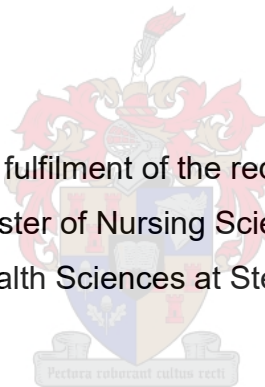# EXPLORING NURSE EDUCATORS' LIVED EXPERIENCES WITH TECHNOLOGY- MEDIATED EDUCATION WITHIN PRIVATE NURSING COLLEGES IN GAUTENG

BY

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Thesis presented in partial fulfilment of the requirements for the degree of
Master of Nursing Science
in the Faculty of Health Sciences at Stellenbosch University

Supervisor: Dr Mariana van der Heever   Date: March 2020

DECLARATION

By submitting this thesis electronically, I, Alethea Sunnasy, declare that the entirety of the work contained therein is my own, original work, that I am the sole author thereof (save to the extent explicitly otherwise stated), that reproduction and publication thereof by Stellenbosch University will not infringe any third party rights and that I have not previously in its entirety or in part submitted it for obtaining any qualification.

Date: March 2020

ABSTRACT

Background: The use of technology in education has become more evident globally and nationally. Nursing institutions recognize the importance of technology in nursing education and have incorporated the use of technology in teaching and learning practice. However, nursing comprises different generations of nurses. The millennials (born in 1981-1996, 23-37 years old) and generation X (born in 1965-1980, 38-53 years old) appear to grasp the integration of technology in teaching strategies better than the older generations such as the baby boomers (born in 1946-1964, 54-72 years old). Furthermore, nurse educators require in-service training and support to efficiently engage with technology-mediated education. On the other hand, nurse educators should also take the initiative and ensure that they are competent in technology-mediated education and thus subject themselves to continuous professional development.

Aim: This study aimed to explore nurse educators' lived experiences with technology-mediated education in private nursing education institutions in Gauteng.

Objectives:

- To explore the types of technology that nurse educators use.
- To describe the nurse educator's initial exposure to technology-mediated teaching methods and the accompanied in-service training.
- To gain an understanding of the lived experiences of nurse educators in relation to the technology-mediated teaching methods that were available to them.

Method: A qualitative approach with a descriptive phenomenological study design was applied. The study was conducted in two private nursing education institutions in Gauteng at three different campuses. The target population included nurse educators at private nursing institutions. A total of 11 nurse educators were selected through purposive sampling. The principle of maximum variation was considered by conducting interviews with nurse educators from different generations with a degree or a diploma in nursing education, with various levels of technology experience (junior nurse educators, senior nurse educators and managerial figures). A pilot interview was conducted, using a semi-structured interview guide to test the guide, the feasibility of the study, and the methodology.

Data analysis was conducted according to the method described by Colaizzi.

Ethical clearance was obtained from the Health Research Ethics Committee at Stellenbosch University. Thereafter, institutional permission was obtained from the nursing education

institutions. Trustworthiness was strengthened using principles such as credibility, dependability, confirmability and transferability.

Results: The themes that emerged from this study are: wide range of technology is used, decisions to use technology, accessibility, educator related aspects and support. Subthemes included decisions to use technology, ease of use, maintaining student interest, addressing students' diverse needs, student engagement and the teaching and learning content. Nurse educators related that they are restricted to use certain websites and had limited access to the computer laboratory. Time constraints to use and master new technology were also identified. Nurse educators also referred to their competency levels and some focused on multi-generational technology transformation as part of their experiences. IT support and in-service training are vital for the delivery of technology-mediated education and yet was identified as insufficient by nurse educators.

Keywords: Technology, educational technology, technology-mediated education, nurse educator.

OPSOMMING

Agtergrond

Die gebruik van tegnologie vir opleiding het wêreldwyd en nasionaal toenemend voor die hand liggend geword. Verpleeginrigtings gee erkenning aan die belangrikheid van tegnologie in verpleegopleiding en het die gebruik van tegnologie in onderrig- en leerpraktyk geïnkorporeer. Nietemin, verpleging bestaan uit verskeie generasies van verpleegsters. Dit blyk dat millenniale (gebore in 1981–1996, 23-37 jaar oud) en generasie-X (gebore in 1965-1980, 38-53 jaar oud), die integrasie van tegnologie in onderwysstrategieë beter begryp as die ouer generasie, soos na-oorlogse kinders (gebore in 1946-1964, 54-72 jaar oud). Voorts, verpleegopvoeders het indiensopleiding en ondersteuning om effektief met tegnologie-gemedieerde opleiding om te gaan, nodig. Daarteenoor, behoort verpleegopvoeders die inisiatief te neem om te verseker dat hulle bekwaam is vir tegnologie-gemedieerde opleiding en behoort hulle te onderwerp aan voortdurende professionele ontwikkeling.

Doel: om verpleegopvoeders se ervaringe wat hulle met tegnologie-gemedieerde opleiding in private verpleegopleidingsinrigtings in Gauteng beleef, te ondersoek.

Doelwitte

- Om die tipes tegnologie wat verpleegopvoeders gebruik, te ondersoek
- Om die verpleegopvoeder se aanvanklike blootstelling aan onderrigmetodes en gepaardgaande indiensopleiding te beskryf
- Om insig te kry in die ervaringe wat verpleegopvoeders beleef in verband met tegnologie-gemedieerde onderrigmetodes wat tot hulle beskikking is.

Metode

'n Kwalitatiewe benadering met 'n beskrywende, fenomenologiese studie-ontwerp is toegepas. Die studie is by twee private verpleegopleidinginrigtings in Gauteng op drie verskillende kampusse uitgevoer. Die teikenbevolking het verpleegopvoeders by private verpleeginrigtings ingesluit. 'n Totaal van 11 verpleegopvoeders is deur middel van doelbewuste steekproewe geselekteer. Die beginsel van maksimum variasie is oorweeg deur onderhoude te voer met verpleegopvoeders uit verskeie generasies met 'n graad of diploma in verpleegkunde, met verskeie vlakke van tegnologiese ervaring (junior verpleegopvoeders, senior verpleegopvoeders en diegene in bestuursposisies). 'n Loodsprojek is uitgevoer deur gebruik te maak van 'n semi-gestruktureerde onderhoudriglyn om die riglyn te toets, asook die uitvoerbaarheid en die metodologie van die studie. Die analise van data is volgens Colaizzi se beskrywing daarvan gedoen.

Etiese goedkeuring is verkry van die Gesondheidnavorsingsetiekkomitee aan die Universiteit van Stellenbosch. Daarna is institusionele goedkeuring verkry van die verpleegkunde inrigtings. Betroubaarheid is versterk deur die beginsels van kredietwaardigheid, geloofbaarheid, bevestigbaarheid en oordraagbaarheid.

Resultate

Die temas wat uit hierdie studie voortgespruit het, is: 'n Wye reeks tegnologie is gebruik, besluite wat geneem is om tegnologie te gebruik, toeganklikheid, opvoederverbande aspekte en ondersteuning. Subtemas sluit in: besluite om tegnologie te gebruik, verbruikersgerief, behoud en aanspreek van diverse studentebelangstelling, studentebetrokkenheid en die onderrig-en leerinhoud. Verpleegopvoeders het meegedeel dat hulle beperk word om sekere webtuistes te gebruik en dat hulle beperkte toegang het tot die gebruik van die rekenaarlaboratorium. Tydbeperkinge om die nuwe tegnologie te gebruik en te bemeester, is ook geïdentifiseer. Verpleegopvoeders het ook verwys na hul bekwaamheidsvlakke en sommiges het gefokus op multi-generasie tegnologie transformasie as deel van hulle ervaringe. Rekenaartegnologie ondersteuning en indiensopleiding is belangrik vir die lewering van tegnologie-gemedieerde onderrig en is deur verpleegopvoeders nogtans geïdentifiseer as onvoldoende.

Sleutelwoorde: Tegnologie, opvoedkundige tegnologie, tegnologie-gemedieerde opleiding, verpleegopvoeder.

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ABBREVIATIONS

DHET   Department of Higher Education

SANC   South African Nursing Council

HEI   Higher Education Institutions

CPD   Continuous Professional Development

ICTs   Information and Communication technologies

NEI   Nursing Education Institutions

IT   Information Technology

CHAPTER 1
FOUNDATION OF THE STUDY

1.1   INTRODUCTION

The use of technology in education has become more evident globally and nationally. The growing use of technology has been ascribed to the need for more innovative teaching and to access information instantly (Hugo & Fakude, 2016:7). With the use of teaching strategies such as online learning, higher education institutions have changed from educator-centred learning to student-centred learning. With a student-centred focus, education has moved away from traditional teaching styles.

Traditionally educators prepared and dispensed lessons to students. Currently, students have been accessing information and preparing the learning content, using various educational technology tools, such as anatomy TV with support from educators. Students, being intricate users of education, need innovative, stimulating and collaborative models of teaching, for example, YouTube videos (Clifton & Mann, 2011:311). The focus is on the student becoming more involved in acquiring knowledge.

In keeping with global trends, there is continuous progress regarding learning techniques presented and included in teaching and learning practice (Li, 2016:105). Nursing schools recognize the significance of technology in nursing education and they have incorporated the use of technology in teaching and the learning practice.

However, some nurse educators are not as proficient with technology compared to their students (Merrill, 2015:72). Therefore, through this study, the researcher aimed to explore the nurse educators' live experiences with technology-mediated education within private nursing colleges in Gauteng.

1.2   RATIONALE

According to the South African Nursing Council, the legislative body that governs nursing in South Africa, nurse educators should be competent to use technology as a teaching strategy and to facilitate learning through the display of expert oral, written and electronic communication (South African Nursing Council, 2005:2).

In addition, the use of technology in higher education has become a requirement and it is included in the South African national developmental objectives (Hugo & Fakude, 2016:15). Subsequently, educators must be able to use technology efficiently to facilitate teaching and

learning. However, some nurse educators are not as skilful and confident with technology (Merrill, 2015:72; Li, 2016:105).

Nurse educators and students emanate from diverse backgrounds and different generations (Fürst, 2011:10). The generation gap between nurse educators, peers and students regarding the familiarity, preference and utilisation of technology in nursing education may pose challenges. As observed, educators from older generations may be experts in their field, having extensive experience, but may prefer traditional sources of technology and be rather reluctant to engage with newer technology. Educators who belong to the millennial generation, on the other hand, tend to adapt easily and are more flexible towards engaging with innovative technology. Likewise, according to Gallo (2011:196) students belonging to the millennial groups, or other students who have an affinity with technology thrive using advanced technology and want instant feedback. Students tend to have a requirement for instantaneous response and are less accepting of those who are not as technologically inclined (Thoothaker, 2017:41).

The researcher, a nurse educator herself, has observed that some nurse educators receive minimal training and support to become skilled with using teaching equipment such as interactive whiteboards. This may be due to various reasons such as shortage of staff, high staff turnover or even high cost of training. The researcher further observed that because nurse educators receive minimal training and support to enhance their competency with technology, they are often left to support one another. Depending on peers for guidance can be frustrating and stressful for both parties. The older generation of nurse educators depends on the younger generation for support, due to their familiarity with technology. The support received from the younger educators relates to the uploading of documents and working in collaboration with students online. For e.g. students and educators who work simultaneously on a document on Google Drive.

According to Hugo and Fakude (2016:143), there are specific reasons leading to the educator's level of willingness to integrate technology in teaching. These reasons may be personal which includes the degree of interest in integrating technology in teaching, being conservative, having a reserved attitude and waiting to see what happens instead of willingly ensuring the integration of technology in teaching.

Factors such as the educator's level of willingness, familiarity, technical support and training regarding the use of technology in teaching and learning can sometimes hinder the integration of technology in teaching (Fürst, 2011:23). Integrating technology efficiently into

nursing education may be demanding for nurse educators who lack the skill and knowledge to use it (Merrill, 2015:73). The nurse educators' individual competencies may also be more related to generational issues, their willingness to engage with technology and the availability of support in the workplace (Fürst, 2011:23).

1.3   PROBLEM STATEMENT

Nurse educators are required and encouraged to use technology in teaching and learning. However, some nurse educators are not as skilful and confident with technology (Merrill, 2015:72; Li, 2016:105. Nurse educators who are less skilled and confident with using technology find themselves needing support from peers who are more skilled and confident with its use.

Support in the workplace such as in-service training and support with new teaching modalities should apparently be strengthened. In addition, some nurse educators require assistance with using and applying educational technology and therefore they appear to be reluctant to embrace the use of technology in nursing education. However, it was previously not known how nurse educators in private healthcare in Gauteng experienced their engagement with technology-mediated education. It was against this background that the study was undertaken.

1.4   RESEARCH QUESTION

The research question: "What are the lived experiences of nurse educators regarding technology-mediated education in private nursing education institutions in Gauteng?" guided this study.

1.5   RESEARCH AIM

The aim of the research was to explore nurse educators' lived experiences with technology-mediated education in private nursing education institutions in Gauteng.

1.6   RESEARCH OBJECTIVES

The objectives of this research were:

- To explore the types of technology that nurse educators use.
- To describe the nurse educator's initial exposure to technology-mediated teaching methods and the accompanied in-service training.
- To gain an understanding of the lived experiences of nurse educators in relation to the technology-mediated teaching methods that were available to them.

1.7   RESEARCH METHODOLOGY

A brief overview of the research methodology is described in this chapter. More detail related to the literature is described in Chapter 2 and the implementation of the methodology is described in Chapter 3.

A qualitative approach was employed since this approach assists with gaining an understanding of human experiences (Grove, Gray & Burns, 2015:67).

1.7.1   Research design

A qualitative approach with a descriptive phenomenological study design was applied.

1.7.2   Study setting

The study was conducted in two private nursing education institutions in Gauteng at three different campuses.

1.7.3   Population and sampling

The target population included nurse educators at private nursing institutions. Purposive sampling was used to select the participants for the study.

1.7.4   Data collection instrument

Data was collected using a semi-structured interview. The guide was developed by the researcher and it contained open-ended questions.

1.7.5   Pilot interview

A pilot interview was conducted, using a semi-structured interview guide to test the guide, the feasibility of the study, and the methodology.

1.7.6   Trustworthiness

Trustworthiness was strengthened using the criteria of Lincoln and Guba (1985:290-327), i.e. credibility, dependability, confirmability and transferability.

1.7.7   Data collection

Data were collected at three private nursing institutions during June 2019 and July 2019 during a semi-structured interview with each participant.

1.7.8   Data analysis

The transcriptions were analysed using the steps described and proposed by Colaizzi (2018:107).

1.8   ETHICAL CONSIDERATIONS

Ethical clearance was obtained from the Health Research Ethics Committee at Stellenbosch University (Ethics Reference number - S19/03/062). Thereafter, institutional permission was obtained from both the nursing education institutions to conduct the study on the respective campuses. Consent to participate in the study was obtained from the study participants.

Other ethical principles applicable that were maintained are the right to self-determination, privacy, confidentiality and anonymity.

1.9   DEFINITIONS

Technology is defined as the organized display of scientific or pre-arranged knowledge to carry out a practical task connecting theory and professional practice (Hugo & Fakude, 2016:410). According to Ramey (2013) technology is an arrangement of knowledge dedicated to creating tools, to distribute actions and to extract resources.

For this study "technology" will be referred to multiple tools such as overhead projectors and laptops (hardware) to computer-based cognitive tools (instructional programmes and software).

Educational technology is defined as the art and science utilised to achieve a task by applying scientific knowledge. It is referred to as a multi-dimensional phenomenon with concepts, procedures and articles (Hugo & Fakude, 2016:47).

For this study "educational technology" will be referred to the technology utilised for an educational purpose to support and enable the teaching and learning process.

Technology-mediated education refers to the use of technology, together with communication structures of media, to deliver instruction and to enable learning (Hugo & Fakude, 2016:410).

For this study "Technology-mediated education" will be referred to as the use of technology as a tool to support, enhance and facilitate teaching and learning.

A **nurse educator** is described as a nurse who employs most of her/his time in the role of an educator who may teach either in a college setting or in a clinical area. A nurse educator must have a formal qualification for this specified role and is considered an expert in her/his field of study (De Young, 2009:10).

For this study "Nurse Educators" will be referred to as nurses with a formal qualification in nursing education, who are employed in this role, at a private nursing educational institution.

