This view was supported by another participant in FG2, *"I think the new manikin is really really good just cause like also in resus when we saying things like im going to put up a iv line now I'm going to get the ABG it would be better if we actually got into the actually doing of things because in real life it does not does not take you two seconds to put up two IV lines. uhm so I think that also so it…. the mankin is really useful in that so that we actually getting some sort of feedback and we know whats happening and it helps and it gives a better sort of real life exposure ."*

Despite, the feedback provided from the student, one participant from FG2 expressed the need for debriefing after participating in a resuscitation in the clinical environment, this was voiced as follows*, "…but when it [resuscitation in the clinical environment] happens it is a big thing and it affects you psychologically, and you have to debrief afterwards. So you want to at least*

know that when I leave here I have some level of competence that if it has failed... I can still go back and reflect."

Discussion: Many students felt that the fact that feedback provided by the facilitators, peers, and manikins was invaluable to the learning process. This is supported by the literature that suggests that the process of feedback, often referred to as the debriefing accounts for approximately 70% of the learning. (59)(23) The ability of seeing one self's actions and interaction between various team members is widely acknowledged to decrease skill decay and optimise the learning experience.(59)

4.3.1.2 Theme 2: Foundational knowledge

Some of the participants' felts that RBST provided enhanced their foundational knowledge regarding the resuscitation of a patient, and that this foundational knowledge can then be applied in the clinical environment.

One participant from FG1 felt that RBST provided a necessary foundation needed to perform resuscitation during clinical practice, this was voiced as follows: *"before simulation training I wouldn't know where to stand, what im doing, who's doing what, what's happening, whereas now I sort of know that everyone has a clear role in my mind, I know if they tell me you do chest compressions, what they expect from me."*

This opinion was shared by another participant from FG2 "…*I think we definitely need this foundation to kind of help you uhm be eager and be involved in the resus* [resuscitation]..."

A participant from FG3 voiced the following: *"…what has definitely changed my understanding is the actual amount time you have to do these things…Whereas in these resus [RBST] by actually doing it with the actual, with the set timing for the different steps, has allowed me to see that there is actually enough time for you to think clearly, to actually ask one person do a specific job uhm and to know thats the role that you have is to actual make sure that you go from one step to the next step and that there's enough time and that's definitely what it has added to me."*

This opinion was shared by another participant in FG3 *"…so in [a] sense its added lots of…. it organized my thoughts for me which I think in a errr rowdy uhm chaotic environment if you don't have any structure you going to really err struggle."*

Another theme that emerged from this question is that RBST has improved the team dynamics associated with performing resuscitation during clinical practice. Team dynamics is crucial to the resuscitation of a patient in the clinical environment and as a result the researcher felt that understanding team dynamics forms part of the foundational knowledge needed to perform resuscitation in the clinical environment.

One participant from FG3 voiced this in the following manner: *"the whole thing of having a team there and assigning roles that's important, because as a new doctor you going to go out there and you need to know like what role and why I'm supposed to take it. There has to be a way that you have to take a role if you can sometimes not take a role but you have to know that this role you have to take some sort of a role and uhm so it doesn't get messy and uhm its nice to see that we are actually practicing that in our resus environment."*

This opinion was shared by another participant in FG3, and was voiced as follows: *"Because you basically know what's supposed to be done, how it's supposed to be done with that said you still allowing inputs from your team members so I think it's a good thing I've learnt that from the simulation."*

Many of the participants felt that RBST improved their practical motor skills when performing the skills necessary to resuscitating a patient in the clinical environment, this was voiced in the following manner: *"Technique I got to practice a little bit, chest compressions and the c mask thing [C-E mask grip]. Ya that's it technique, basically, which is good I guess cause you can't be practicing in real life, how to do something, you need to go there knowing how to do it already."*

Another participant from FG1 agreed with this opinion, and voiced it as follows: *"So for me, the technique was really helpful…"*

From FG2 one participant agreed that RBST has improved their technique, and voiced I as follows: *"agreeing with [no.] 5 uhm I think in term of being able to do skills like compressions and breathing and checking air ways yes it's definitely helped me to feel competent or confident."*

Discussion: Many students felt that the RBST improved their motor skills when performing fundamental resuscitation manoeuvres such as Bag-Valve-Mask (BVM) ventilation, intravenous (IV) access and endotracheal intubation. This finding is supported by literature which suggest that SBME provides continued and repeated, hands-on practise opportunities for invasive often time sensitive procedures.(20)

Additionally, SBME provides the opportunity to standardised training opportunities for teaching invasive procedures in a non-threatening, safe environment.

4.3.1.3 Theme 3: Safe environment to learn

The next major theme which emerged from the data was that the students felt that the RBST provided them with a safe controlled environment to learn. One participant from focus group one voiced this as follows: "*uhmm its good initially because it gives you a safe environment for you to get the protocol in to get use to …. and manage [the] patient in* [a] *resus* [resuscitation] *situation"*

This opinion was shared by another participant in focus group one which voiced this in the following way; *"...It's a controlled environment…. "So it's just a much more controlled environment than out there, safer for you and the doll or potential patient."*

During focus group two this view was shared by a participant *"…uhm I think it's really good just for that fact that it gives you exposure in like a non-sort of-threatening- stressful environment."*

During focus group three, one participant expressed the following; "…*it's a protected uhm setting uhm there's room for error to make error no lives are at risk."*

Another participant from focus group 1 agreed with this and voiced it as follows *"I agree with no 3 and no 1 so basically you put through the clinical scenario without the potential complications you would have in real life. Because you dealing with a doll and not a real patient so you...sort of preparing yourself for that circumstance in a way, before you have to face the consequences or mistakes..."*

Discussion: One of the major themes regarding the students perceptions of the RBST they received at UCT during the course of their studies that emerged from the data is that the student felt that the simulation environment provided through the UCT Simulation Centre provided them with a non-threatening safe environment in which they can practise without any risk or harm to themselves or the patient.