Private nursing colleges Private colleges are owned by private organisations or individuals and are not bound by the government's finances or administration (Odendaal:2015). Nursing college is referred to any nursing education institution accredited by the Council in terms of section 15(2) of the Nursing Act (Act no.33of 2005).

For this study "private nursing colleges" will be referred to private nursing institutions in Gauteng.

1.10   DURATION OF THE STUDY

Table 1.1 Duration of the study

Year	Month	Activity
2019	April	Ethics approval obtained
2019	April	Institutional permission Institution A.
2019	June	Pilot interview conducted.
2019	July	Institutional permission Institution B.
2019	July	Data collection.
2019	August - September	Data collection / Data analysis.
2019	April-November	Writing of dissertation.
2019	November	Technical and grammar editing.
2019	December	Submission of the thesis.

1.11   CHAPTER OUTLINE

Chapter 1: Foundation of the Study

Chapter 2: Literature Review

Chapter 3: Research Methodology

Chapter 4: Results

Chapter 5: Discussion, Conclusions and Recommendations

1.12   SIGNIFICANCE OF THE STUDY

This study is considered significant as the findings may be advantageous, and may provide information which could be used to improve the way technology is introduced and used by nurse educators and institutions. The identification of the lived experiences as well as common challenges may assist with improving the use of technology in education.

1.13   SUMMARY

This chapter contains an overview of the study that was undertaken, outlining the rationale for the study, the problem statement, the objectives and the research methodology applied. A brief description of the ethical considerations and significance of the study was provided.

CHAPTER 2
LITERATURE REVIEW

2.1   INTRODUCTION

Chapter 2 concerns a literature review on the experiences of nurse educators about technology-mediated education.

The purpose of this literature review was to gather relevant information regarding the topic and attain a broader view while exploring information to establish what is known about technology-mediated education and more specifically in nursing education (Grove *et al.,* 2015:163).

2.2   ELECTING AND REVIEWING THE LITERATURE

The literature review was conducted over a two-year period. A preliminary review was conducted during the proposal phase of the study. Upon completion of data analysis, the review was revised and strengthened to reflect/include literature related to the findings of the study. Literature search engines used included EBSCOhost (CINAHL, eBook collection, e-journals, ERIC, Health source, Medline), PUBMED, and Google Scholar.

Articles published in English were selected, the majority from peer-review journals, between 2010 and 2019. All articles used in this research were full text.

The range of articles used in this literature review provided a broad view of the topic and determined the information available and relevant in this regard. Keywords used in the literature search were: technology in education, technology in the classroom, technology-mediated learning, technology and learning, technology-mediated learning, technology in health science, nursing education and technology.

2.3   FRAMEWORK OF THE LITERATURE REVIEW

The review is presented in the following order:
- The history of technology-mediated teaching.
- Legislation that supports the integration of technology-mediated teaching.
- Types of technology used in nursing education.
- Continuous professional development of nurse educators.
- Factors influencing competency with teaching and learning with regard to technology-mediated education.

2.3.1 The history of technology-mediated teaching - the gradual integration of technology in teaching and the lesser use of traditional teaching methods

The 21st century is marked by a gradual shift from face to face teaching to the more frequent use of technology-mediated teaching (Li, 2016:105). Over the past decade, there has been a noticeable change in higher education as students now attend classes using their own laptops, readily accessing information instead of awaiting information from the educator, marking more changes in the teaching and learning environment (Damewood, 2016:268). Internationally, in countries such as the United States of America, Canada, United Kingdom, Malaysia and Nigeria the use of technology in nursing education has rapidly increased, and has changed the practice of nursing (Risling, 2016:268; Clifton & Mann, 2011:311; Damewood, 2016:268; Afolabi, 2015:611). As described by Clifton and Mann (2010:311) changes include a social phenomenon described as a user-generated content social networking site called YouTube, which is used in the classroom to show video clips. Embracing technological changes and with the use of teaching strategies such as online learning, higher education institutions have changed from educator-centred learning to student-centred learning (Li, 2016:105).

With a student-centred focus, education has moved away from traditional teaching styles. Traditionally nurse educators prepared and dispensed lessons to students. Currently, education has expanded a great deal, from a traditional classroom setting to digital e-learning. The latter relates to the integration of online sessions in traditional teaching and learning lectures (Saadé, Bűyűkkurt and Alkhori (2011:395).

Currently, students access information regarding objectives in their study guide and prepare the learning content, using various educational technology such as anatomy TV, with support from educators. Students, being intricate users of education need innovative, stimulating and collaborative models of teaching, for example, YouTube videos (Clifton & Mann, 2011:311). The focus is on the student becoming more involved in acquiring knowledge (Saadé, Bűyűkkurt & Alkhori, 2011:395; Clifton & Mann, 2011:311).

In keeping with global trends, there is continuous progress regarding learning techniques that are being presented and included in teaching and learning practice (Li, 2016:105). Nursing schools recognize the significance of technology in nursing education and they have incorporated the use of technology in teaching and learning practice (Merrill, 2015:72).

The use of technology in nursing education has become more evident globally and nationally. Similarly, in South Africa, this growing use of technology is ascribed to the need for more innovative teaching and to access information quicker (Hugo & Fakude, 2016:7). Since the 1990s e-learning had emerged across higher education institutions in South Africa and was accompanied by other technological practices. The practices include email, the use of online journals and the growth of software solutions for information management tasks in teaching, research and other administrative functions (Ravjee, 2007:27). According to a South African study, e-learning and other technological teaching modalities are being introduced in higher education, to enhance teaching and learning (Coopasami, Knight & Pete, 2017:300).

However, Harerimana and Mtshali (2019:1-2) argue that as the health care system is progressively becoming more dependent on technology, nurses are required to constantly develop their technical skills in this regard. To address this issue educator must commence by integrating technology-mediated education into the nursing curriculum. Additionally, the utilisation of technology necessitates a change in nurse educators' methodology in the teaching and learning process. Similarilarly in a study in Nigeria recommendations suggested that educators should include online learning into the curriculum (Afolabi,2015:615). However, in a study conducted in Canada, Risling (2017:91) argues that nursing education does not require comprehensive transformation with regards to the technology-mediated learning environment, but for a successful technological evolution to take place nurse educators have to play a pivotal role in its implementation. Additionally, in agreement with Harerimana and Mtshali (2019:1-2), Afolabi (2015:615) and Risling (2017:91) stated that educators may need to increase their own knowledge and skills of technology. More importantly, educators must be a role model in embracing change in this technology-mediated nursing environment.

2.3.2 Legislation supporting the integration of technology-mediated teaching

The American Association of Colleges has made the development and maintenance of skills to use technology a requirement for nurse educators. This requirement is due to an increase in developments regarding higher education online nursing programmes (Donnelly, Kverno, Belcher, Ledebur & Gerson, 2016:655).

In South Africa, the use of technology in higher education has similarly become a requirement and is included in the National Developmental Plan of 2012. According to the National Developmental Plan of 2012, educators should be capacitated with the application

of technology in teaching and learning and then practice these skills (National Planning Commission, 2012).

The White Paper for post-school education and training in South Africa (Republic of South Africa, 2013:50), produced by the Department of Higher Education and Training (DHET), encourages the use of technology-mediated education to enhance access, communication and student engagement. The DHET acknowledged that equitable access to technology is vital for meaningful participation in a technologically advanced world (Republic of South Africa, 2013:55).

The South African Nursing Council (SANC), the legislative body that governs nursing in South Africa (under the provisions of the Nursing Act 2005), in the document, "*Competencies for a nurse educator*", specifies that nurse educators should be competent to use technology as a teaching strategy and to facilitate learning through the display of expert oral, written and electronic communication (South African Nursing Council, 2005:2). Furthermore, nurse educators must be able to facilitate the development of students by assisting them to use educational resources (South African Nursing Council, 2005:3).

2.3.3　Types of technology used in nursing education

The technology used in teaching and learning in Canada includes websites, software, computer-assisted activities, multimedia applications and game-based learning (Saadé *et al.,* 2011:395). Other global trends of technology-mediated education are voice thread, personal response systems, quick response codes, clicker technology and gamification. All are web-based digital presentation tools that permit asynchronous communication between students and educators (Donnelly *et al.,* 2016:655; Revell & McCurry, 2009:272; Zurmehly & Adams, 2017:505; Toothaker, 2017:80; Day-Black, Merrill, Konzelman, Williams & Hart, 2015:90).

In a study conducted in the United States of America on "Current trends in higher education technology: Simulation'', it was found that simulation forms an important part of nursing education. Furthermore, that simulation has evolved and concerns the use of high-tech equipment to simulate certain disease processes and to promote learning (Damewood, 2016:269). According to Sanko (2017:78) simulation can be used for technical skills such as suturing and non-technical skills such as communication.

Notwithstanding communication as contained in simulation, communication between educator and learner is enhanced through using WhatsApp or email. Communication in teaching and learning is also strengthened through Google Drive, whereby students and

educators can work on a programme simultaneously (Hugo & Fakude, 2016:175; Saadé *et al.,* 2011:395).

Further beneficial uses of educational technology identified the promotion of students' reflective and critical thinking (Waghid, 2011:2; Frantz & Rowe, 2013:9; Swart, 2017:30). Other benefits include addressing several learning styles, by using various technologies to promote student engagement (Wolf, Rutar, Delgado & Niederriter, 2017:40).

In Africa, experience with or exposure to innovative technology as mentioned above is minimal or absent. E-learning and audio-visual devices such as podcasts, video, radio and television are being used as instruction techniques (Harerimana & Mtshali, 2018:24). In the rural areas within South Africa, mobile phones and social media are being used for learning and for teaching nurses (Pimmer, Brysiewicz, Linxen, Walters, Chipps & Grohbiel, 2014:398).

Students in remote areas within South Africa are using Facebook communities to attain support from peers in difficult situations (Pimmer *et al.,* 2014:398). Within the South African context, various types of technology such as online learning programmes, data projectors, PowerPoint slides, interactive whiteboards, teleconference, social media, multimedia, satellite broadcasts, computer-based simulation and the internet are used in higher education institutions (HEI) (Hugo & Fakude, 2016:215).

Computer hardware: South African universities use hardware, i.e. the physical component of an information or communication system (Hugo & Fakude, 2016:407), such as personal computers, laptops, Smartphones and the tablet. According to Thakur (n.d), computers are electronic devices designed to work with information and usually refers to the Center Processor Unit plus Internal memory. Laptops on the other hand as described by (Bucki 2019) is a portable personal computer which has an attached keyboard and a touchpad, trackball or an isometric joystick, which can be used for navigation. Laptops are powered by a battery or an AC cord plug into an electrical output. It has a thin display screen compared to bulky attached desktop computers and can be folded flat for easy mobility.

Software: Institutions of higher education also uses the software. Software refers to programs and materials by which information is presented in a structured manner, put simply, it is the instructions that direct the computer on what to do (Hugo & Fakude, 2016:410). Software used includes MS Word, Excel and PowerPoint presentations (Harerimana & Mtshali, 2019:1). The software contains software systems and application

software. Software systems are a type of software that is intended to communicate with the hardware or even with application software. It acts as an interface between the hardware and the computer programs, coordinating the tasks between the two components of a computer system. The software systems ensure that the hardware manages its task productively (Mulongo, 2019). Examples of software systems include videos, Turnitin (software that detects plagiarism) and Moodle (an e-learning platform).

Moodle, Edmodo, Khan Academy and Bridgit are systems software used by educators in the classroom to some extent. Moodle is a learning platform intended to support educators to build effective online learning environments (Moodle Docs, 2019). Similarly, Edmodo is also referred to as an online learning environment where educators can grade students' work and students can get assistance from their peers (Balasubramanium, Jaykumar & Fukey, 2014:416). Khan Academy used by a few participants offers students exercises to practice learning content, instructional videos and a personalized dashboard that allows students to learn at their own pace (Khan Academy, 2019). Brigit on the other hand used only by some educators, has three main functions: confidential reporting, restorative resources and provide a private social network. Confidential reporting supports students in need and assists in tracking incidents and management. Restorative resources such as lesson plans, restorative activities, and videos are available for students, educators and parents. A private social network allows for a social network platform to connect and engage students, teachers, and parents via messenger, news feeds and support (Bridgit, 2019).

Microsoft word sometimes referred to as MS Word is a word processor allows you to create documents, letters, reports and has features such as spellcheck, text and font formatting as well as grammar check (Computer Hope, 2019). According to (Deskbright, 2019) Microsoft Excel is referred to as a software Programme used to create spreadsheets to capture data in rows and columns. PowerPoint presentations according to Hugo & Fakude (2015:409) is a software Programme that is used to create text slides, multimedia programmers, flow charts, graphs, and graphics.

Smartboards are described as interactive whiteboards that have numerous tools and are highly engaging allowing educators to work online and offline. These also have an interactive touch function similar to a smartphone (Cox, 2019). eBeam is a portable interactive whiteboard system that works with computers and projectors. It converts any typical whiteboard or wall into an interactive display and writing surface, whilst presentations can be saved in real-time and shared with participants (Mustec, 2019).

However, sufficient documented information with reference to the types of technologies used in private nursing colleges in Gauteng was not identified.

2.3.4   Continuous professional development of nurse educators

Continuous professional development (CPD) is described as the ongoing development of one's knowledge, skills and professional attributes. It is regarded as lifelong learning that takes place after a qualification has been acquired (Vasuthevan & Viljoen, 2003:94).

The rationale for CPD: Educators are facilitators of learning. They guide students in the acquisition of knowledge, as an alternative to providing the information traditionally (Li, 2016:106). Subsequently, nurse educators have important responsibilities that include the development and the maintenance of skills to utilise online technology such as e-learning. Many higher education institutions are moving towards e-learning. Without ongoing technological development, nurse educators may find that they are not on par with current trends and are thus less able to assist students (Donnelly *et al.,* 2016:655). Toothaker (2017:80) stated that it is imperative that educators use a variety of teaching approaches, such as YouTube videos and online quizzes, thus fully involving the students in learning that is fun and interactive, while stimulating critical thinking.

Challenges to utilise technology efficiently may lead to educators continuously upskilling themselves to be able to apply technology in education (Risling, 2016:89). On the other hand, having an understanding of current developments regarding teaching and learning technology can be valuable to educators (Ndawo, 2016:2).

Having adequate knowledge of a variety of teaching technologies increases the likelihood of such skills be used to benefit students (Hugo & Fakude, 2016:333). Various studies concede that the curricula of nursing education must expose students to various technologies, to effectively assist students to function efficiently within healthcare (Wyatt, Krausoph, Gaylord, Ward, Hawkins & Goodwin, 2010:109).

Legislation to promote CPD: In South Africa, according to the Nursing Act, no 58 of 2005, Section 39, proposed actions by SANC which are in the pipeline, involving regulating continuing professional development requirements (CPD). This includes the extent of CPD's criteria that needs to be met for the council to credit actions of the individual and institutions in order to meet CPD requirements, that nursing professionals need to adhere to. Requirements will have to be achieved in order for nurses to retain their registration with the council. The SANC is required to institute a CPD system for the nursing profession in South

Africa. Until this system is established, all nurses and midwives are to continue independently with professional development opportunities, ensuring maintenance of competence in their area of practice as well as continuously updating skills and knowledge (Armstrong, Bhengu, Kotze, Nkonzo-Mthembu, Ricks, Stellenberg, van Rooyen & Vasuthevan, 2013:115).

CPD activities can consist of formal or informal learning, self-directed learning and experiential learning. Requirements for CPD may be achieved by presenting the content of a CPD program, presenting at a professional conference or congress, attending workshops, or conducting clinical research (Mccarthy & Illiffe, 2013:25).

Participation in a formal study program offered by an accredited or approved provider of education is a common activity used in CPD. Some employers require enrolment in advanced degree programs to maintain the development of clinical skills or as a requirement to fulfil a professional position. Self-directed activities such as intermittent self-assessment of competencies, reading professional journals, or the development and maintenance of a professional portfolio are included in approved CPD activities (Mccarthy & Illiffe, 2013:25).

It becomes vital for nurse educators to ensure that they keep up with CPD activities to stay skilled and up to date with current trends. The educator's skills and ability to use technology can impact on how technology is integrated into nursing programmes (Harerimana & Mtshali, 2018:24). Additionally, nurse educators are expected to keep up to date with developments in teaching and learning approaches, as well as developments regarding technological advances to develop the students' learning experience (Ndawo, 2016:2).

Growing developments in knowledge and technology make it imperative that health care professionals continue to update their technological skills and knowledge base in order to practice optimally (Meyer, Naude, Shangase & Van Niekerk, 2009:90). It is therefore important that the SANC promulgate regulations pertaining to compulsory CPD for nurse educators, as this would be beneficial for the update and sustainment of competencies pertaining to technology-mediated education.

2.3.5 The availability of resources and tools

Educational technology or information and communication technologies (ICT's) is a term that is used in higher education when referring to electronic and digital teaching technologies such as the Internet, computers, digital cameras and associated software (Hugo & Fakude, 2016:51). E-Learning tools comprise of websites, software and computer-assisted activities

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to facilitate teaching and learning on the Internet. Researchers have identified and investigated learning tools such as web-based practice systems, multimedia applications and game-based learning as tools that focus on learning needs (Saade *et al.,* 2011:395). The general outcome of the study showed that 80% of the students who use online learning tools found it supportive of their learning requirements (Saade *et al.,* 2011:401).

Merrill (2015:73) concedes that it is vital for educational institutions to identify resources that educators will need in order to use technology in the classroom. Technology can positively influence the teaching and learning environment, but with the absence of significant strategies to identify and guide their implementation, technology is not used efficiently (Li, 2016:105). In order for technology to be utilized effectively, it becomes vital for educators and students to have the technology and the instructional materials at their disposal to access and utilize as needed. These resources and tools must be made available through institutional provisions to support teaching and learning (Hugo & Fakude, 2016:41). Deficiency of adequate technology or unavailability of resources such as software and the Internet to produce or to use instructional materials may lead to educators reverting back to traditional modes of communication with students (Hugo & Fakude, 2016:144; Fürst, 2011:23).

In South Africa, some challenges in integrating technology into teaching and learning have been identified, especially access to technology, which has an impact on achieving learning objectives (Frantz & Rowe, 2013:11). Insufficient service and support to ensure the optimal use of technology as well as insufficient educational technology may cause an educator to be resistant to using technology (Hugo & Fakude, 2016:144).

2.3.6 Factors influencing competency with teaching and learning with regard to technology-mediated education

2.3.6.1 Generational issues

According to Gallo (2011:195), four diverse generations of nurses are practising nursing side by side at the same time in nursing history. All four generations have unique characteristics and learning styles. The Veteran nurses, born between 1925 and 1946, prefer a traditional learning style and are not keen on using technology. The Baby Boomers, born between 1947 and 1964, are active learners who prefer face to face communication and are comfortable with computers as part of professional development. Generation X, born between 1965 and 1980, is also known as the television and music generation. Communication relating to technology appeals to this group and they prefer learning that

comprises high-tech computer-aided instruction, videos and problem-solving. Generation Y also referred to as Millennials, born between 1980 and 2001, thrive using advanced technology such as web-based, webinars, simulations and blogs.

It is therefore beneficial that nurse educators are knowledgeable on the different generations of students and their preferred learning styles, in order to promote understanding of the teaching and learning content, as well as to keep them interested, engaged and stimulated (Gallo, 2011:196).

The use of technology in education is important and has contributed to the development of new teaching strategies. However, according to Merrill (2015:72), there are concerns for nurse educators who did not grow up in the same technical savvy age as their students. Educators who belong to the millennial generation tend to adapt easily and are far more flexible towards engaging with innovative technology. Likewise, students belonging to the millennial groups, or other students who have an affinity with technology tend to be less accepting of educators who are not like-minded (Thoothaker, 2017:41).

The technological revolution in education is putting a strain on educators from different generations due to insufficient technical knowledge and skills. Training in this regard becomes important for the successful implementation of educational technology (Hugo & Fakude, 2016:249).

2.3.6.2 Technostress

Technostress experienced by educators is stress due to not being able to use technology proficiently (Tacy, 2015:23). Nervousness and avoiding the use of technology by educators may be due to mistrust, confusion and/or fear. Discomfort when using technology indicates a deficiency in knowledge and skills needed for using such technology, while stress and uncertainty suggest distrust of technology (Nugroho & Fajar, 2018:321-322).

Discomfort, in turn, denotes not being able to have control over the use of technology and thus being overwhelmed by it. This feeling of being overwhelmed can lead to anxiety (Nugroho & Fajar, 2018:321-322). Using new technology and becoming skilful in it can be stressful for nurse educators. Understanding how technostress affects nurse educators may offer insight into their technology issues (Tacy, 2015:2).

The important factors are the motivation and the attitudes of the educators, regarding its use. Some educators are aggrieved and unreceptive of technology (Hugo & Fakude, 2016:142).

Therefore, motivation to use technology will have an impact on how technology is implemented in teaching and learning.

The findings of a study conducted in the United States of America, on the effects of technostress on nurse educator's acceptance of technology, revealed that nurse educator's usage of technology is negatively influenced by technostress. However, educators only displayed positive attitudes and intentions to use technology that was perceived as user-friendly and useful. These perceptions directly lead to varying levels of job satisfaction. Other findings in the study suggested that supporting positive strategies to use technology in nursing education may support decisions by educators to use it (Tacy, 2015:59). Equally, in a study conducted in Indonesia, findings showed that activities in education can be influenced by the level of discomfort that is experienced in using technology. This eventually may lead to a feeling of lack of control or being overwhelmed when using technology. However, discomfort and anxiety can be addressed by the use of informative feedback and developed by starting with simple forms of technology (Nugro & Fajar, 2017:322). Coopasami *et al.,* (2017:301) stated that it is important for institutions to explore technology readiness before implementing new technology. Harerimana and Mtshali (2019:12) in a study at a South African University, conceded that there needs to be progressive training for nurse educators. Additionally, the quality of the educators training programs must be updated to assist educators to ensure uniformity in the manner nursing programmes is presented.

2.3.6.3 Educators competency levels

As technology is increasingly integrated into teaching and learning, nurse educators need to improve their digital literacy (Donnelly *et al.,* 2016:655). Educators knowledge deficiency concerning technology, ineffectual teaching strategies and negative attitudes, are some of the factors that obstruct learning (Harerimana & Mtshali, 2018:25).

Merrill (2015:73) asserted that integrating technology into nursing education can prove to be taxing for nurse educators who have limited knowledge in the use of technology, and therefore may need continuous development to be able to use technology in the classroom. Harerimana and Mtshali (2017:24-25) argued that the use of technology in nursing education requires educators to change their teaching strategy. The authors advised that nurse educators be capacitated to use teaching technology correctly and to consider the fit between particular content or what needs to be taught and specific technology. Being competent would assist in avoiding inconsistencies between technology and the learning

content since a misalliance between technology and what needs to be taught can hinder learning.

Nugro and Fajar (2018:322) stated that there is a positive and negative perception of the use of technology. Positive perceptions show a person's willingness to use technology while negative perceptions can be viewed as distrust as well as being sceptic about technology working well. This may lead to decreased confidence and competency levels. Some may even feel that there are risks associated with using new technology and therefore may not be keen on using it. Harerimana and Mtshali (2017:24-25) conceded that negative attitudes of educators and their resistance to change, hinder teaching and learning.

Factors such as the educator's willingness, familiarity, technical support and training regarding the use of technology in teaching and learning can hinder the integration of technology in teaching (Fürst, 2011:23). Educators are not at the same level of competency with regard to using and integrating technology in education and therefore they may require support on different levels (Hugo & Fakude, 2016:248). Since educators differ regarding competency levels with the use of educational technology, all cannot be measured in the same way (Waghid, 2011:29).

Nurse educators are not exempt from understanding and implementing technologies and they must contemplate how the relevant sources of technology can be included in nursing programmes, to ensure that nursing education is easily accessible (Armstrong *et al.,* 2013:25).

Health care technologies and especially information technologies will continue to exist within the health care environment, therefore understanding and implementing the use of technologies is of great importance (Armstrong *et al.,* 2013:8-11). According to Merrill (2015:73), nurse educators who are not competent with implementing technology-mediated teaching and learning should be patient and continue to develop skills to use new technology in nursing education. According to Mulaudzi, Danials, Direko and Uys (2012:25), study findings showed that newly qualified educators see themselves as less competent in light of performing certain assignments such as curriculum development. This becomes a concern, if educators are not competent with curriculum development, how effectively will technology be integrated into the curriculum. Therefore, the continuous development of nurse educators is important and educators must be encouraged in this regard and there must be a budget to cater for capacity building programs.

2.4   SUMMARY

A discussion was provided on literature regarding the history of technology-mediated teaching, the gradual integration of technology into teaching and the lesser use of traditional teaching methods. National and internal policies also reflect support for the integration of technology-mediated teaching, the types of technology used in nursing education and continuous professional development of nurse educators. However, the use of technology-mediated education appears to be influenced by competency and technostress experienced by nurse educators as well as generational issues.

Extensive literature (Gallo, 2011:196; Toothaker, 2017:41-81; Anderson & Enge, 2012:358; Afolabi, 2015:611; Wolf *et al.*, 2017:40; Coopasami *et al.,* 2017:301 and Orton, Nokes, Scott & Hickey, 2015:13) exist on students' needs, experiences, and exposure to technology in education. However, limited literature exists regarding nurse educators' experiences with technology-mediated education, particularly within the South African context.

The next chapter concerns a description of the research process as applied in the study.

CHAPTER 3
RESEARCH METHODOLOGY

3.1   INTRODUCTION

In the previous chapters' discussions were provided on the background and rationale of the study and a literature review on technology-mediated education.

This chapter comprises a description of the research methodology that was applied to explore nurse educators' experiences with technology-mediated education within private nursing colleges in Gauteng.

3.2   AIM AND OBJECTIVES

The aim of the research study was to describe the nurse educator's lived experiences with technology-mediated education in private nursing education institutions in Gauteng.
The objectives of this research were:

- To explore the types of technology that nurse educators use.
- To describe the nurse educators' initial exposure to technology-mediated teaching methods and the accompanied in-service training.
- To gain an understanding of the lived experiences of nurse educators in relation to the technology-mediated teaching methods that were available to them.

3.3   THE STUDY SETTING

The study was conducted at two private nursing education institutions in Gauteng each representing a different private healthcare company. Data was collected at one campus of one private institution and at two campuses at the other private institution. The private nursing education institutions were selected as they were the two largest nursing education institutions in the country.

Institution A has two campuses in Gauteng and is in partnership with a university in Gauteng that assists with establishing and maintaining academic standards. The institution has more than 800 students registered at the various campuses, with an average of four classrooms on each campus. The classrooms are small to medium in size and can accommodate between 15 to 60 students at any given time as observed.

The nurse educators employed at the institution have qualifications in nursing education and are assessor and moderator trained as evidenced by information provided in section A of the interview guide. Nurse educators, to some extent, receive training regarding the use and the maintenance of technological equipment as per information provide during the interviews.

Institution B has three campuses in Gauteng. The institution is affiliated with a university in Cape Town. The institution has more than 600 registered students dispersed across three campuses. Each campus has at least four classrooms. Each class which are small to medium in size can accommodate between 15 to 60 students at any given time as observed.

The nurse educators employed at this institution also hold qualifications in nursing education, and some are assessor and moderator trained as evidenced by information provided in section A of the interview guide. Although there is information technology (IT) technicians to assist daily, nurse educators receive minimal in-service training and minimal training on the maintenance of technological equipment at all 3 campuses as per information provide during the interviews.

3.4   RESEARCH DESIGN

A qualitative approach with a descriptive phenomenological study design was applied. Qualitative research is seen as a systematic method that is used to explain experiences and situations as perceived by the person in a situation. The researcher, in turn, analyses these experiences and discovers meanings in the words provided by the participant. From the meanings, the researcher provides a description of the participants' experience that promotes a deeper understanding of the experience (Grove *et al.*, 2015:67). A qualitative approach was chosen for the insight it can provide with regards to the experiences of nurse educators with technology-mediated education and the rich descriptions that it can generate of these experiences (Grove *et al.*, 2015:67).

Descriptive phenomenology as developed by Edmund Husserl focuses on the cautious description of experiences as they occur in everyday life (Polit & Beck, 2018:187). Husserl regarded phenomenology as gathering information-rich descriptions of the phenomenon from the participants. The researcher then engages with participants to derive knowledge, using an attentive manner that enables understanding and a description of the phenomenon. Experiences are seen as unique to the person, time and situation, in which they take place (Grove *et al.,* 2015:67).

This design was considered so that the experiences, the nurse educators experienced with technology-mediated education can be explored and described as it occurred in their everyday life (Polit & Beck, 2018:187).
Each educator has their own unique approach to teaching styles and how they apply technology to enhance learning. However, the levels of familiarity and competence with the utilisation of technology vary. How each educator perceives and embraces technology is

also debatable, and therefore it was advantageous to explore their lived experiences from a phenomenological perspective.

Paradigm: Husserl's philosophical perspective concerns phenomenology that emphasises the description of experiences of the participants in their everyday life (Polit & Beck, 2018:401).

Subsequently, knowledge is gained from the insights provided by the participants (LoBiondo-Wood & Haber, 2018:105). As described by de Vos, Strydom, Fouche and Delport (2011:19), Husserl focuses on epistemology. Epistemology concerns the relationship between the knower and what needs to be known. The participant is the knower, and the researcher, in turn, wants to gain knowledge and understand the phenomenon under study, in this instance the live experiences of the participants regarding technology-mediated education. The final description of knowledge regarding the experiences of participants about technology-mediated education should be pure and untainted by the views of the researcher.

Accordingly, the researcher had to apply bracketing. Bracketing is the ability to identify and to set aside one's preconceived ideas, beliefs and opinions about the phenomena. Using a reflective journal is considered useful to achieve bracketing (Polit & Beck, 2018:187-188). Subsequently, the researcher purposefully reflected on her prejudices and presumptions regarding the topic under study and wrote these in a reflective journal.

During data collection and analysis, the researcher focused on the continuous bracketing of these preconceptions about the phenomenon, to avoid influencing the final description of the participant's experiences and constantly strived to attend to the phenomena with a naïve approach (Grove *et al.*, 2015:69). The preconceptions of the researcher are displayed in Table3.1.

Table 3.1 Preconceptions bracketed by the researcher

Preconceptions
1. Types of technology being used in nursing education.
2. Decisions to use specific technology e.g. ease of use.
3. Challenges to use technology in nursing education such as connectivity.
4. Lack of IT support.
5. Lack of in-service related to use of technology.
6. Student factors such as students' level of computer literacy.
7. Educators competency with technology.

3.5   POPULATION AND SAMPLING

The population is described as all the components (people, objects and substances) that fulfil the criteria for inclusion in a study (Grove *et al.,* 2015:46). The population of the proposed research included nurse educators at private nursing institutions.

A sample is a subgroup of the population, carefully chosen for a study and it is referred to as the participants of the study (Grove *et al.,* 2015:46).

Purposive sampling was used to select the participants for the study. Purposive sampling is a method based on the researcher's decision: as the sample may be a distinctive representation of the research phenomenon or the participants may be regarded as experts in their field, having the relevant information that is needed. The participants were selected on the basis of currently being active in the role of a nurse educator (LoBiondo-Wood & Haber, 2018:106). Nurse educators who were available and were willing to participate were interviewed.

The sample size was dependent on the number of educators at each campus of the nursing education institution, and on when data saturation had been reached which meant that no new data arose during the collection of data (LoBiondo-Wood & Haber, 2018:224).

In qualitative research using purposive sampling, and having numerous participants may prove to be complex for analyses of data. The adequacy of the sample size is dependent on when meaning is derived and when the subject studied has been fully explored. Data saturation refers to the stage at which no new data arises during the collection of data (LoBiondo-Wood & Haber, 2018:225). In the current study, ten interviews were conducted when data saturation was reached, the researcher conducted the eleventh interview to ensure no new information arose.

Nurse educators from different generations with a degree or a diploma in nursing education, with various levels of technology experience, were included in the sample. Using purposive sampling, educators with varying levels of experience were included, to derive meaning from their experiences concerning technology-mediated education. Senior and junior educators were included to embrace a variety of experience.

As described by Polit and Beck (2006:274) phenomenology involves participants who have experienced the phenomenon under study, which may include participants with demographic variations, but who have experienced the same phenomenon. Participants involved in the study may share other characteristics such as working in similar environments and having had exposure to the same equipment.