The importance of creating a learning environment that is safe and non-threatening is well documented within the literature. (60) Literature suggest that when learning occurs in a threatening environment, the brain has a diminished ability to accurately interpret learning clues from the environment, the individual is less likely to adopt new behaviour but would rather resort to previously learnt behaviours, the individual's ability to use higher level thinking is diminished, and the individual has diminished long term memory capacity.(60,61) ultimately, in a threatening environment, the student can default to a state where protection from humiliation and embarrassment rather than learning takes preference.(60)

The fact that the students perceive the Simulation Centre as a safe non-threatening environment in which they can make mistakes and optimise the learning process is very encouraging.

4.3.2 Confidence Levels

The following domain which emerged from the data was with regards to the confidence or lack thereof to participate and/or coordinate the resuscitation of a patient in the clinical environment. The following themes emerged from the data:

4.3.2.1 Theme 4: Lack of confidence in their skills

One of the participants from focus group one expressed a lack of confidence for clinical practice, this was voiced as follows: *"… in the time [when I need to participate in the resuscitation of a patient] am I going to remember that or am I going to be screaming.. aaw.. whats the dose?, what's the dose?"*

This was echoed by another participant from focus group one who recalled an episode in which she was required to participate in the resuscitation of a patient in the emergency centre; *"…and I was like standing there….and I remember sitting there thinking oh my gosh this persons going to die when I do compressions on his chest. Because how do I know… Im doing it properly…"*

When the participants were asked to comment on the perceived competence for participating during resuscitation in the clinical environment. Many of the students voiced their lack of confidence despite the question directly asking about perceived competence. This could suggest that the participants closely relate their perceived competence and their confidence levels to participate during resuscitation in the clinical environment.

4.3.2.2 Theme 5: Willingness to participate

Another major theme which emerged from the data was that some of the students felt that the RBST has contributed to increasing their willingness to participate with the resuscitation of a patient in the clinical environment, however for many of the students this confidence was isolated to participating in the resuscitation of participation but not leading coordinating the resuscitation efforts (see Theme 6).

A participant from FG1 felt that RBST contributed to increased confidence to participate during resuscitation during clinical practice because it exposed her/him to aspects of the resuscitation process albeit in a simulated environment, this was voiced it as follows: *"I think it did… because I was like well, I kinda know what they are discussing…so you can kinda see the structure and the actual.. uhm.. the way in which they are working, you can see the system that they have got going there so you feel comfortable because I know im not disrupting anything cause I know where I am*

supposed to be and I know that this is….so ya basically that. So I felt comfortable going in and confident actually knowing that I know how to do.. I know what depth to make my compression…"

Another participant from FG2, felt that she/he would be more willing to participate because of an increased confidence to participate, this was voiced as follows: *"We would be more willing to participate in that…. yes uhm like everyone has been saying uhmmm we gain more confidence in our resus technique after the simulations…"*

From FG3 participants shared this view and expressed it in the following manner: *"yes I will be, the reason, major reason is confidence it's not cause we don't know the work that we suppose to know it's because of the confidence.."*

Another participant from FG3 voiced this in agreement; "*Its made me alot more comfortable with ok if I don't know what to do I know A and B which means if I do those fine I can actually still think about C uhm ja which is ok."*

4.3.2.3 Theme 6: Reluctance to lead

The next major theme that emerged from the focus groups was that although some of the participants felt more confident to participate during resuscitations, many of them felt a reluctance to lead the resuscitation; this was voiced as follows:

One participant from FG1 voiced the following…"*uhm that you are more comfortable to do what you are being told to do but honestly I feel that I am not confident enough to actually start doing something like being the leader you…"*

Another participate from FG1 shared this opinion… "*I agree with no 8.. uhm that you are more comfortable to do what you are being told to do."*

Another participant voiced this in the following manner and felts that is was because of a limited exposure to RBST (Theme 2): "…*in terms of basic life support I think im fairly competent with that, I'm confident with that part; il do*

CPR and bag mask (group agrees with no 3) I'm fine; but in terms of the advance parts, the H's and T's and all of that , that I get a little bit flustered with simply because again .we haven't practiced it enough we haven't seen it in real life that much as well.."

This opinion was shared by another participant in FG1,*…"the basic life support is taught really nicely, so we get introduced with it 2nd year, 3rd year clinical skills we doing it, even up until 6th year they reinforce it; and then the advance life support they bring you in one day where they start from the beginning and they cover everything you need to know uhm and you leave the end of that day…. More bewildered than you came in. so now you doubting yourself and you kinda get confused when you in the clinical situation"*

Another participant from FG1 voiced a complete reluctance to participate during resuscitation in the following… *"I don't feel confident at all, to practice, even here practicing I still don't feel confident just practicing on the manikin when I am the leader I get flustered I get nervous";* this participant went on to elaborate that because "Theme 2: Limited exposure to Resuscitation based simulation training", this was voiced as follows: *"..it's like I don't feel you have given us enough like practice for us to do it like over the 6 years we have only like no 10 mentioned, done it a couple of times so…"*

This participant (above) from FG1 went on to recount an episode where she/he walked away from a resuscitation because she/he was reluctant to lead, this was expressed in the following manner: *"I also agree with everyone like I'm not comfortable at all. I think the only I can do is chest compressions, because I remembered the time we were in a ward round and the patient just didn't have a pulse and then they called "Doctor there is no pulse" and I just walked away I was like….i cant be involved."*

Participants from FG2 shared tis opinion and voiced it as follows: "…*I think I would be more willing….like I would be willing to help in a real life resus but I think I would be more fearful to lead the resus* [resuscitation]."

Discussion: The issue of confidence levels to participate and initiate resuscitation efforts in the clinical environment provided some conflicting

evidence. Some of the participants felt a general lack of confidence to participate in resuscitation during the studies. This was attributed mainly to a lack of exposure to clinical practice, as well as a lack of exposure to RBST. This finding is rather concerning as these students were in their final year of study and would inevitably be required to participate or even lead resuscitation efforts upon completing their studies.

This being said, a group of students from across the three focus groups said that they believe that the RBST has increased their confidence to participate in resuscitations in the clinical environment. They went on to say that the RBST has resulted in them being more willing to participate in resuscitation in the clinical environment as opposed to not receiving any RBST.

Despite this many students who felt willing to participate in resuscitation efforts during clinical practice expressed that this confidence is limited to participating in the resuscitation and not leading the resuscitation efforts. Many students felt that this is because the lack of exposure to actually leading a resuscitation in the simulated and clinical environment. Also, due to the current format of the RBST, many students felt that too many skills were cramped into the training sessions, which resulted limited exposure to leading resuscitation efforts in the simulated environment. This speaks to the fact that generally the students are comfortable with the motor skills required to perform resuscitation however they lack clinical reasoning and diagnostic thinking.

The fact that there exists a reluctance to lead the resuscitation is concerning and needs further exploration.

4.3.3 Critique

The final domain which emerged from the data was in regards to the critique which the students perceived regarding RBST. The following major themes emerged:

4.3.3.1 Theme 7: Not enough exposure to RBST

The theme which emerged from data which can be categorised under "Critique" is that the students believed that there was limited exposure to RBST during the duration of their studies.

During focus group one, one of the participants felt that the resuscitation based simulation was very limited and voiced it as follows: "... *I feel like the resuscitation training specific is very limited uhm…we do these simulations like we had like one in fam med [family medicine rotation]; I think I had one in beginning of year…. probably in fourth year and like you do all these things and its very scarce and then a situation comes and you have no idea what you suppose to do…"* this opinion was shared by another participate during focus group one and was voiced as follows:

"urrg I think just in agreement uhm the key thing is that we are not getting enough exposure from 4th year to final year... so you suppose to know how to do that but I just dont think we have gotten enough exposure. "

From focus group two, one participant felt that the resuscitation based simulation training was good practice but needed to be more frequent. This was voiced as follows: "*uhm I think that it was good the practice sessions that we got but I also felt that it would've.. I would have felt a lot more happier if we gotten it more frequently…"*

Another participate from focus group two felt that the time between the simulation training was too long and that more exposure to RBST was needed, this was voiced as follows …" *uhm I think that it was good the practice sessions that we got but I also felt that it would've.. I would have felt a lot more happier if we gotten it more frequently. Because I think the space between getting it and maybe once a year is too long so I'm relearning at the start of every year instead of just revising."*

This was echoed by a participate in focus group two: "*uhm just to elaborate on what No 2 said uhm on the frequency definitely I think uhm erg it's a bit of a schlep to having years in between resus's (resuscitation training)…"*

Another participant in focus group two felt that the training sessions were spaced out to far apart….. *…uhm ….yes uhm ja I think the spacing is bit of a problem…"*

These sentiments were shared during focus group three, with one participant feeling that the RBST is very useful, however the frequency of the training needs to be increased, this was voiced as follows: *"…I think it's very useful uhm when I go for these session I always come out feeling like I can actually perhaps carry it out in an actual clinical setting… But I actually would like it to be more like frequent because I feel very competent when it happens. Hmmm and I just feel quiet sad after a few months uhm when people ask you about you know it it's a bit hazy…….in my head and also practically, so it was like interspersed inside will keep us .. will jog our memory and eventually it will become second nature."*

Another participant during focus group three agreed with the opinion of the participant above…… *"with regards to the frequency I have to agree that cause the minute you do sim you feel like you can run the whole ATLS.. the minute you walk out you still good for the next few weeks and then that's it.."*

Discussion: When enquiring about the RBST that the final year medical studies experienced throughout their studies at the UCT clinical Simulation Centre, a strong theme that emerged from the study was that the studies felt that their exposure to the RBST over the course of their studies was inadequate to prepare them for clinical practice during their internship and community service years. The lack of exposure was multi-faceted and included both the frequency of the RBST, the duration of time between RBST opportunities, as well as the accessibility of the Simulation Centre to the students.

Many of the students felt that frequency or rather lack thereof of the RBST was greatly deficient. When RBST occurred, the students felt like they were comfortable and adequately prepared to partake in resuscitation within the clinical environment. However due to the lack of re-training opportunities and the inevitable skill decay(62) that confidence quickly diminished and was replaced with feelings of shame and embarrassment because the students'

perceived that the clinical staff expected them to be competent to perform to a certain standard.