The participants in the sample included nurse educators who were employed in private nursing education institutions and shared similar teaching environments with similar technology. The sample comprised of eleven nurse educators. Eleven interviews were completed, six interviews at institution A and five interviews at institution B. The principle of maximum variation was considered by conducting interviews with junior nurse educators, senior nurse educators and managerial figures. All the educators held post-basic qualifications in nursing education and were assessor trained while three still had to be moderator trained.

Phenomenological studies focus on small samples which range from ten or fewer participants. Two principles guide this decision of a small sample size. Firstly, the sample must include participants who have experienced the phenomena and secondly participants must have had the ability to talk about their experiences (Polit & Beck, 2018:202).

3.5.1 Inclusion criteria

All study participants had to be nurse educators currently employed in the role of nurse educators at the two institutions under study.

3.5.2 Exclusion criteria

Nurse educators who were on sick leave, study leave, annual leave or any other unspecified leave were excluded from the study sample.

3.6 INSTRUMENTATION

Individual interviews were conducted using a semi-structured interview guide. The semi-structured interview guide contains two sections, section A and section B. Section A concerns biographic data (age, gender, qualifications and years of experience as an

educator). The demographic data was considered important as it provided information which assisted the researcher in describing the basic characteristics of the study sample.

The guide contained a set of questions aimed to attain a realistic, yet rich account of the participants' experiences as advised by Grove *et al.* (2015:83). The guide was developed by the researcher and contained open-ended questions, as that allowed the participants to provide an in-depth view of the phenomenon being studied. The interview guide (Appendix 5), also contained probes for example words that support the initial question.

Each interview commenced with the following open-ended question: "Tell me about your experiences regarding technology-mediated education".

3.7   PILOT INTERVIEW

A pilot interview was conducted to assess how the intended study would proceed. The intended method of data collection, data analysis and setting were assessed and the quality regulated (Grove *et al.,* 2015:45).

A pilot interview was conducted with a nurse educator who had met the inclusion criteria. This interview assisted in assessing the accessibility of the determined setting, the feasibility of data collection and whether the questions contained in the interview guide were indeed clear and unambiguous. Data obtained during the pilot interview was included in the findings since no major problems arose during the interview.

3.8   TRUSTWORTHINESS

Trustworthiness includes the degree to which the findings of the study may be regarded as credible, transferable, dependable and confirmable (Grove *et al.,* 2015:392).

3.8.1   Credibility

Credibility is described as an important aspect for evaluating trustworthiness in qualitative research, refers to the confidence in the data collected and interpretations being accurate and truthful (Polit & Beck, 2018:295). Credibility is the confidence of the reader that the results produced are a true reflection of the participant's views (Grove *et al.,* 2015:392).
The researcher applied the principles of peer debriefing in order to be assessed for any bias, search for meanings, and to explain the reasons for particular understandings, in order to ensure that the results analysed were true reflections of the participants' interpretations

(Brink, Van der Walt & Van Rensburg, 2018:111). Peer debriefing was conducted with peers who have completed their master's degree and with the supervisor.

The researcher clarified her interview interpretation by returning to the participants requesting them to confirm the themes as collated and to check that they were consistent with the participant's experiences, in order to assure that facts were not misinterpreted by the researcher (Polit & Beck, 2018:55).

3.8.2   Transferability

Transferability is the applicability or the usefulness of the findings in similar studies or similar settings (Grove *et al.*, 2015:392). In keeping with transferability, the researcher aimed to maintain a comprehensive detailed database. A rich and thorough description of the phenomenon being studied was provided, to allow readers to understand the phenomenon, thereby allowing them to compare the description given with what they have observed in similar circumstances.

3.8.3   Dependability

Dependability refers to the thoroughness of the documentation and the presence of detail about the research process that was applied at all stages of the research study, including the analysis of findings and the decisions made throughout the study process (Grove *et al.,* 2015:392). The researcher ensured that thorough documentation of each step of the study ensued, to confirm the dependability of the study. The supervisor reviewed the written accounts thereof.

The interviews were conducted in the same manner for all participants, as per the interview guide. Coding was checked by the supervisor who also monitored selected interviews and listened to the voice recordings.

All transcriptions were verified by the researcher for accuracy. The supervisor reviewed a few transcriptions to confirm accuracy. Furthermore, the supervisor assessed the coding of randomly selected transcripts to gauge for over-or under-coding, to prevent over-interpretation of data or the lack thereof.

3.8.4   Confirmability

Confirmability assures that the findings, the conclusions and the recommendations are supported by evidence and that the researcher has not influenced the findings, but has

rather abided by the internal agreement between the researcher's interpretation and the study evidence (Brink *et al.*, 2018:111). To comply with confirmability, the data was reviewed by both the researcher and the supervisor, to ensure that the conclusions were logical and not influenced by the researcher's own perceptions and interpretations. An audit trail of themes and sub-themes was maintained as well as a reflective journal.

3.9   DATA COLLECTION

Data collection is referred to as the detailed gathering of relevant information for the purpose of the study (Grove *et al.,* 2015:47).

Data were collected at two private nursing institutions during June 2019 and August 2019. Data collection was obtained during a semi-structured interview with each participant. The researcher being a nurse educator at one of the study institutions chose not to collect any data at the institution she is affiliated with. This decision was made on the premise that the researcher must not personally influence the research in any way.

Preparation of Interviews: The researcher had previously received training by her supervisor for conducting interviews at the University of Stellenbosch's nursing department. The researcher attended a workshop on interviewing skills where her ability to interview participants were assessed in a role-play situation.

Data was collected at one institution by the researcher and at the other institution by a field worker who had completed her master's degree and who had training and experience in conducting interviews. The field worker's interviewing skills were assessed by the supervisor by listening to a recording done prior to the commencement of data collection. The decision to use a field worker was made due to the researcher's affiliation with one of the institutions and more importantly her familiarity with the nurse educators at that institution.

Privacy was ensured by conducting the interviews in a secured private venue as previously arranged with the participants. The interviews were conducted at a pre-arranged time at the nursing education institution where the educators were employed, to fit their work schedule. Anonymity was ensured using aliases.

Meeting the gatekeepers, then recruitment and selection: To recruit participants, the researcher met with the management of each campus to request an opportunity to address the staff and to introduce the study to them. Participants were given a brief description of the process to be followed and the topic under discussion, with an opportunity to ask questions.

The participants were informed during the initial meeting that the interviews would be recorded using a voice recorder and that consent to participate also included the consent for the interview to be recorded. Upon participant consent, a time, venue and date were confirmed with each participant and the interviews were scheduled and conducted accordingly.

The interviews lasted 30 to 45 minutes, to give each participant enough time and to ensure that a comprehensive and adequate data collection process was followed. In total 11 interviews were completed. Transcription of the data followed the interviews.

Follow-up interviews

Two follow-up interviews were conducted with two participants to clarify the descriptions of their experiences with technology-mediated education. Descriptions regarding their initial exposure and experiences with technology-mediated education given in the initial interview were vague and needed to be elaborated on. The participants were made aware of the possibility of follow-up interviews during the initial meeting.

Participants were thanked for their participation and a gift to the value of one hundred rands (R100.00) was given to each, as a token of gratitude for taking time to participate in the research.

3.10   ETHICAL CONSIDERATIONS

Ethical clearance was obtained from the Health Research Ethics Committee at Stellenbosch University (Ethics Reference number - S19/03/062), (Appendix 1). Thereafter, institutional permission was obtained from the nursing education institutions ((Appendix 2). Informed written consent to participate in the study was obtained from the participants (Appendix 3). Other ethical principles applicable that were maintained included the right to self-determination, privacy, confidentiality and anonymity (the transcriptions and the recordings were coded).

3.10.1 Right to self-determination

In keeping with the ethical principle of respect, participants were given the relevant information pertaining to the study and they were allowed to practise the right to self-determination to participate. Accordingly, participants were informed that participation is voluntary, that they may decline to participate and that declining would not affect them negatively in any way. The participants were also informed that they were free to withdraw

from the study at any point, even if they initially agreed to take part. In addition, participants were informed that they were welcome to ask the researcher questions about any part of the study that they did not fully understand. They were advised that it was very important to be completely satisfied that they clearly understood what the research entailed and how they could be involved and assist in the study by participating.

3.10.2 Right to confidentiality and anonymity

The participants' right to privacy of information was ensured, as interviews were carried out at a pre-arranged private and secure venue, the participants were given aliases to ensure anonymity. All transcriptions are electronically stored for five years and password protected, only accessible to the researcher.

The participant information leaflet and signed consent forms are still locked in a safe only accessible to the researcher. The participants were given a copy of the signed participant information and consent form. The transcriber and the fieldworker signed a privacy and confidentiality agreement to ensure that all information concerning the participants was to be kept private and confidential. These are also kept in a locked safe for a five-year period and only accessible to the researcher.

3.10.3 Right to protection from discomfort and harm

The principle of beneficence was applied for the comfort of participants and the safety of all participants was ensured. Venues were arranged in a safe and secure location that was accessible and suitable for the participants. The participants were interviewed at an appropriate time which did not interrupt any participant's work schedule.

3.11   DATA ANALYSIS

Data analysis in phenomenology is described as being immersed with the data, indicating that the researcher has spent substantial time reading and reflecting on the data (Grove *et al.,* 2015:88). Data analysis was conducted according to the method described by Colaizzi (See Section 3.10.1 below). As described by LoBiondo-Wood and Haber (2018:107) data analysis is the process whereby the data collected from the participants' descriptions are synthesised using several steps (See Section 3.10.1 below).

Transcription has been described as a central aspect of qualitative studies, as a verbatim transcript that is able to capture the participant's actual descriptions, explanations and expressions (*Grove et al.,* 2015:88). A transcriptionist was used to transcribe the data.

3.11.1 Steps of analysis

The steps as described in LoBiondo-Wood and Haber (2018:107) utilised a data analysis method as proposed by Colaizzi (2018:107) and includes the following:

- Reading the whole transcript to gain a feel for and to understand the participants' insights and descriptions: the researcher adopted a phenomenological approach and she immersed herself in the data, by reading the transcripts, to gain a feel for and to understand the participant's insights and descriptions, as well as to listen to the recordings concurrently with the transcripts, thus ensuring that optimal analysis and reflection of the data took place.

- Identifying and outlining substantial accounts from descriptions related to the proposed phenomenon under study: The data was broken down to identify and to outline substantial accounts from the descriptions related to the proposed phenomenon under study.

- Deriving meanings from the substantial accounts and to reflect on the use of bracketing: The researcher grouped the substantial accounts into sub-groups and coded the data accordingly. The codes resulted in themes being identified of the phenomenon under study, deriving meanings from the descriptions given by the participants.

- Repetition of this process was applied to all the participants' descriptions to bring together recurring substantial themes, as well as authenticating the themes with follow-up interviews to clarify themes. The researcher allocated codes to the data and emerging themes were identified. Data that was similar in meaning were grouped into categories, with accuracy and transparency ensuring that links of the themes could be made to the original data.

- Assimilating the identified themes creating a rich description of the participants' live experiences regarding the phenomena being studied. Assimilation of the identified themes took place to create a rich description of the participants' live experiences with technology-mediated nursing education.

- Condensing the identified themes into a structure to provide a description of the behaviour: The themes were condensed into a structure to provide a rich description of the participants' live experiences with technology-mediated nursing education.

- Cross-checking the interpretation of the themes by conducting further interviews with the participants: A cross-check of the interpretation of the themes was conducted by interviewing the participants again.

- The researcher followed the steps mentioned above in the data analysis process.

3.12 SUMMARY

In this chapter, the research methodology of the study was discussed in detail and it included various steps in the research process. The methodology, a qualitative approach with a descriptive phenomenological study design was applied.

The objectives which were: to describe the types of technology that nurse educators use, to describe nurse educators' initial exposure to teaching methods and the accompanied in-service training and to gain an understanding of the experiences of nurse educators in relation to the technology-mediated teaching methods that were available to them, were described.

A detailed description of the study setting in two different private institutions was provided. Trustworthiness was explained and incorporated important aspects for evaluating trustworthiness in qualitative research namely credibility, transferability, dependability and confirmability.

The data collection process followed in this study was described, and it was explained that data collection was obtained during a semi-structured interview with each participant.

Ethical considerations were provided. Ethical clearance was obtained from the Health Research Ethics Committee at Stellenbosch University. Other ethical principles applicable that were maintained included the right to self-determination, privacy, confidentiality and anonymity.

Data analysis was conducted according to the method described by Colaizzi. The steps utilised in the data analysis method were described above.

The next chapter concerns the findings of the study.

CHAPTER 4
FINDINGS

4.1   INTRODUCTION

The findings of the study are presented in Chapter 4. The chapter has 2 sections. Section A concerns a discussion of the biographical data while Section B relates to the themes and subthemes that emerged from the data. The raw data were analyzed according to the method described by Colaizzi (see Chapter 3). The findings, the themes and subthemes, are presented in Table 4.1. Dominant themes and sub-themes that emerged during the analysis are described and discussed.

4.2   SECTION A: BIOGRAPHICAL DATA

The biographical data that were collected include age, gender, the position held at the institution, student-group facilitated, qualifications and years of experience.

Eleven nurse educators were interviewed and all were females. Their ages ranged from 29 years to 71 years, with the majority of the participants being in their forty's. As identified nursing education comprises different generations of nurse's educators. Nurse educators in the study comprised of 2 millennials (born in 1981-1996, 23-37 years old),7 generation X (born in 1965-1980, 38-53 years old) and 2 from the baby boomer generation (born in 1946-1964, 54-72 years old).

 All the participants possessed a postgraduate qualification in nursing education and some had specialist qualifications e.g. critical care nursing. Some participants facilitated undergraduate programmes, other short learning programs such as a renal course and postgraduate programmes such as critical care nursing. Years of working as a nurse educator ranged from 2 years to 26 years, with the majority being between 3 to 5 years.

4.3   SECTION B: THEMES EMERGING FROM THE INTERVIEWS

Themes and sub-themes are presented in a summary table (Table 4.2).

Table 4.2: Themes and sub-themes

Themes	Sub-themes

Wide range of technology is used	• Hardware
	• Software
	    ○ Systems software
	    ○ Application software
	• Wide range of technology is beneficial
	• Connectivity to Wi-Fi, the internet and intranet

	• Embracing technology	
Decisions to use technology	• Ease of use	
	• Student interest	
	• Enhance understanding	
	• Generational preferences of students	
	• Directive to use technology	
	• Student computer literacy	
Accessibility	• Restricted World Wide Web Access.	
	• Computer laboratory	
	• Time constraints	
Educator related aspects	• Competency levels	
	• Multi-Generational Technology transformation	
Support	• IT support	
	• In-service training	

4.3.1 Theme 1: Wide range of technology is used

Nurse educators described teaching experiences that involve a wide range of technical equipment that is used for teaching purposes. These include hardware e.g. computers, projectors and software such as the e-learning platform and Turnitin, amongst others.

4.3.1.1 Sub-theme 1: Hardware

Nurse educators from both private nursing education institutions utilize similar types of hardware and software technology. The hardware described by the nurse educators include computers, laptops, iPads, cell phones or smartphones, Proxima (screen projectors), Smartboards, eBeam, simulation manikins. It was clear that a wide range of technology is available.

> *"…we have computers and computer laboratories, uhm and for these courses, we have access for the students on the intranet so that they can be taught how to actually find all the various policies, documents, the work procedures any communique on our own systems."*
> (Participant 7)

Both institutions have resource centres also called computer labs on all the campuses with computers for both student and nurse educators to access. Nurse educators have personal laptops at their disposal. Laptops are used for preparing teaching and learning content, research, administration and presentations of teaching, learning material in class and other educator functions. Proxima also called screen projectors are used to project videos, PowerPoint presentations and other teaching and learning content by nurse educators.

Smartphones and IPads are used by educators to facilitate learning and teaching activities. At first, Smartphones were not acceptable in the classroom as described by nurse educators and were seen as distractions. Currently, it is used by educators for content related educational games, quick reference to google, access to textbooks and numerous other useful computer-based applications. Although it is accepted and used, as students tend to use it for other purposes such as social media not learning-related, it becomes a challenge to monitor and control by educators.

> *"I'm trying to get Moodle up in running because it's also its cell phone-based its computer-based students can access it from any place".* (Participant 1)

Although most of the basic nurse educators who facilitated the first year and second year bridging courses found simulation enhanced innovation when teaching practical issues, post-basic nurse educators who facilitated the intensive care course felt that it lacked advanced simulation equipment for example ventilators that could be used in the scenarios to make the setting more realistic.

> *"We don't have fidelity facilities, so we cannot do a real proper physical assessment on the manikin. Uhm and we do not have all the environmental things that go with a critical care unit so we do basically all our critical care clinical in the units".* (Participant 1).

4.3.1.2   Sub-theme 2: Software

Nurse educators from both institutions described usage of technology that included systems software such as Moodle, Edmodo, Khan Academy, Bridgit, Primal pictures, Aclands Anatomy, Ovid, EBSCOhost, Google Scholar, Cochrane, Turnitin, Survey monkey, YouTube videos, Gamification (Kahoot, Mindcaraft) and WhatsApp.

Students are referred to the computer laboratory by nurse educators to search for articles either to promote further understanding of a topic covered in class, integration of learning content or for the purpose of research. Some of the software described by nurse educators for research was Ovid, EBSCOhost, Google Scholar and Cochrane. Ovid provides full-text journal articles, e-books and nursing content. EBSCOhost is described as an online reference system available via the Internet. It contains a variety of patented full-text databases and databases from information providers. Google scholar offers a system to search for scholarly literature. The Cochrane Library is described as a database that is free

of charge from the Wiley Website and educators and students can access articles for research as well as teaching and learning practices.

> *"We have computers in the resource centre where we send them like if they have to, for example, they have to search for articles they are doing research they can use Ovid they can use ehh Google scholar to get articles an-or to read".* (Participant 2)

Nurse educators evaluate the facilitation of the learning content and study materials using software called the Survey Monkey, that students are requested to complete using their phones, iPads, laptops or the computer laboratory. However, this software is only being used in one of the institutions. Students are orientated at the start of their course and use it at the end of each theory block to evaluate the course content.

> *"What we also do is still in our computer laboratories, is we do some of our assessments uhm like with Survey Monkey, they are then also assisted with these types of assessments we can then print them out".* (Participant 7)

<u>System software:</u> Systems software such as YouTube videos, gamification (Kahoot & Mindcaraft), Moodle, eBeam, Edmodo, Khan Academy, and Bridgit are used to engage students, integrating the teaching and learning content and enhance understand and learning.

Games included Kahoot and Minecraft but are not used extensively in either of the nursing education institutions. Kahoot is a web-based program that permits educators to pose questions to students using a Proxima. Kahoot is useful in evaluating learning. Students respond from a selection of answers electronically on their own devices such as IPads, Smartphones or Laptops. Minecraft is referred to as a Lego style adventure game. Educators only experience challenges if there are problems with the Wi-Fi and are not able to get everyone to connect.

> *"We use quite a bit off uhm Wi-Fi-based student games, we do quite a bit of gamification uhm and-and so the students are then able to uhm access with their own, with Wi-Fi that's supplied, doesn't cost them anything but they can then use their own mobile phones, to find information or to play out a game Kahoot."* (Participant 7)

<u>Application software: Microsoft Word, Microsoft Excel, and PowerPoint presentations</u>
Educators have access to application software and use application software such as PowerPoint for the presentation of teaching and learning content. However, students need educators to support them with using these applications depending on their computer literacy level.

"The students then have access to all the Word programs and Excel and PowerPoints. That gives them the opportunity to give us uhm media and technology-supported assignments. That's again part of our electronic library as well as how we assist the students but then obviously the educator is responsible to assist students with all of these abilities and functions that we make available for them". (Participant 7)

4.3.1.3   Sub-theme 3: Wide range of technology is beneficial

Nurse educators described a wide range of technology that they used to facilitate teaching and learning and stated that its use is beneficial in reaching teaching and learning outcomes.

"We use a lot, e-BEAM, Smartboard, we use a lot of videos and tutorials, a lot of my things I look for free online tutorials like Khan Academy and I work it in to do pre-work. We have our academic databases for journals. We've got the more advanced manikins for critical care." (Participation 1)

understanding of anatomy and Nurse educators use the computer laboratory for various teaching and learning practices. As identified it is used to integrate teaching and learning content by referring students to systems software such as primal pictures or Acland's Anatomy. Primal pictures are 3D anatomy software and are used to enhance the physiology. Acland's Anatomy provides students with videos of real human anatomic specimens in their real colour which aims to enhance the understanding of the structure and function of anatomical structures.

"We've got what you call Primal Pictures, we've got media centre; we've got computers yah. When we teach anatomy, we give them objectives and outcomes from their study guides, and we send them there, where they watch videos. Let's say maybe they want to watch the physiology of sight or the physiology of smell, there are steps involved, it is very interactive". (Participant 11)

4.3.1.4   Sub-theme 4: Connectivity to Wi-Fi the Internet and intranet

Throughout the interview, nurse educators conferred that the most issues experienced with technology implementation were experienced due to issues with connectivity. Nurse educators described aspects such as not being able to access software such as YouTube videos, online articles and other pertinent information as required for teaching and learning due to problems experienced with poor connectivity.

Nurse educators spent time and effort to put together creative presentations integrated with technology but found themselves reverting to traditional methods of teaching and learning

due to issues with connectivity to the Internet. Nurse educators also stated that due to issues with connectivity at the institutions, they had to resort to using the Internet at home.

Nurse educators are dependent on Wi-Fi and the Internet to access software used in teaching and learning. They expressed frustration due to interruption of power supply or technical issues that affected the Wi-Fi, Internet and intranet connectivity.

Nurse educators and students use the intranet to access internal communication, policies, and procedures which assist students to immediately refer to the policies and procedures used in practice as well as in theory.

> *"If anything goes wrong with regards to connectivity, we are very remote so things like connectivity for this particular learning centre are a huge issue, and I do find that there could have been a whole lot more support in that sense. So power failures we've had quite a lot in the area that this particular learning centre is situated in. It is also an industrial area so there's very little done. In terms of the greater area to support, the municipal support is very poor, to support the infrastructure and the lack of infrastructure definitely has an influence. So we can't always throw that under the bus, of the health group it's really bigger than that. The infrastructure that is simply cut by Eskom, for example, and-and it has an influence it really does. At the moment I do not have a generator, we did negotiate with the main hospital here for a generator with no success, so my current budget has a generator in planning and-and I'm quite sure once we, once we go into the new budget, we will then have our own power if something goes wrong, then at least we will be able to continue with teaching. At the moment it's not as easy".* (Participant 7)

4.3.1.5 Sub-theme 5: Embracing technology

All the nurse educators described ways in which they embrace technology in the classroom. Some have expressed excitement in using and trying out new technology. Although nurse educators had and still have various issues, most of which have been discussed and some still to be discussed, all seem to embrace technology. Though at times they experience challenges with connectivity, participants make efforts to download content at home which is not ideal but is done in order to maintain the use of technology-mediated education.

> *"…we've also got a thing called an e-Beam, which is quite a nifty little device it is about ten centimetres long and oval, and it's you put it on the wall and it's got a connector to your computer and then you switch it on, you need a projector with it but everything that you will do on your computer or on the wall you can put it anywhere you want, it is then saved on the computer. So especially my post basic lecturers loved it because then they work with the*

students, and they do everything and when they finished with it they just save it and send it to everybody". (Participant 9)

Nurse educators stated that using a wide range of technology is beneficial in reaching teaching and learning objectives as well as assisting in addressing the various learning styles and class dynamics. Class dynamics include students with different levels of computer literacy, different generations, as well as level of understanding.

A wide range of hardware and software have been identified through the nurse educators' descriptions of their experience with technology-mediated nursing education. The majority of hardware and software are used in both nursing education institutions, however, there are identifiable differences for example software such as Aclands anatomy, Turnitin and Survey Monkey are not utilised identically in both institutions. All participants experience the same challenges with connectivity, accessing the Internet, intranet, and downloading of YouTube videos, however, all embrace technology despite the limitations.

4.3.2   Theme 2: Decision to use technology

Nurse educators' decisions to use technology is based on various facts, some decisions were based on how easy it is to use, others use it to maintain student interest, address students' diverse needs, student engagement and the teaching and learning content. However, there is also an organisational mandate that drives their decisions to used technology, and thus the use thereof must be reported.

4.3.2.1   *Sub-theme 1: Ease of use*

Some of the nurse educators, mostly Baby Boomers and Generation X participants described their decisions to use a specific type of technology to depend on ease of use, as described, YouTube videos are easy to use and do not need preparation. While Moodle, on the other hand, needs much more time to plan and integrate with the learning content. The less complex the chosen type of technology, the more it is preferred. Other nurse educators preferred the ease of use due to workload and time constraints. Nurse educators described their experiences as having large groups to facilitate, and besides facilitation of students, there are other functions that must be completed such as compiling lesson plans, simulation scenarios, administration related duties, assessments that must be conducted and recorded.

> *"I started with for instance Moodle last year as a learning platform but there's so much technical stuff to figure out behind it that uhm I don't have the time, to figure it out".* (Participant 1)

4.3.2.2   Sub-theme 2: Student interest

Nurse educators stated that maintaining the students' interest in teaching and learning is important in order to achieve the intended learning outcomes. To achieve this, the educator has to use various types of technology that maintains the students' interest. Using technology such as the smartboard not only assists nurse educators in maintaining the students' interest but encourages active participation. Students are able to go up to the smartboard and draw diagrams or write their replies. Nurse educators find the lecture method boring and students are less interested in the teaching and learning content.

> *"when you like for example, you are using a smartboard, I can use things that will make the students be awake and interested and listen".* (Participant 2)

4.3.2.3   Sub-theme 3: Enhance understanding

Nurse educators shared that the aim of choosing a specific type of technology was to enhance the understanding of teaching and learning content. In most descriptions shared by nurse educators, it was evident that a blended approach was utilised. A blended method is regarded, for example, using a lecture method with the integration of technology such as YouTube video to enhance teaching and learning.

> *"I like to use the video clips especially if it is a difficult topic like the nervous system or the endocrine system, then I will go through the work with them and I will have, for instance: the blood-brain barrier for some reason they struggle to understand that part. So after I've done it with them I will play like reinforcement and I put that also on Edmodo because they can go and look at it over and over and over until they get the message, so that works well".* (Participant 4)

4.3.2.4   Sub-theme 4: Generational preferences of students

Nurse educators acknowledge the importance of addressing generational preferences and stated that they try and use different teaching and learning technology-mediated strategies by taking into consideration the diverse generational technological preferences. Students entering the basic and post-basic courses are from different age groups. All the basic students have acquired a qualification as an enrolled nurse and are now pursuing a qualification to become a registered nurse. Post-basic students are pursuing additional qualifications, for example, intensive care training. Students belonging to the Baby Boomers (born 1946-1964) and Generation X (born 1965-1980) prefer to use hard copies of the textbooks to study from and have difficulties with using technology. Millennials (born 1981-

1996), on the other hand, are more technology-savvy, prefer e-Books that can be easily accessed on their smartphones, iPads or laptops.

"Huge variety of students in our classes like you've got my generation the ones that were born in the eighties and then some in the seventies, so and then we still have we have our millennials. My generation the ones born in the seventies battle a lot, textbooks are now on the phones. Others study the textbooks on their phones or on their iPads, but they can't learn from the textbooks on their phone compared to the newer generation". (Participant 3)

4.3.2.5   Sub-theme 5: Directive to use technology

Nurse educators stated that according to institutional requirements it is a directive to include technology in their teaching and learning practice. The usage of technology must be indicated in lesson plans. A monthly report is compiled on technology usages such as the use of computers in the computer laboratory and simulation.

"' I get checked on you know, the digital media usage in the computer room so I will write up a report of how many students used the computers on a monthly basis, and what did they access the computers for, for example, was it just self-study, did they access Google, did they use it for Ovid, so overall we've got a register where the students will sign and they'll say what they used the computers for". (Participant 10)

4.3.2.6   Sub-theme 6: Student computer literacy

Nurse educators stated that student computer literacy has to be taken into consideration when engaging in teaching and learning. Some students can work efficiently with technology especially the Millennials as Millennials are students who have grown up in the technological age, while others such as the Baby Boomers and Generation X are not so efficient. Nurse educators need to orientate students to the computer laboratory at the beginning of the course and how to use computers. Undergraduate and postgraduate students are assisted with computer literacy through the completion of course work. Before using a type of technology the nurse educators orientate students on its use, but still during the lesson, encounter students who are slower in understanding and less able to use the technology than others. This lack of proficiency amongst some students becomes a challenge for nurse educators and other students alike. Students who are able to utilise that specific technology will have to wait for the others. Nurse educators find this time consuming having to assist the students, to get the whole class on par.

"We try to be quite computer-driven uhm and we found that our students, some are good on computers and some are really [pause] they don't even know the basics. So since 2018 January, we introduced a module of academic development where we do computer literacy with all the post basic students and all the basic students". (Participant 1)

"Okay uhm I think our students are a bit, some of them are very clued up with technology but the older ones struggle with it. So it depends on what kind of student you have in your class, some of them will go for it and others will always have a problem with using it". (Participant 4)

Nurse educator's decision to use technology due to its perceived ease of use included types of technology that maintain student interest as well as enhance understanding. Students belonging to different generations have preferential learning styles paired with the type of technology which must be taken into consideration. Nurse educators found it important to consider student preferences. There is also a directive to use technology, hence participants use technology and have to report on their experience. Student computer literacy is an important factor that has to be considered when using technology, as all students are not on the same level and may require additional support.

4.3.3   Theme 3: Accessibility

Nurse educators related that they are restricted to use certain websites and therefore cannot access all software and information required for teaching and learning. Another area of accessibility that was highlighted was access to the computer laboratory. Time constraints to use and master new technology were also identified. These gaps are possible barriers to the implementation of technology-mediated nursing education.

4.3.3.1   Sub-theme 1: Restricted web access

Nurse educators expressed frustration as they are not able to access websites that they deem necessary for teaching and learning. Individuals felt limited as educators, due to having restricted access to the World Wide Web. For example, not being able to access articles other than the ones on Google Scholar and Ovid, additionally, not all participants have access to EBSCOhost. Nurse educators stated that due to not being able to download content or access certain software such as Minecraft and educational YouTube videos at the institution, which is intended to enhance teaching and learning, they had to download information at their homes. Nurse educators acknowledged that a process has to be followed especially due to cost that may be incurred for the payment of certain sites, where restrictions had to be implemented in order to protect the integrity of the company and

prevent abuse of the resources. Restricting educational websites for educators becomes frustrating and the restrictions should be reviewed on an ongoing basis. Educators are not yet using other means like dropbox or send space as accessing the information is a major problem due to restrictions to websites, placed by the organisation.

> *"I cannot access YouTube or certain sites where I can download video clips for my students, so I need to do that at home or I need to do it at the resource centre, with the laptops and we're not allowed to use Flash Drives anymore, so how do I get it from there to my laptop. So I have to download it at home. If I'm preparing on campus and there's stuff I cannot do, I need to go and do it at home so it makes the preparation time longer. There's lots of security and we don't have administrative access so you cannot download anything that is not approved by the company, so that is uhm it's frustrating…"* (Participant 4)

4.3.3.2   Sub-theme 2: Computer laboratory

Nurse educators stated that due to the computer laboratory having a limited amount of computers it becomes a challenge for large groups of students. Therefore, they have no other option but to divide students into smaller groups and facilitation of the groups becomes difficult. Some students may not grasp the learning content as quickly due to issues surrounding the use of technology or even their level of understanding.

> *"It's a challenge because uhh our student numbers are quite high and resource centre can't accommodate all of them, so it if you want to include the resource centre in our lesson plans then we need to rotate them as the one group will come here and the other group will do another activity".* (Participant 3)

4.3.3.3   Sub-theme 3: Time constraints

Nurse educators stated that though they are being sent for workshops relating to educational technology, they face time constraints and therefore do not have the time to use and master the new technology. Turnitin is one of the types of technology that nurse educators received training on but due to not having time to master it, it is not being used to its full potential. This, in turn, leads to the institution's hesitance to send them for further training due to cost implications. Students can utilize the computer laboratory to submit their assignments via Turnitin, a service that is used to check for originality and plagiarism of an assignment submitted. However, it is not being utilized by either of the two institutions and is still in the infancy stage in the one institution that is trying to implement it.