Another strong theme that emerged from the focus group interviews was that the students felt that when RBST occurred particularly during the latter years of their studies, that the allocated time given for the training was insufficient.

In terms of accessibility of the Simulation Centre to the students to perform self-directed learning (SDL), many of the students felt that (1) the Simulation Centre was not very accessible to them, (2) if the Simulation Centre was in fact accessible, that this was not communicated to the students effectively. Many of the students expressed that there are many opportunities within the curriculum where they would have been willing to come to the Simulation Centre and practise their resuscitation skills however they were unaware of how to go about accessing the Simulation Centre. This is despite the fact that the Simulation Centre currently has processes in place for any UCT Faculty of Health Science student to access the Simulation Centre through an email booking system. This speaks to the fact that the communication between the students and the Simulation Centre needs to be improved to ensure that the resources within the Simulation Centre and learning are optimised. Also; it is important to realise that not all the students have the same learning curve when mastering the skills required for resuscitation. By making the simulation centre more accessible to the students for supervised and unsupervised SDL; the differences in learning curves can be accounted for, something that has traditionally been challenging with traditional teaching methods.

Exposure to resuscitations in the clinical environment is unpredictable and relatively infrequent in certain environments. A structured RBST can provide the necessary exposure and practical hands-on experience to infrequent, life threatening medical conditions in a safe non-threatening environment.(20)

4.3.3.2 Theme 8: Protocol based approach

Another theme that emerged from the data was that the participants felt that the RBST was beneficial in learning the resuscitation protocols, however it

lacked in teaching them how to apply these protocols to clinical practice. One participant from focus group one voiced this as follows: "*uhmm it's good initially because it gives you a safe environment for you to get the protocol in to get use to…how and manage patient in resus situation. Uhm ja initially but I feel that if we were to be more exposed…."* This participant goes on to recall a scenario in which a baby needed to be resuscitated and despite the fact that the participant 'recently' received paediatric life support training in a simulated environment; the participant was unable to apply these protocols to clinical practice; this is voiced in the following excerpt:

"…this year 6th year peads we had a resus for a baby who was having a tet spell and I remember we were in the ward and the babies stats kept dropping and we were kind of staring at the baby and we just did that pediatrics life support thing also and it made it like more awkward but like literally sats [oxygen saturation levels] were dropping heart rate was going down, neither one of us as two of the medical students actually recognized the reality of what was happening…"

Discussion: Participants felt that the RBST was beneficial in learning the resuscitation protocols, however many of them lacked clinical reasoning and decision making skills. This is concerning as these students will inevitably be faced with complex clinical scenarios that requires clinical decision making and clinical reason.

In the South African health care system which experiences many resource constraints. Many health care professionals, including doctors could be placed in environments where they need to act as 'senior' health care professionals during their early career. This places them in situations where complex clinical scenarios requiring advance clinical decision making skills are needed. Failure to equip the students with the necessary knowledge and skills at UCT to adequately manage these situations could potentially place the patients and health care professional at undue risk.

Establishing a structured SBME curriculum with deliberate practise can afford students the ability to interact with rare and complex clinical scenarios.(20)

The implications for UCT Clinical Skills Centre is that more emphasis should be placed on ensuring that clinical decision making and clinical reasoning skills are developed in manner which is inclusive and allows for learning to be optimised.

4.3.3.3 Theme 9: Not enough exposure to clinical experience

One of the major themes that emerged from the data was that some of the students felt that there is a lack of exposure to clinical practice. This was expressed through the following dialogue. From focus group one: *"I feel that if we were to be more exposed … I know that people don't just come in… in cardiac arrest [but] if we were to be more exposed to patients in real life cause those are the patients you remember for life"*

During focus group two another participate felt that resuscitation based simulation training provided good practise but that exposure to clinical practice is needed, and voiced it as follows: …. *you get good practice and go through things but at the same time I also feel like it also like in real life situations I'm way more scared so like it doesn't really give you that little bit of extra fear that you need to learn"*

One participant during focus group three shared a similar opinion and voiced it as… *"when you down in EC [emergency centre] like say GSH [Groote Schuur Hospital] ..whatever it is much better to do it in real life than the sim cause in real life you actually do have help like you have like trained people to help you and what not however the sim also prepares you for not having so much help cause you run the whole thing and you are assuming that your helpers don't know anything you need to teach them the CPR method and you know and the cycle there is to whatever that's the thing so I feel like it's very intense when you do training; but it's much more applicable when.. and easier when you doing it in real life"*

Discussion: One of the themes emerged quite strongly from the research is that the students felt that the RBST lacked exposure to the clinical practice environment despite the advances in resources within the Simulation Centre in recent years. Many of them felt that the amount of exposure they received

to the clinical environment was lacking. The participants felt that the within the simulated environment, the clinical environment is not rein acted sufficient. What became clear from the focus group interviews is that the students realised that in order to optimise the learning, a good relationship between clinical practice and RBST needs to be present within the curriculum. This finding is supported by research conducted by Kneebone et al(32)(29) who concluded that in order “to realise its full potential as a learning aid, simulation must be used alongside clinical practice and linked closely with it.” To optimise SBME, it is important to integrate the SBME activities and deliberate practise into the existing curriculum which may include the existing educational activities, appropriate clinical experience, problem-based learning, theoretical lectures and many others. This means that a SBME curriculum has to be a well thought-out event rather than a hap-hazard add-on to the existing curriculum that lacks planning and scheduling.(29)(9)

Additionally, SBME has been successfully implemented to achieve the learning objectives when used in conjunction with existing education activities.(29) However, SBME should not be conducted in isolation from the clinical environment with the intention of simplifying the learning process as oversimplification can hamper with deep understanding. (32)(29)

Chapter 5

5.1 Conclusions

The aim of the study was to explore 6th year medical students' perceptions and self-reported competence for clinical practice after receiving Resuscitation-Based Simulation training.

The study provided valuable feedback regarding their experience of the resuscitation based simulation training programme at the University of Cape Town provided valuable insight into current strengths and gaps. This feedback is useful for developing the simulation programme to be more aligned both to students' needs and the clinical reality, in order to prepare them for managing resuscitations in the clinical environment.

Through the analysis of the focus group interview data several themes emerged. Sixth year medical students' feel that the UCT Simulation Centre provides them a safe non-threatening environment in which mistakes can be made and learning optimised. The students felt that the RBST improved their practical motor skills and improved their confidence to participate in resuscitation during the clinical practice. Despite these perceived benefits of the RBST, the students felt that their exposure to the RBST and clinical environment is limited. Additionally, although the students expressed an improved confidence to participate in resuscitation efforts after receiving RBST, many students' still expressed a reluctance to lead resuscitation efforts in the clinical environment despite receiving RBST.

5.2 Recommendations

During this chapter the researcher's recommendations will be discussed, the recommendations have been drawn from the focus group participants exclusively rather than the researcher team.

1) The findings of this study be submitted to the management of the UCT, Clinical Skills Centre consideration, implementation and further recommendations.
2) A process to formalise a structured simulation curriculum be initiated with the relevant stakeholders.
3) Access to the Clinical Simulation Centre be increased.
4) Incorporate more realistic and clinically relevant simulations into the RBST.
5) A process of improving the effective integration of clinical practice and RBST in the simulated environment.

5.3 Limitations of the study

Despite every effort being made to ensure that this study was sound methodologically, the following limitations need to be discussed.

The study was only conducted in one site only and included undergraduate medical students; it could be relevant to post graduate specialisation training however this needs to be addressed in further research.

The study made use of convenience sampling methodology due to time constraints. A purposive sampling strategy might be more beneficial if a similar study is conducted in the future.

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Appendices

Appendix 1: UCT HREC Ethics Approval form

UNIVERSITY OF CAPE TOWN
Faculty of Health Sciences
Human Research Ethics Committee

Room E52-24 Old Main Building
Groote Schuur Hospital
Observatory 7925
Telephone [021] 406 6338 • **Facsimile** [021] 406 6411
Email: lamees.emjedi@uct.ac.za
Website: www.health.uct.ac.za/fhs/research/humanethics/forms

02 September 2015

HREC REF: 623/2015

Dr R Weiss
Clinical Skills Centre
OMB

Dear Dr Weiss

PROJECT TITLE: A QUALITATIVE STUDY ON 6TH YEAR MEDICAL STUDENTS' PERCEPTIONS AND SELF-REPORTED COMPETENCE FOR CLINICAL PRACTICE IN THE CONTEXT OF RESUSCITATION SIMULATION TRAINING (MPhil-candidate-M Jansen)

Thank you for submitting your study to the Faculty of Health Sciences Human Research Ethics Committee for review.

It is a pleasure to inform you that the HREC has **formally approved** the above-mentioned study subject to:

1. Student Affairs approval.
2. Please inform the Committee of what will happen to the audio recordings after the study.

Approval is granted for one year until the 30th September 2016.

Please submit a progress form, using the standardised Annual Report Form if the study continues beyond the approval period. Please submit a Standard Closure form if the study is completed within the approval period.
(Forms can be found on our website: www.health.uct.ac.za/fhs/research/humanethics/forms)

Please quote the HREC REF in all your correspondence.

We acknowledge that the MPhil-candidate-Mr Marvin Jansen will also be involved in this study.

Please note that the ongoing ethical conduct of the study remains the responsibility of the principal investigator.

Yours sincerely

PROFESSOR M BLOCKMAN
CHAIRPERSON, FHS HUMAN RESEARCH ETHICS COMMITTEE

Appendix 2: Consent Form

INFORMED CONSENT FORM

Information sheet

Study Title

A qualitative study on 6th year medical students' perceptions and self-reported competence for clinical practice after receiving Resuscitation-Based Simulation training.

Investigators

Primary investigator:	Marvin Jeffrey Jansen (BTech: EMC)
Supervisors:	Rachel Weiss
	Heike Geduld

Purpose and Scope

The purpose of the study is to explore the role of Resuscitation-based simulation on the self-reported competence of 6th year medical students for clinical practice. It seeks to explore the perceptions of the potential barriers to effective resuscitation based simulation training, and interrogates from a student perspective how the simulation curriculum can be improved in order to facilitate improved perceived preparedness.

What will the study involve?

If you agree to join the study, you will be required to partake in a focus group interview with other final year medical students. This focus group will be audio recorded.

Why are you being invited to take part?

You are being invited to take part of this study because you are a 6th year medical student at the University of Cape Town.

How long will you take part in this research – how much of your time will be needed – will you need to take time off work?

The focus groups will be approximately 45-60 minutes; and you will not be missing any lecture time.

What will happen to the data?

The data will be analyzed and will form part of research thesis and a publication.