"If we ask the company to put in five thousand rands in a workshop we need to use that thing and I think the problem comes in at, for instance, turn-it-in, its nog technology, we have attended the workshops but we do not get the time to go practice the other skills, or features of turn-it-in like online marking and so forth. So we use it just as a similarity report generator at this moment, but we had that training for the rest of the stuff, but even if you had training you still need to go sit and do it yourself and figure out the practicalities behind it and then you can use it. I think that creates a reluctance on the company's side, to sommer put in money and say let's send you all on a Moodle workshop and then it doesn't realize in everyday technology use". (Participant 1)

Nurse educators identified restrictions on websites as a factor contributing to accessibility. Not being able to access information and download software and content, for example, YouTube videos, are barriers to the implementation of technology-mediated nursing education. Further barriers as a result of inaccessibility, were inadequate computers in the resource centre to accommodate large student numbers and dynamics. Time constraints to learn and master new technology are also identified as a barrier due to inaccessibility with regards to sufficient time to practice and become skilled.

4.3.4   Theme 4: Educator related aspects

When asked about their experience with technology-mediated education, nurse educators also referred to their competency levels and some focused on multi-generational technology transformation as part of their experiences. Multi-generational technology transformation refers to nurse educators that belong to different generations, trying to adapt to newer technology that they are not familiar with. The focus is their experiences with technology, using and embracing similar technologies that have evolved over time in their current roles as educators.

4.3.4.1   Sub-theme 1: Competency levels

Some nurse educators described that they were not as competent using technology as compared to their peers. Nurse educators stated that they engage in self-development by teaching themselves how to use technology or sought help from peers and are still seeking help with technology. Others stated that most of their exposure to technology took place during their postgraduate studies. Although nurse educators were exposed to technology in their postgraduate studies, some stated that it was not sufficient and realised that they had to learn much more once they came into the role of a nurse educator. Educational technology even in postgraduate training were not introduced to nurse educators. Nurse educators stated that simulation was not a part of their training and therefore had to learn

about simulation and how to use it only when they were in the position of actively facilitating students.

> *"you know in the beginning it is a little bit daunting, having to learn new different types of technology, when I first came here I've never had to work with simulation before so, I had to learn".* (Participant 10)

4.3.4.2   Sub-theme 2: Multi-Generational Technology transformation

According to the biographical information captured from the participants, it is identifiable that the nurse educators belong to different generational groups. It was also identified that the nurse educators from the Baby Boomers (born 1946-1964) and Generation X (born 1965-1980) had a bit more transformation to do than the Millennials (born 1981-1996). All the nurse educators expressed the need to keep upskilling themselves and learning as new types of technology emerge. Millennials stated that it was not difficult to learn new technology and it did not take much time. However, some of the Baby Boomers felt that they need to update their knowledge in order to stay on par with students who are more technology-savvy. Generation X, although having more exposure and experience than Baby Boomers also stated that due to the developments in technology they too found the transformation a challenge. Therefore, it is identifiable that nurse educators from the Baby Boomers and Generation X need assistance with the integration of technology in nursing education.

> *"I use the computer to update my knowledge to find out what was going on, plus it's a great thing to use for preparing your lectures and uhm and they the students catch me out so I need to use the computer to check up if what they're telling me is right".* (Participant 8)

Nurse educators found that they are not as competent as their peers although they engaged in self-development, they still have to rely on peers for assistance. Exposure to technology usage in post-basic studies was inadequate and did not prepare them sufficiently for their role as educators, hence they engage in learning new technology needed for teaching and learning while in the role. Generational technology transformation also contributed to how educators use technology: Baby Boomers and Generation X educators find it more difficult to learn and use new types of technology than Millennials.

4.3.5 Theme 5: Support

The constant change in the educational technology landscape requires a constant change in practice and therefore, various kinds of support are required. The nurse educators viewed IT support and in-service training as vital for the delivery of technology-mediated education.

4.3.5.1 Sub-theme 1: IT support

IT support is important for the application of technology: numerous technologies must be supported in order to create an environment that will be helpful in integrating the use of technology. Nurse educators stated that although there is remote IT support in the organization, there is no physical IT support on campus. The IT support available appears to focus more on hardware and less on software, including the operation and assistance thereof. Nurse educators need assistance with software applications especially downloading and the setting up of it. Some participants referred to the assistance as technical support and stated that it was a time-consuming task to figure it out on their own. Other nurse educators stated that IT support is not efficient and effective as a long process needs to be followed before any assistance is received. Participants stated that they preferred IT support to be on-site so that assistance would be more efficient.

> *"We lack support. IT wise I don't think our IT support system for the school, we don't have an IT person on-campus number one, we have to send everything to Joburg if it needs to be fixed".* (Participant 1)

4.3.5.2 Sub-theme 2: In-service training

The use of technology in education enhances students' training, therefore it is vital that educators and students are trained on how to effectively use and integrate technology into education.

Nurse educators have indicated that there is a lack of sufficient in-service training for nurse educators with regards to technology-mediated education. Nurse educators expressed that although some in-service training was provided for example, the Smartboards, they are still not being utilized as educators don't know how to use it. Initial training on how to use technology is not sufficient. There is often no expert or professional support and therefore they are left to support and teach each other on how to use a particular technology. Nurse educators expressed a need for in-service training and some even felt that their request for in-service support was ignored.

> *"We don't have people that are experts in for instance Moodle, who can help us to set up the system that it is both secure for the students but we can use it, so its learning curves that we have to go through ourselves if we want to use these things."* (Participant 1)

Although there is some form of IT support, it is not efficient, nurse educators need IT support that is easily accessible, ongoing in-service, and effective to make integration of technology into teaching and learning a smooth process.

4.4   SUMMARY

In this chapter, the dominant themes and sub-themes that emerged from the raw data have been described.

Nurse educators at both institutions have described a wide variety of technology that can be used for teaching and learning. However, it became clear that not all the technology that is available is being used. Competence is indeed lacking and often the decision the use a particular form of technology is based on competency and ease of use. Although educators have a variety of techniques to use, they are restricted to certain websites and only have access to certain online journals.

Competency with technology is an issue for some educators, who often engage in trying to learn how to use technology on their own or rely on peers who are more competent for support. Even though all the nurse educators had some exposure to technology in post-basic studies, it was insufficient in preparing them for current technology use in nursing education.

Nurse educators from the Baby Boomers born in 1946-1964 and Generation X born in 1965-1980 find it difficult to make the transition from the technology they were used to in comparison to the new and current technology being used at present in nursing education. Millennials born in the years 1981-1996, on the other hand, are more tech-savvy and experience less difficult in using technology.

Nurse educators need support with in-service training to keep skilled and updated in order to successfully implement technology-mediated education and meet teaching and learning outcomes. It is important for IT support to be more efficient in assisting nurse educators to prevent frustration and thus reverting to more traditional methods of teaching and learning.

The next chapter includes the discussion, conclusion and recommendations.

CHAPTER 5
DISCUSSION, CONCLUSIONS, AND RECOMMENDATIONS

5.1   INTRODUCTION

The previous chapters comprised the background and overview of the study, a synthesis of the literature on the topic, a description of the methodology that was applied and a presentation of the findings. The current chapter provides a discussion of the findings in relation to literature, the conclusion, and recommendations based on the findings and supportive literature.

5.2   DISCUSSION

The aim of the research was to explore nurse educators' lived experiences with technology-mediated education in private nursing education institutions in Gauteng. The discussion concerns the findings of the study in relation to the objectives.

5.2.1   Objective 1: To explore the types of technology that nurse educators use.

The findings reveal that a wide range of technology is used in nursing education at the two participating nursing colleges. However, global trends provide a much more varied perspective. According to Oermann (2015:55), nurse educators use of technology in education in the United States of America continues to grow at a fast pace and include technology such as web conferencing, cloud computing, podcast, vodocast, virtual worlds, gaming, simulation and mobile technologies among others. The findings of a study completed in the United Kingdom (Clifton & Mann, 2011:311) showed that nurse educators have a wide range of technologies available such as virtual reality, simulation, podcast, blogs, wikis, iTunes U, computer-assisted learning and user-generated content.

As discussed in Chapter 2 Section 2.3.3, the findings of a study conducted in Canada on the technology used in teaching and learning also confirmed the use of websites, software, computer-assisted activities, multimedia applications and game-based learning *(Saadé et al.,* 2011:395). Similarly, other global trends embrace technology such as voice thread, personal response systems, quick response codes, clicker technology and gamification. All are web-based digital presentation tools that permit asynchronous communication between students and educators (Day-Black *et al.,* 2015:90; Donnelly *et al.*, 2016:655; Revell & McCurry, 2009:272; Zurmehly & Adams, 2017:505; Toothaker, 2017:80).

However, the findings of a study completed in Malaysia (Irinoye, Ayamolowo & Tijnai, 2016:9) affirmed information communication technology to be an important motivating factor

towards globalization. The authors advised that to be on par with global trends, the nursing profession in developing countries must address their possibilities, plan the required developments and implement important changes in adjusting to the new broad spectrum of communication technologies.

The findings of the current study also showed the benefits of having a wide range of technology. The latter is in line with findings of Thomas, Reyes and Blumling (2015:35) who found that using a variety of technologies is beneficial in stimulating students' understanding of teaching and learning. Using a variety of technological approaches in teaching assisted in meeting students' learning needs. Wolf *et al.,* (2017:40) (see Chapter 2, Section 2.3.3) similarly stated that using various technologies are beneficial in addressing different learning styles of students.

Concurring with the findings in the study regarding poor connectivity to the internet, the findings of a study in Nigeria indicated that access to the Internet was also a challenge in nursing education (Afolabi, 2015:614). O'Connor and Andrews (2015:140) conducted a study in the United Kingdom on mobile technology and its use in clinical education. They found a slow or non-existing Wi-Fi connection to be a barrier, preventing students from efficiently accessing useful learning content on the Internet using their mobile phones.

Participants in the current study embrace the use of technology despite challenges. Similarly, Oermann (2015:55) stated that although students prefer to be passive learners in different situations, nurse educators embrace technology and continue to move forward with teaching methods that provide an opportunity for students to work collaboratively. Nurse educators endeavour to use innovative technologies to engage students in a student-centred environment creating opportunities for active learning.

Zurmehly and Adams (2017:505) concur that innovative educators are evolving with technology and ensuring that creative learning experiences are available for students. However, the findings of a study in Nigeria by Afolabi (2015:614) showed that the non-adoption and the lack of innovation from educators towards online learning as a teaching and learning method is a challenge in creating technology-mediated teaching and learning online environment.

5.2.2 Objective 2: To describe the nurse educators' initial exposure to technology-mediated teaching methods and the accompanied in-service training.

Most of the participants described their competency levels, postgraduate exposure to technology as well as initial exposure in the role as a nurse educator, generational issues, IT support and in-service training.

In line with the findings of the current study, the findings of another South African study indicated that the nurse educator's competency level is vital and the core aspect in nurse educator programmes. However, they found that a new nurse educator's adjustment to the academic setting and preparation for initial exposure to performing tasks such as curriculum development was inadequate (Mulaudzi *et al.,* 2012:1). As discussed previously in Chapter 2, section 2.3.6.3, technology is increasingly integrated into teaching and learning, therefore nurse educators need to improve their digital literacy (Donnelly *et al.*, 2016:655). However, some nurse educators are not as proficient with technology (Merrill, 2015:72).

As discussed in Chapter 2 section 2.3.6.3, nurse educators who lack the required knowledge and skills to use technology efficiently can obstruct teaching and learning (Harerimana & Mtshali, 2018:25). The findings of a study conducted in Israel revealed educator's lack of computer skills and discomfort with using technology, as one of the barriers in the integration of technology in nursing education (Gonen, Sharon & Levi-Ari, 2016:1). Merrill (2015:73) asserted that integrating technology into nursing education can prove to be taxing for nurse educators who have limited knowledge to use technology. Educators, therefore, need to engage in continuous development to be skilled in technology-mediated education. In the current study, nurse educators identified time constraints to develop technological skills and insufficient in-service training as factors that contribute to their competency levels with technology.

The findings of a South African study by Harerimana and Mtshali (2019: 1) showed that students too, lack technology skills/computer literacy. The authors recommended that emphasis should be placed on the inclusion of computer literacy in the nursing curriculum especially because first-year students have limited exposure to computers in some schools. Landeiro, Freire, Martins, Martins and Peres (2015:1) conducted a study in Portugal and identified a difference between undergraduates and postgraduate students use of technology. They accordingly suggested that educators need to reconsider the curricula, especially with the use of technology in nursing care. Similarly, Mohammed *et al.* (2017:30) in Saudi-Arabia, recommended that the curricula be infused with technological innovations to better prepare nurses for the challenges in healthcare. Swart (2017:31) acknowledged the

significance of including technology in the curricula but related that the lack of agreement and unwillingness to transform teaching practice can be a barrier to its adherence. Similarly, Nwozichi, Marcial, Farotimi, Escarbarte and Madu (2019:2) argued that due to a lack in standardisation concerning ways to integrate technology content into the nursing curricula, there are inconsistencies in the integration of technical skills in nursing education that need to be addressed. Nurse educators in the current study identified that student computer literacy has to be taken into consideration when engaging in teaching and learning. Therefore, undergraduate and postgraduate students are assisted with computer literacy through the completion of course work.

Landeiro *et al.* (2015:2) state that it is important to understand how nurses address transformations that arise in practice, more especially in line with technologies and interferences that these might have on their behaviour and attitudes. However, according to Tacy (2015:1) on the other hand, there is an insistence to integrate new technology systems and applications into the nursing curricula, therefore, necessitating nurse educators to employ a quick transition to bridge the gap between current generations of nurse educators and students. However, in the current study nurse educators belonging to Generation X, although having more exposure and experience than Baby Boomers also stated that due to the developments in technology they too found the transformation a challenge. Therefore, it is identifiable that nurse educators from the Baby Boomers and Generation X need assistance with the integration of technology in nursing education.

Furthermore, the technological revolution in education is putting a strain on educators from different generations due to insufficient technical knowledge and skills. Training in this regard becomes important for the successful implementation of educational technology (Hugo & Fakude, 2016:249). As discussed in Chapter 2 section 2.3.6.1, according to Merrill (2015:72) there are concerns for nurse educators who did not grow up in the same technical savvy age as their students. Educators who belong to the millennial generation tend to adapt easily and are far more flexible in engaging with innovative technology. Likewise, some students belonging to the millennial group, or other students who have an affinity with technology, tend to be less accepting of educators who are not like-minded (Thoothaker, 2017:41).

As technology is increasingly integrated into teaching and learning, nurse educators need to improve their digital literacy (Donnelly *et al.,* 2016:655). The findings of a research study conducted in Chile showed that it is essential to make sure that the educators' knowledge is updated in order to provide quality training to students as well as providing them with varied

exposure in the intended field of knowledge (Alonso, Plaza & Orafali, 2019:170). Li (2016:105) argued that due to the absence of guidelines given to educators and institutions, in a study in Malaysia on how to move from conventional teaching to learner-centred teaching, technology is not being used for its intended purpose.

However, Oermann (2015:55) stated that it is not necessary for all educators to search and adapt to new technologies, but every department requires a few nurse educators who adapt quickly, are creative and can guide other nurse educators.

Educators are not all similar and thus beginner to seasoned educators need suitable orientation and training (Hugo & Fakude, 2015:248). Damewood (2016:271) conceded that as technology develops so too, must the support of it through resource allocation, training and hiring practices. Identifiably nurse educators in the current study indicated that there is a lack of sufficient in-service training with regards to technology-mediated education and Initial training on how to use technology is not sufficient. There is often no expert or professional support and therefore they are left to support and teach each other on how to use a particular technology.

According to Alonso *et al.* (2019:173), there is a greater tendency to use technology in infrastructure and social influence, which supports its integration. In a study in the United States of America, recommendations were made which suggested that clear and easy to follow training for technological programmes as well as suitable technological support be delivered to manage maintenance and malfunctions (Anderson & Enge, 2012:367). In line with the current findings, it is important to ensure that educators are kept up to date in technical knowledge, and have access to real-time IT support which is imperative in the implementation of technology-mediated nursing education (Fürst, 2011:44)

5.2.3 Objective 3: To gain an understanding of the lived experiences of nurse educators in relation to the technology-mediated teaching methods that were available to them.
Participants provided a description of their life experiences in relation to the technology-mediated teaching methods that were available to them, with almost all sharing the same sentiments.