Rights to Withdraw and Alternatives

Taking part in this study is completely voluntarily. If you choose not to participate in the study or if you decide to stop participating in the study you will continue to be a part of the academic program. You can stop participating in this study at any time, even if you have already given your consent. Refusal to participate or withdrawal from the study will not involve penalty or loss of any benefits to which you are otherwise entitled.

What are the risks and discomforts of taking part in this research?

We do not expect that any harm will happen to you because of joining this study. <u>This will not affect student grades.</u>

Confidentiality

During the focus groups all reference to participants will be made via a study identification number. All information we collect during the focus groups will be anonymized and entered into computers with only the study identification number. Databases will be password protected on an access-controlled computer.

Are there any benefits to you if you take part in this research?

If you agree to take part in this study, you will be helping to improve the Simulation -based medical education teaching and learning practices.

Participant compensation

There will be no financial compensation, however snacks will be provided prior to the focus groups

Return of results

The results can be made to you if you require; please provide your email address on the Recording Consent form if you wish to receive the results.

In Case of Injury

We do not anticipate that any harm will occur to you as a result of this study

What procedures, drugs or other treatments are involved in this research?

No procedures, drugs or other treatments will be used during this research project

Who to Contact

If you ever have questions about this study, you should contact the principal investigator; Marvin Jeffrey Jansen on 021 404 7698 or 0834790808.

The UCT FHS Human Research Ethics Committee can be contacted on 021 406 6338 in case you have any questions regarding your rights and welfare as a research subject.

The Human Research Ethics Committee is situated in the Old Main Building of Groote Schuur Hospital, Floor E52, Room 23, Observatory, 7925

The study has received ethics approval from UCT Faculty of Health Sciences Human Research Ethics Committee

Ethics Approval number: 623/2015

Focus Group and Recording Consent

I, _____ have read and understand the contents provided in the information sheet. My questions have been answered. I consent to participate in the focus group with the understanding that the research team will take notes and audio recordings of the event.

Signature of participant _____

Email Address (optional)_____

Witness _____

Date of signed consent _____

Appendix 3: Focus Group Script

FOCUS GROUP INTERVIEW

Moderator:

Observer:

The topic is: A qualitative study on 6th year medical students' perceptions and self-reported competence for clinical practice after receiving Resuscitation-Based Simulation training.

You have been selected because you are a 6th year undergraduate medical student at the University of Cape Town.

Guidelines:

- There are no right or wrong answers.
- The session will be tape recorded, so speak clearly.
- To maintain confidentiality; refer to the number in front of the person; state your number when you are speaking.
- We ask that you turn off your cellular phone during the interview.
- The facilitator will guide discussion.

Opening question:

"What do you think of the resuscitation simulation training that you were involved in at the UCT Clinical Skills Centre during your studies?

Additional questions

1) **What is your understanding of resuscitation based simulation?**
2) **Would you be more willing to participate in resuscitation during clinical practice after receiving resuscitation based simulation training? Why?**
3) **How has resuscitation-based simulation contributed to your self-reported competence for clinical practice? What (if anything) does it make you feel able to do?**
4) **Any other comments regarding the current simulation training?**

Appendix 4: Research Access to Students

	RESEARCH ACCESS TO STUDENTS	DSA 100

NOTES

1. This form must be **FULLY** completed by all applicants that want to access UCT students for the purpose of research.
2. Return the fully completed **(a) DSA 100** application form **by email**, in **the same word format**, together with **your: (b) research proposal inclusive of your survey, (c) copy of your ethics approval letter / proof (d) informed consent letter** to: Moonira.Khan@uct.ac.za. You application will be attended to by the Executive Director, Department of Student Affairs (DSA), UCT.
3. The turnaround time for a reply is **approximately 10 working days.**
4. NB: It is the responsibility of the researcher/s to apply for and to obtain **ethics approval and to comply with amendments that may be requested;** as well as **to obtain** approval to access UCT staff and/or UCT students, from the following, at UCT, respectively: (a) **Ethics:** Chairperson, Faculty Research Ethics Committee' (FREC) for ethics approval, (b) **Staff access:** Executive Director: HR for approval to access UCT staff, and (c) **Student access:** Executive Director: Student Affairs for approval to access UCT students.
5. **Note:** UCT Senate Research Protocols requires compliance to the above, **even if prior approval has been obtained from any other institution/agency. UCT's research protocol requirements applies to *all* persons, institutions and agencies from UCT and external to UCT who want to conduct research on human subjects for academic, marketing or service related reasons at UCT.**
6. **Should approval be granted to access UCT students for this research study, such approval is effective for a period of one year from the date of approval (as stated in Section D of this form), and the approval expires automatically on the last day.**
7. **The approving authority reserves the right to revoke an approval based on reasonable grounds and/or new information.**

SECTION A: RESEARCH APPLICANT/S DETAILS

Position	Staff / Student No	Title and Name	Contact Details (Email / Cell / land line)
A.1 Student Number	JNSMAR029	Mr Marvin Jansen	Marvin.jansen@uct.ac.za
A.2 Academic / PASS Staff No.	01446752		
A.3 Visitor/ Researcher ID No.			
A.4 University at which a student or employee		Address if *not* UCT:	
A.5 Faculty/ Department/School	**Health Sciences/Medicine**		
A.6 APPLICANTS DETAILS If different from above	Title and Name	Tel.	Email

SECTION B: RESEARCHER/S SUPERVISOR/S DETAILS

Position	Title and Name	Tel.	Email
B.1 Supervisor	Dr Rachel Weiss	021 404 6718	Rachel.Weiss@uct.ac.za
B.2 Co-Supervisor/s	Dr Heike Geduld	021 944 9223	Heike.Geduld@uct.ac.za

SECTION C: APPLICANT'S RESEARCH STUDY FIELD AND APPROVAL STATUS

C.1 Degree – if applicable	**MPhil: Emergency Medicine**
C.2 Research Project Title	A qualitative study on 6th year medical students' perceptions and self-reported competence for clinical practice after receiving Resuscitation-Based Simulation training
C.3 Research Proposal	Attached: Yes X No
C.4 Target population	6th year UCT medical students
C.5 Lead Researcher details	If different from applicant:
C6. Will use research assistant/s	Yes No X If yes- provide a list of names, contact details and ID no.
C.7 Research Methodology and Informed consent:	Research methodology: Qualitative Focus Groups Informed consent:
C.8 Ethics clearance status from UCT's Faculty Ethics Research Committee (FREC)	Approved by the FREC Yes X With amendments: Yes No X (a) Attach copy of your ethics approval. Attached: Yes (b) State date and reference no. of ethics approval: Date: 2 Sept 2015 Ref. No.: 623/2015

SECTION D: APPLICANT/S APPROVAL STATUS FOR ACCESS TO STUDENTS FOR RESEARCH PURPOSE
(To be completed by the ED, DSA or Nominee)

	Approved / With Terms / Not	* Conditional approval with terms	Applicant/s Ref. No.:
D.1 APPROVAL STATUS	(i) Yes [redacted] (ii) With terms (iii) No	(a) Access to students for this research study must only be undertaken after written ethics approval has been obtained. (b) In event any ethics conditions are attached, these must be complied with before access to students.	JNSMAR029/ Mr Marvin Jansen

D.2 APPROVED BY:	Designation	Name	Signature	Date of Approval
	Executive Director Department of Student Affairs	*Dr Moonira Khan*	[signature]	*4 September 2015*

Appendix 5: Research Proposal

A qualitative study on 6th year medical students' perceptions and self-reported competence for clinical practice after receiving Resuscitation-Based Simulation training.

STUDENT: Marvin Jeffrey Jansen
Bachelors of Technology: Emergency Medical Care
JNSMAR029

SUPERVISOR(s): Rachel Weiss
MBChB, MPhil(Ed)
Heike Geduld
MBChB MMed FCEM(SA)

This study is in partial fulfilment of the M.Phil. (Emergency Medicine) degree

Declaration:

I, Marvin Jeffrey Jansen, hereby declare that the work contained in this assignment is my original work and that I have not previously submitted it, in its entirety or in part, at any university for a degree.

Signature: Date: 21 July 2015

Contents

Summary/ Abstract

Research shows that Simulation-Based Medical education (SBME) translates to clinical practice improvements. However, the effect that SBME has on the self-reported competence of medical students has not been assessed within the literature. The Kirkpatrick model of evaluation evidence includes the importance of evaluating the participant's reaction to the educational activity. This study will seek to evaluate the role of resuscitation based simulation on 6th year medical students' self-reported competence for clinical practice.

Background/ Literature Review

Simulation Based Medical Education

Ensuring patient safety is at the centre of global healthcare and medical education institutions need to ensure that their training adequately equips the students with the skills and knowledge required to operate in an effective manner. (1) However due to the burden of disease within South Africa and Africa (2), increasing student numbers, and the ethical concerns of performing skills on patients , students are infrequently exposed to training in acute adult or paediatric emergencies and other conditions. (3)(1) This creates a significant potential for patient safety to be compromised if these students are expected to perform without the necessary skills and knowledge to safely perform these clinical skills. (4)(5)(1)

Simulation has been widely used within areas such as aviation, travel, and warfare, and has gained favour within the realms of medical education in recent years. (6)(7)(8)(9) Simulation-Based Medical education (SBME) includes computer-based virtual reality, simulation computer-enhanced manikins, part-task trainers, simulated patients and procedural skills simulation. (10) However the implementation of simulation training curricula within South African medical education has been slow. (1) For the purpose of this study, resuscitation-based simulation will be defined as the training activities required to competently manage resuscitation of critically ill patients

using computer-enhanced simulation manikins to teach the knowledge and skills.

Kirkpatrick's four level evaluation model

The Kirkpatrick model provides a framework to assess the response and impact of educational activities. (11) These levels include;

> Level 1: Reaction – This level seeks to evaluate how the students react to the educational activity. This level evaluates the student's perception of the educational activity. Despite level 1 not evaluating the acquisition of new skills it is beneficial because student motivation is crucial to the success of the educational activity and there is increased knowledge acquisition when students are motivated by the activity through seeing the relevance of it. (12)
>
> Level 2: Learning- This level seeks to evaluate what knowledge was learned.
>
> Level 3: Behaviour- This level seeks to evaluate whether the student's behaviour was changed in the workplace.
>
> Level 4: Results- This level seeks to determine what organisational or patient benefits resulted from the educational activity.

The evidence that simulation training results in increased participant satisfaction, self-reported knowledge and improved performance. (13) While often considered less significant than other domains of educational evaluation, reaction (often referred to as affect or perception) is an important aspect of an educational intervention and is an important surrogate measure for the acceptability of an educational intervention(14)

Although no directly correlation can be made between self-reported competence and clinical competence; the importance of evaluating the reaction of participants when evaluating educational activities has been identified by the Kirkpatrick four level evaluation model.