Findings in a study conducted in the United Kingdom showed that nurse educators preferred mobile technology for its usefulness, portability, and flexibility (O'Connor & Andrews, 2015:140). Thomas *et al.* (2014:33) argued that technologies used in a nursing education

environment should be instinctive, add value and be easy to use. However, the findings of a Chilean study indicated that difficulty of adapting to teaching practices by nurse educators was due to the students' use of a specific tool and if its perceived use was difficult, it was rejected by educators. The educator's intention to use technology is also influenced by the effort, social influence and teaching conditions. Oermann (2015:55) suggested that technology-mediated education should be based on teaching and learning outcomes to be attained instead of how and when tools should be used and that the focus should be on selecting technology that will enable learning.

Thomas *et al.* (2014:33) stated that when presenting challenging content, individual students start at different levels of understanding, and thus recommended that educators assess the exposure of students to teaching and learning methodologies as they develop, to keep students engaged and motivate participants to enhance learning. According to Clifton and Mann (2011:312) using varied methods in teaching can engage students in deep learning as well as keep student's responsiveness focused. Findings in a study conducted in the United States of America suggested that being able to produce student-centred learning environments can be a challenge for educators, and instead, educators should consider methods such as serious gaming which provides a stimulating learning environment (Day-Black *et al.,* 2015:90). Although nurse educators in the current study have identified gaming as an innovative method to engage students with, the teaching and learning content it is still not widely utilised as more training in this regarded is needed.

To create a stimulating learning environment, the technology used in nursing education must be seen as a fundamental component in health care, as it comprises of skills, tools and knowledge that allows for sharing information that is categorised in such a manner as to develop an understanding of health issues (Landeiro *et al.,* 2015:2). According to Nwozichi *et al.* (2019:3), findings of the study conducted in Portugal indicated that technology-enhanced education is more effective than traditional methods and enhances the learning experience of nurses. Coupled with the confidence levels that students developed in using technology-enhanced learning, the technology used by nurse educators to enhance learning was found to be useful in fulfilling teaching responsibilities.

Findings in a South African study indicated that students prefer learning in a technology-infused environment (Maboe & de Villiers, 2011101). However, in another study in South Africa according to Thomas *et al.,* (2014:33) recognising expectations of the current generation of students and applying new techniques in teaching can be challenging for educators, especially when it comes to the integration of technology into the learning

content. Multiple teaching methods should be used to make sure students' learning styles are considered and learning content is made clear. They explained that the next generation of students will endure demanding innovative methods of course conveyance in the same way the current generation does, but just at an accelerated speed. In a study conducted in Ghana, it was found that younger students had higher confidence levels in using mobile technology and found it easier to use than older students, additionally, younger students were more positive in embracing technology than older students (Buabeng-Andoh, 2018:55). However, in a study conducted in the United States of America, it was found that using innovative strategies to engage students also aided in addressing the generational diversity of students (Toothaker, 2017:80).

Similar to the current study findings, in a study conducted in Southeast Asia, directives made by the Philippine Department of Education included that technology must be integrated into all learning activities to ensure its use in nursing education (Nwozichi *et al.,* 2019:3). Similarly, the Nursing Department in an unnamed centre in Israel has moved towards including technology it to its curriculum (Gonen *et al.,* 2016:2).

In line with the current study findings, a study in South Africa found that the student's literacy level is a key component in the successful application of educational technology (Pimmer *et al,* 2014:1). Mohmmed, Mohammed and El-sol (2017:30) conceded that central to the inclusion of technology-mediated methods in nursing education is computer literacy. Additionally, in a study in Malaysia, it was found that students will need to have sufficient computer skills to access technological tools as well as the infrastructure (Irinoye *et al.,* 2016:19). Findings in a study in the United Kingdom reported that poor computer literacy among nursing students negatively affected the use of mobile technology. Students who were computer literate were more compatible with the use of mobile devices than mature and international students who lacked computer skills (O'Connor & Andrews, 2015:40).

According to Fürst (2011:21), access to the World Wide Web in public forums serve as an essential means for educators and students to be a part of the global village. Equally, the availability and access to resources and services are vital in supporting educators and students. In order for technology to be utilized effectively, it becomes important for educators and students to have the technology and the instructional materials at their disposal to access and utilize as needed. These resources and tools must be made available through institutional provisions to support teaching and learning (Hugo & Fakude, 2016:41). Thomas *et al.* (2014:33) recommended that it is necessary to prepare students with resources available in the digital environment and utilise methods that include tools that assist students

to source information effectively. In a study in Rwanda, findings revealed that educators that have the appropriate resources coupled with knowledge and skill will be able to employ effective facilitation approaches in a technology-mediated nursing education environment (Harerimana and Mtshali, 2017:30).

Mulaudi *et al.* (2012:11) recommended that nurse educators' time in practice and in preparing lesson plans as well as teaching must be increased in order for students to benefit. Tacy (2015:2) in a study in the United States of America, stated that acceptance and becoming skilful in new technology can be challenging. The obligation to participate in the teaching-learning paradigm and maintain skills at the same time can affect the workload of a nurse educator. Wolf *et al.* (2017:42) stated that activities in technology-mediated learning can be time-consuming especially when the instructional designer has other tasks to complete.

5.3   LIMITATIONS OF THE STUDY

- Lack of prior research studies on the topic: sufficient documented information with reference to the types of technologies used by private nursing colleges in Gauteng was not available. In addition, sufficient prior research on the experiences of nurse educators with technology-mediated education in private institutions in Gauteng was not available.
- Lack of available data: although guidelines on writing were followed, the duration of some of the interviews were short.
- Due to the study being conducted in two private institutions in Gauteng, it may not be possible to generalize the findings to all nurse educators, especially regarding public institutions.

5.4   CONCLUSIONS

In this chapter, the findings of the study were discussed in relation to the study objectives.

The aim of the study was to explore the nurse educators' live experiences with technology-mediated education in private nursing education institutions in Gauteng.

Global trends in a technology-mediated education environment embrace a much more advanced technological experience, utilising a variety of high tech forms of educational tools. It is evident that using various technology is beneficial in addressing different learning styles, engaging and stimulating students as well as providing a platform to address the

generational diversity of students. It is evident from the findings that the nurse educator's generational transformation challenges are not taken into account. There is a lack of institutional support in the form of ongoing in-service training, workshops and seminars related to technology-mediated teaching and learning methods that can be integrated with the learning content. IT support is also insufficient, leading to frustrations experienced by nurse educators and causing them to revert to traditional methods of course delivery.

It is imperative that educators and students alike are computer literate in order to engage in a successful technology-mediated teaching and learning environment, nurse educators must be able to keep abreast of technological developments and have sufficient time to master new technology. Resources such as Internet connectivity, resource centre, and various educational technologies are important to maintain a conducive technology-mediated, student-centred teaching and learning environment.

Findings indicate that nursing education curricula lack adequate opportunities for exposure to technology in basic and postgraduate courses in order to assist learners to develop at a similar pace as other nursing students globally.

5.5   RECOMMENDATIONS

5.5.1   Internet connectivity, IT support and technological resources

Nursing education institutions need to enable better connectivity, IT support and sufficient technological resources such as computers in the resource centre in order to make technology-mediated nursing education a seamless process. Harerimana and Mtshali (2017:29) stated that in order for technology-mediated learning to be successful, accessibility and availability of technological tools for educators and students alike must be ensured.

5.5.2   Continuous professional development and in-service training

There should be adequate in-service training, workshops and training platforms provided to nurse educators regarding technology-mediated education, keeping them skilled and knowledgeable of current trends. To include a variety of educational technology in basic and post-basic programmes in order to prepare future nurse educators for their role in a technology-mediated teaching and learning environment. Gonen *et al.* (2016:2) stated that nurse educators who participated in seminars, workshops and were given training by experts, found that it supported their self-ability with regards to educational technologies.

5.5.3   Planning

Nurse educators should be offered more time to develop skills and become efficient in using new technology. Planning and integrating technology into the teaching and learning process can take time to be successfully implemented. According to Day-Black *et al.* (2015:90) nurse educators who have sufficient time to efficiently implement learning activities, centred on teaching and learning goals can obtain substantial benefits.

5.5.4   Future research

The following areas for future research are proposed:

- Students' experience of technology-mediated education in private nursing institutions should be explored so that it can be compared with that of the nurse educator's experiences.
- Technology-mediated education in both private and government institutions should be explored.

5.5   DISSEMINATION

The findings of the study will be presented at the research days of the respective colleges and collaborative Nursing Education Departments. An article will be written and published in an accredited journal. A copy of the thesis will be submitted to each participating institution.

5.6   CONCLUSION

Technology-mediated education in nursing is vital in developing nurses and preparing the future nurse to be compatible with a technologically advanced health care environment. Since technology is developing at a fast pace, it is important to understand the nurse educators experience within a technology-mediated teaching and learning environment in order to provide support, address challenges and ensure quality delivery of nursing courses.

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APPENDICES

APPENDIX 1: ETHICAL APPROVAL FROM STELLENBOSCH UNIVERSITY

Approval Notice

New Application

17/04/2019

Project ID :9300

HREC Reference #: S19/03/062

Title: Nurse educators experiences with technology mediated education

Dear Ms Alethea Sunnasy,

The Response to Stipulations received on 17/04/2019 08:40 was reviewed by members of Health Research Ethics Committee 2 (HREC2) via expedited review procedures on 17/04/2019 and was approved.

Please note the following information about your approved research protocol:

Protocol Approval Period: This project has approval for 12 months from the date of this letter.

Please remember to use your Project ID [9300] on any documents or correspondence with the HREC concerning your research protocol.

Please note that the HREC has the prerogative and authority to ask further questions, seek additional information, require further modifications, or monitor the conduct of your research and the consent process.

After Ethical Review

Please note you can submit your progress report through the online ethics application process, available at: Links Application Form Direct Link and the application should be submitted to the HREC before the year has expired. Please see *Forms and Instructions* on our HREC website (www.sun.ac.za/healthresearchethics) for guidance on how to submit a progress report.

The HREC will then consider the continuation of the project for a further year (if necessary). Annually a number of projects may be selected randomly for an external audit.

Please note that for research at a primary or secondary healthcare facility, permission must still be obtained from the relevant authorities (Western Cape Departement of Health and/or City Health) to conduct the research as stated in the protocol. Please consult the Western Cape Government website for access to the online Health Research Approval Process, see: https://www.westerncape.gov.za/general-publication/health-researchapproval-process. Research that will be conducted at any tertiary academic institution requires approval from the relevant hospital manager. Ethics approval is required BEFORE approval can be obtained from these health authorities.

We wish you the best as you conduct your research.

For standard HREC forms and instructions, please visit: Forms and Instructions on our HREC website https://applyethics.sun.ac.za/ProjectView/Index/9300

If you have any questions or need further assistance, please contact the HREC office at 021 938 9677.

Yours sincerely,

HREC Coordinator,

Health Research Ethics Committee 2 (HREC2).

Page 1 of 2

APPENDIX 2: PERMISSION OBTAINED FROM PRIVATE INSTITUTION

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████████████████████████████████

Life
Telephone: +27 1 1 219 9000 Group   www.lifehealthcare.co.za   Telefax: +27 11 219 9001

National Health Research Ethics Committee registration: REC 251015-048

REF: 07042019/1

04 July 2019

Dear Alethea Sunnasy

RE: APPLICATION TO CONDUCT RESEARCH:

Title of study: Exploring nurse educator's lived experiences with technology mediated education within private nursing colleges in Gauteng

The Research & Scientific Committee of ████████████ hereby grants permission with no conditions for your study to be conducted at ██████████████████ ████████████

1 . If patient or institutional confidentiality is breached, ████████ is entitled to withdraw this permission immediately. The Higher Education institution under which the research is taking place will be notified, and ██ ████████ reserves the right to take legal action against you, should the company feel that this is warranted.

2. An electronic copy of the research report must be submitted to the ██████████████████ prior to publication. Failure to do this may result in permission to continue to examination being withdrawn. The Higher Learning institution will be notified of this withdrawal.

3. No direct reference may be made to ████████, its subsidiaries or any of its facilities or institutions in the research report or any publications thereafter. The Company and its facilities, patients and staff must be de-identified in the study, and remain so for any other studies which may utilise this information.

4 The research must be completed within the time allotted by the Higher Learning institution. If the research is being done in an individual capacity by an employee of the ████████ the research must be conducted within one year of permission being given by the Company, OR the proposed time period must be specified in the proposal, and approved. Permission may be withdrawn if the research extends beyond the approved time period.

5 ████████ will not take responsibility for any unforeseen circumstances within its institutions which may materially change the context and potential outcomes of a student's research. Should this occur, the student will be required to approach their Higher Learning institution for guidance around alternatives.

6, Placement of the electronic research report and any publications on the Company's research register after approval by the associated Higher Education Institution.

7. ████████ will not be liable for any costs incurred during or related to this study.

APPENDIX 3: PERMISSION OBTAINED FROM RESEARCH OPERATIONS

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RESEARCH OPERATIONS COMMITTEE FINAL APPROVAL OF RESEARCH

Approval number: UNIV-2019-0015

Ms Alethea Sunnasy

E mail: █████████████

Dear Ms Sunnasy

RE: EXPLORING NURSE EDUCATOR'S LIVED EXPERIENCES WITH TECHNOLOGY MEDIATED EDUCATION WITHIN PRIVATE NURSING COLLEGES IN GAUTENG

The above-mentioned research was reviewed by the Research Operations Committee's delegated members and it is with pleasure that we inform you that your application to conduct this research at Private Nursing Education Institution, h" þeenapproved, subject to the following:

i)   Research may now commence nce with this FINAL APPROVAL from the Committee,

ii)   All information regarding the GpmpañYÐill be treated as legally privileged , and confidential.

iii) The Company's name will not be mentioned without written consent from the Committee.

iv) All legal requirement' with regards to participants' rights and confidentiality will be complied with.

v) All datq extracted may only be used in an anonymised, aggregated format purposes of this specific study as specified in the proposal .The data may under no circumstances be used for any Other purpose whatsoever.

The Company must be furnished with a STATUS REPORT on the progress of the study at least annually on 30th September irrespective Of the date of approval from the Committee as well as a FINAL REPORT with referenée to intention to publish and probable journals for publication, on completion of the study.

vii)   A copy of the research report will be provided to the Committee once it is finally approved by the relevant primary party or tertiary institution, or once

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vii) complete or if discontinued for any reason whatsoever prior to the expected completion date.

viii) The Company has the right to implement any recommendations from the research, ix) The Company reserves the right to withdraw the approval for research at any time during the process, should the research prove to be detrimental to the subjects/ Company or should the researcher not comply with the conditions of approval.

x) APPROVAL IS VALID FOR A PERIOD OF 36 MONTHS FROM DATE OF THIS LETTER OR COMPLETION OR DISCONTINUATION OF THE STUDY, WHICHEVER IS THE FIRST.

Yours faithful

████████

████████

Date:

This letter has been anonymised to ensure confidentiality in the research report. The original letter is available with author of research

APPENDIX 4: PARTICIPANT INFORMATION LEAFLET AND DECLARATION OF CONSENT BY PARTICIPANT AND INVESTIGATOR

PARTICIPANT INFORMATION LEAFLET AND CONSENT FORM

Title of Research Project:	
Exploring nurse educators ' lived experiences with technology-mediated education within private nursing colleges in Gauteng.	
DETAILS OF PRINCIPAL INVESTIGATOR (PI):	
Title, first name, surname: Mrs. Alethea Sunnasy	**Ethics reference number:** 9300
████████████████████	**PI Contact number:** ████

We would like to invite you to take part in a research project. Please take some time to read the information presented here, which will explain the details of this project. Please ask the researcher questions about any part of this project that you do not fully understand. It is very important that you are completely satisfied and that you clearly understand what this research entails and how you could be involved. Your participation is **entirely voluntary**, and you are free to decline to participate. In other words, you may choose to take part, or you may choose not to take part. If you choose to say no, it will not affect you negatively in any way whatsoever. Refusal to participate will involve no penalty or loss of benefits. You are also free to withdraw from the study at any point, even if you agreed to take part initially.