Research question

What is 6th year medical students' perceptions and self-reported competence for clinical practice after receiving Resuscitation-Based Simulation training?

Aim

The aim of the study is to explore 6th year medical students' perceptions and self-reported competence for clinical practice after receiving Resuscitation-Based Simulation training.

Objectives

1) To evaluate 6th year medical students' perceptions of the current Resuscitation based simulation curriculum within their training.
2) To evaluate the influence of resuscitation based simulation on the self-reported competence of 6th year medical students for clinical practice.

Methodology

Study design

Descriptive Qualitative Design using volunteer focus groups of students.

Characteristics of study population

The study population will consist of sixth year undergraduate medical students at the University of Cape Town (UCT). Sixth years students present the most practical sampling for the following reasons:

1. They have been exposed to clinical practice, albeit supervised.
2. They have been exposed to forms of Resuscitation-based simulation throughout their studies.
3. They are nearing the completion of their undergraduate studies and will be practicing independently upon completing of their studies.

These students are the best equipped to comment on the contribution (if any) that Resuscitation-based simulation made on their self-reported competence for clinical practice and their perceptions around resuscitation-based training.

Recruitment and enrolment

Convenience sampling will be used as a sampling strategy. Students will be recruited by approaching the entire 6th year medical student group during a lecture; the study will be outlined and their participation requested. It will be made clear that participation is voluntary and that they may withdraw at any time. Students will also be assured that the research will have no influence on any of their assessments. It will also be made clear that the researcher (Mr Marvin Jansen) is not involved in any 6th year assessment.

Data Collection

Audio recorded focus groups will be conducted with 6th year medical students at UCT. Focus groups were selected because the participants have a shared social experience; being that they are all medical students and have all been exposed to the simulation training offered by the UCT clinical skills centre.

Three to five focus groups comprising approximately 6 -10 individuals will be sought. This would represent 12-20% of the population. However the amount of focus groups may be increased or decreased until thematic saturation is reached. The focus groups will be moderated by a researcher trained in focus groups interviewing techniques.

A supervised focus group will be conducted using medical students, this data will not be used however as the activity will be used as a pilot exercise.

Data Analysis

The data will be analyzed by the researcher according to the grounded theory analytic process which includes:

- open coding
- axial coding

The data will be manually coded individually by the research team. Subsequently consensus will be sought from the research team on induced themes. If the need arises, NVivo 10 software will be used.
The researcher will strive for trustworthiness of the content analysis of the focus group interview through rigorous categorisation, defining the categories and showing the connection with the focus group interview question. The research team will have experience and training in grounded theory and qualitative analysis.

Reliability is defined by Goodwin as "the extent to which a measurement instrument yields consistent, stable, uniform results over repeated observations or measurements under the same conditions every time". (15)
The reliability of the focus group interviews will be enhanced by the consistent method applied in the interviewing procedure, by employing the same facility and the same facilitator for the different focus group sessions.

Transferability will be addressed by collecting sufficient detailed transcriptions of data followed by detailed reporting on the outcomes of analysis.
Dependability will be addressed by keeping an audit trail consisting of a complete set of records of the research process. (16)

Validity is defined as the extent to which the instrument measures what it is supposed to measure[4]. The validity will be ensured by completing a comprehensive literature review when designing the research instruments and later in the review of coded data.

Ethical considerations

This study will be presented to the Research Ethics Committee of the Faculty of Health Sciences UCT for approval. An additional approval for "Research Access to students" at UCT will be sought before commencing the research project.

The researcher has no influence on the academic results of the final year medical students and does not act as an examiner in any summative assessments.

All participants will be required to give consent for the data they provide to be included in the study. This consent would be voluntary in nature and students would have the opportunity to withdraw at any point

The confidentiality of the research participants will be maintained by assigning a number to each participant; during the focus group any reference to a participant will be made via the assigned number.

The data will be stored on a password protected hard drive. Only the primary researcher and his co-supervisors will have access to this file.

Furthermore, every precaution would be taken to respect the privacy of the subject and to minimize the impact of the study on the subject's physical and mental integrity and on his or her personality. (7)

The researcher is not involved in any 6th year medical students' assessments, and this will be made clear when recruiting any participants.

Finally there are no financial biases which the researchers need to declare and all efforts will be made to ensure that personal biases do not influence the process or results of the study.

Data dissemination plan

The researcher intend to disseminate the findings regardless of what they might be, provided the process and results are expected to not cause harm to any participant or potential recipient.

Any participant who wishes access to research findings shall be granted such, on condition that confidentiality is maintained.

The primary purpose of this study and its results will be for the partial completion for the M.Phil. (Emergency Medicine) at the University of Cape

Town. It is the intention of the researcher to submit the findings to a peer-reviewed journal publication.

Project timeline

2015	JUN	JULY	AUG	SEP	OCT	NOV
EM-DRC	X					
Sx-DRC			X			
Ethics			X			
Data Collection				X		
Data Analysis				X		
Compilation of Final Report					X	
Submission						X

Budget

Budget		
February – December 2013		
Item	**Description**	**Total cost**
Consumables		
1. materials and supplies		R2000.00
2. materials and supplies		
3. specialized services		
4. office supplies, printing & reproduction for data collection		
5. office supplies, printing & reproduction for reports		R500.00
Research travel		
1. travel to sites		
2. other, specify		
Minor research equipment		
Personnel		
1. transcription fees		R500.00
2. Research Assistant(s)		
Sub-Total		
Total		**R3000.00**

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