This study has been approved by the **Health Research Ethics Committee** at Stellenbosch University. The study will be conducted according to the ethical guidelines and principles of the international Declaration of Helsinki, the South African Guidelines for Good Clinical Practice (2006), the Medical Research Council (MRC) Ethical Guidelines for Research (2002), and the Department of Health Ethics in Health Research: Principles, Processes and Studies (2015).

What is this research study all about?

➤ *The study will be conducted at two private nursing education institutions, at two or more campuses depending on the availability of participants*

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- *The aim of this study is to explore the nurse educator's daily experiences with using technology-mediated education in private nursing education institutions. The reason behind exploring the nurse educators' experiences with technology-mediated education, is to gain insight into the types of technology used, how it is being used and the training and support that educators receive.*
- ***Explain the process.***
- *The purpose of the research will be explained to you.*
- *You will be invited to participate in the research.*
- *Prior to your participation, you will be requested to sign a consent form to participate in the research, the document also includes consent to the interview be recorded.*
- *A time, date and venue will be arranged for the interview at your convenience.*
- *It is anticipated that the interview may take forty-five to sixty minutes*
- *The interview will be conducted by the researcher or a field worker.*
- *You may be requested to participate in a second or third interview should the researcher need clarification or to confirm information with you.*
- *After the research has concluded and the findings have been analyzed and collated, the findings will be shared with you.*

Why do we invite you to participate?

You have been invited to participate in the study due to being actively involved in the role of a nurse educator and regarded as an expert in the field of study, having the information that is required.

What will your responsibilities be?

Your responsibility is to participate freely in the study after being given all the relevant information about the study.

You have a right to refuse to participate.

Sign a consent form should you decide to participate in the study.

Inform the investigator should you decide at any time not to continue in the study.

To provide an accurate account of your experiences related to technology-mediated nursing education.

Will you benefit from taking part in this research?

The findings could be advantageous as they may provide information that could be used to improve the way that technology is introduced and used by nurse educators and institutions.

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- I have read this information and consent form, or it was read to me, and it is written in a language in which I am fluent and with which I am comfortable.
- I have had a chance to ask questions and I am satisfied that all my questions have been answered.
- I understand that taking part in this study is **voluntary,** and I have not been pressurized to take part.
- I may choose to leave the study at any time and nothing bad will come of it – I will not be penalized or prejudiced in any way.
- I may be asked to leave the study before it has finished if the study doctor or researcher feels it is in my best interests, or if I do not follow the study plan that we have agreed on.

Signed at (*place*) .... on (*date*) .... 2019.

Signature of participant   **Signature of witness**

Declaration by investigator

I (*name*) .... declare that:

- I explained the information in this document in a simple and clear manner to
  ....
- I encouraged him/her to ask questions and took enough time to answer them.
- I am satisfied that he/she completely understands all aspects of the research, as discussed above.
- I did/did not use an interpreter. (*If an interpreter is used then the interpreter must sign the declaration below.)*

Signed at (*place*) .... on (*date*) .... 2019.

Signature of investigator   **Signature of witness**

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APPENDIX 5: INTERVIEW GUIDE

Interview Guide: Exploring a nurse educator's personal experiences with technology-mediated education within private nursing colleges in Gauteng.

Section A

Demographic Data

Age:

Gender:

Qualifications:

Years of experience as an educator:

Section B

Questions

- Tell me about your experiences regarding technology-mediated education.
  - ○ **Probes:** What drives decision making to use a specific technology, your competencies with technology, your preferences and why;
- Tell me about your introduction to technology-mediated education?
  - ○ **Probes:** initial exposure; institutional support that was provided; period involve with it; in-service training that was provided; what works for you.
- Please describe the types of technology being used in education?
  - ○ **Probes:** types of technology; user-friendly equipment; challenging equipment. Decision making about what to use/procure – who is involved (managers and followers or merely managers/managerial structures; how does buy-in of staff materialize about procurement.

APPENDIX 6: CONFIDENTIALITY AGREEMENT WITH DATA TRANSCRIBER

DECLARATION REGARDING CONFIDENTIALITY AND PERSONAL DATA PROTECTION

This agreement pertains to the transcribing of recorded interviews as provided to the Transcriber, MARISTA DE JAGER, and the Client, RESEARCHER/STUDENT MS. A. SUNNASY.

I, the undersigned, **Marista de Jager**, formally declare that:

✓ I will treat confidentially any information and documents, in any form (i.e. paper or electronic), disclosed in writing or orally in relation to the transcribing of recorded interviews and/or the performance of the studies/research of my client, and process any personal data in accordance with the Protection of Personal Information Act (No. 4 of 2013) on the protection of individuals with regard to the processing of personal data by the Community institutions and bodies and on the free movement of such data.

✓ I am fully aware of my obligations, *inter alia* in terms of confidentiality and personal data protection arising from the general conditions prescribed by the Information Regulator of South Africa as provided in the Protection of Personal Information Act No 4 of 2013 found at: http://www.justice.gov.za/inforeg/docs/InfoRegSA-POPIA-act2013-004.pdf

✓ I will undertake to observe strict confidentiality in relation to my work as follows:
  ▪ I will not use or disclose, directly or indirectly, confidential information or documents for any purpose other than fulfilling my obligations in terms of the agreement with my client.
  ▪ I will not discuss my work with others, including other experts or relevant service staff not directly involved;
  ▪ I will not communicate any confidential information that is revealed to me or that I have discovered, with anyone other than my client.
  ▪ I will not make any adverse use of information given to me.

I shall continue to be bound by these undertakings after completion of my work unless this disclosure of confidential information is required by law.

✓ If material/documents/reports/deliverables are made available to me either on paper or electronically, I agree to be held personally responsible for maintaining the confidentiality of the documents or electronic files sent and for returning, erasing or destroying all confidential documents or files on completing my work as instructed.

✓ When my work takes place on premises as provided by the Protection of Personal Information Act (No. 4 of 2013), I:
  ▪ will be held personally responsible for maintaining the confidentiality of any documents or electronic files sent, and for returning, erasing or destroying all confidential documents or files on completing my work as instructed.

Date: **29th of October 2019** Place: **CENTURION/ROOIHUISKRAAL**

Signature:

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APPENDIX 7: EXTRACT OF TRANSCRIBED INTERVIEW

Transcription: Institution A	
Participant 1	**Interviewer:** I'm going to start with my first question: Which is, tell me about your experience regarding technology-mediated education. **Participant** [Sigh] uh okay. I [pause] I read a lot about it and I have an [pause] an idea that it can work very well. Uhm we lack support, and uhm I'm an I'm not very technologically inclined so I struggle, I started with for instance Moodle last year as a learning platform but there's so much technical stuff to figure out behind it that uhm I don't have the time, to figure it out basically. But I can see uhm how valuable can be too, to take a lot of the learning time and the effort I need to put in now to get students to do stuff or to do assessments I can uh I can replace all this repetitive stuff with a thing like Moodle but ah it needs to be set up first. So, I think it can be very positive, if I can get the time to work with it [giggles while speaking]. [Sigh] I use, or use to use E-BEAM and then we had a version problem, so E-BEAM was like … I don't know if you know it. Uhm It is uhm like writing on the wall but it projects, a screen with an interactive pen, and you write on the wall so you can put up slides and then you can draw on the slides so you can put up a question and students can answer and it becomes like a PowerPoint presentation so you can go back to the previous slides where like on a whiteboard you have to wipe and you can't go back. So that worked extremely well, but then we had a version problem with the E-BEAM system and the new computer upgrades, and we had to install, and got the new E-BEAMs and na and now for some reason, there's a connectivity problem. So [pause] that one I really want to get working again because it's amazing uhm ii-it can also be more interactive with students because they can come to write and they can come fully in quizzes on the board or draw pictures or label stuff [whispers] *and so forth*. We have a smartboard but my classes are small, so I never work in the smartboard classes that's apparently very interactive, more than E-BEAM but it's similar to E-BEAM… 02:33 [Whispers inaudibly]. **Interviewer:** I heard you say there's not a lot of support, will you elaborate a little bit more on that? **Participant:** Okay uhm, IT wise I don't think our IT support system for the school, we don't have an IT person on-campus number one, we have to send everything to Joburg [?] if it needs to be fixed. They do not understand these technological educational technological systems. [Breaths in] So, they can install it, then we need to get, and we cannot install anything ourselves so even if you find nice things online you cannot access them, because, or you cannot download them, like videos for instance. So I cannot download a video on to my computer to show in class, I must download it on, on my private computer and take-bring it here because I cannot use USB-sticks anymore, so I cannot email videos to myself, our large transfer system only allows twenty megs, so I cannot [Whispers somewhat unclearly] videos are bigger than that. So, there's a problem in accessing it, so here we are lucky we have Wi-Fi in most of the classes but now you are dependent on that you have Wi-Fi access and it works today and everything. [Breaths deep] Uhm [Pause] We don't have people that are experts in for instance Moodle, who can help us to set up the system that it is both secure for the students but we can use it, so its learning curves that we have to go through ourselves if we want to use these things.

APPENDIX 8: INVESTIGATOR DECLARATION

UNIVERSITEIT·STELLENBOSCH·UNIVERSITY
jou kennisvennoot • your knowledge partner

HEALTH RESEARCH ETHICS COMMITTEE 1 AND 2

INVESTIGATOR'S DECLARATION
(INFORMATION SHOULD BE TYPED)

The principal investigator, supervisor, as well as all sub- & co-investigators must each sign a separate declaration.

SECTION 1: INVESTIGATOR DETAILS and ROLE IN THIS RESEARCH					
Title, First name, Surname:		**SU number:**		***PROJECT ID NUMBER*** *(HREC office use only)*	
Professional Status:					
University DIVISION and DEPARTMENT:					
Telephone No:		**E-mail address:**			
Role *(mark with X)*	**Principal investigator**	**Co-investigator**		**Sub-investigator**	**Supervisor**

SECTION 2: PROJECT TITLE *(maximum 250 characters for database purposes)*

SECTION 3: CONFLICT OF INTEREST DECLARATION (OBLIGATORY)
I, *(Title, Full name)* .... declare that: ☐ I have no financial or non-financial interests, which may inappropriately influence me in the conduct of this research study; OR   ☐ I do have the following financial or other competing interests with respect to this project, which may present a potential conflict of interest: (Please attach a separate detailed statement)   Signature: .... Date: ....

SECTION 4: DECLARATION (OBLIGATORY)
I, *(Title, Full name)* .... declare that: • I have read through the submitted version of the research protocol and all supporting documents and am satisfied with their contents   • I am suitably qualified and experienced to perform and/or supervise the above research study.   • I agree to conduct or supervise the described study personally in accordance with the relevant, current protocol and will only change the protocol after approval by the HREC, except when urgently necessary to protect the safety, rights, or welfare of subjects. In such a case, I am aware that I should notify the HREC without delay.   • I agree to timeously report to the HREC serious adverse events that may occur in the course of the investigation.   • I agree to maintain adequate and accurate records and to make those records available for inspection by the appropriate authorised agents when and if necessary.   • I agree to comply with all other requirements regarding the obligations of clinical investigators and all other pertinent requirements in the Declaration of Helsinki (2013), as well as South African and ICH GCP Guidelines and the Ethical Guidelines of the Department of Health as well as applicable regulations pertaining to health research.   • I agree to comply with all regulatory and monitoring requirements of the HREC.   • I agree that I am conversant with the above guidelines.   • I will ensure that every patient (or other involved persons, such as relatives), shall at all times be treated in a dignified manner and with respect.   • I will submit all required reports within the stipulated time frames.   Signature: .... Date: ....

HREC Declaration Form V4.2 February 2015
Stellenbosch University, Faculty of Medicine and Health Sciences

APPENDIX 9: DECLARATION BY LANGUAGE EDITOR

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04th December

2019

To whom it may concern,

I herewith confirm that I have proofread and edited the master's dissertation in Nursing Education of Alethea Sunnasy, Student Number: 22387579 in its entirety.

With kind regards,
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APPENDIX 10: DECLARATION BY TECHNICAL EDITOR

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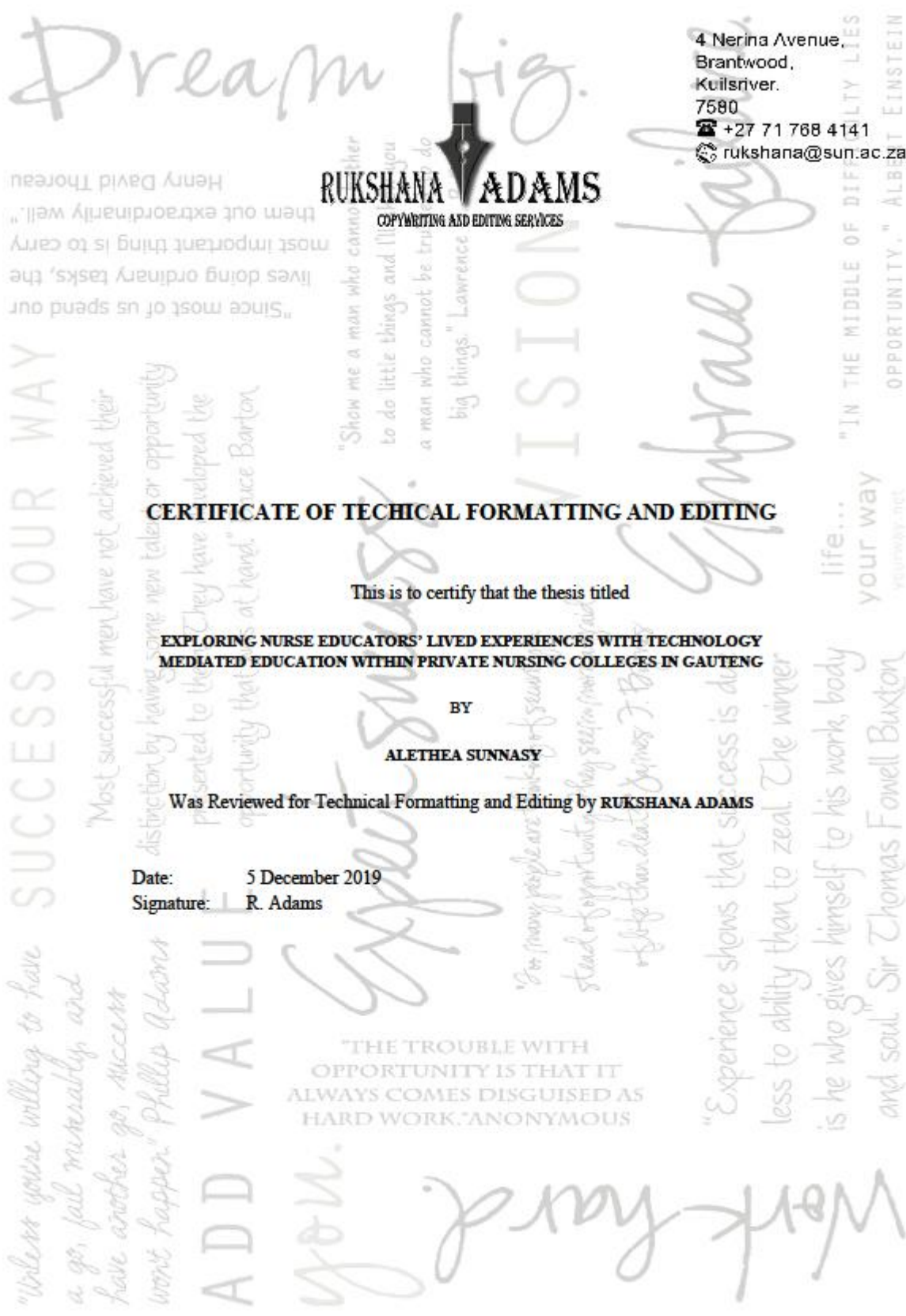
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CERTIFICATE OF TECHICAL FORMATTING AND EDITING

This is to certify that the thesis titled

EXPLORING NURSE EDUCATORS' LIVED EXPERIENCES WITH TECHNOLOGY MEDIATED EDUCATION WITHIN PRIVATE NURSING COLLEGES IN GAUTENG

BY

ALETHEA SUNNASY

Was Reviewed for Technical Formatting and Editing by **RUKSHANA ADAMS**

Date: 5 December 2019
Signature: R. Adams