The Utilization of ICT by lecturers in a TVET college in Paarl, Western Cape

by

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Signed: *MC Joseph* **Date: 14 September 2020**

DEDICATION

I dedicate this thesis to my family (husband, our two daughters, dad, mom, brother and sister) who supported me throughout this journey.

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I thank my Lord Jesus Christ for giving me strength and understanding to complete my studies.

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ABSTRACT

Since December 2019, when Covid-19 cases started to manifest across the world, adoption of online learning for many institutions has become imperative. Lockdown, which started on 26 March 2020 in South Africa, forced higher education institutions to make use of alternative teaching methods and to provide online support to students. It was a crucial time and it was important that academic activities continued although students and educators were not in the traditional classroom setting. This research study aimed to explore how 13 lecturers in the Department of Office Administration utilise information and communications technology (ICT) in classrooms at a TVET college in Paarl, Western Cape. A deductive approach was used to analyse the data, together with the conceptual framework used in this study. This study made use of a qualitative design and hence the researcher made use of an interpretive methodological approach.

13 lecturers were selected and interviewed by the researcher through means of purposive and convenience sampling methods. This study was influenced by exploring the Technology Acceptance Model in collaboration with the Theory of Reasoned Action (TRA) and the Unified Theory of Acceptance and Use of Technology (UTAUT). The conceptual framework was based on the following constructs found in the UTAUT model, namely, age, lecturers' level of experience, and willingness to learn. The researcher explored whether the age of the lecturers will influence whether or not they make use of ICT in the classroom and explore if their willingness to learn will also depend on how they can adapt to the changing digital era (Williams et al., 2013). The TRA model's construct 'attitude' was used to add to the conceptual framework of this study. The key findings of this study indicated the ICT tools available at the TVET college. Moodle is available for lecturers and students to use to upload notes, assignments and activities; computers and laptops are available to lecturers; lecturers audio-record their lessons and distribute these to students in their absence; an open learning centre with a limited number of computers is available, as well as computer laboratories on campus available as per a timetable. ICT utilisation in classrooms was identified and lecturers noted the following: online communication via email; uploading course material on Moodle; online quizzes to monitor understanding of concepts; and presentation of YouTube videos. Lecturers could rate whether they were comfortable using ICT or not.

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ABBREVIATIONS

DHET	Department of Higher Education and Training
FET	Further Education and Training
ICT	Information and Communications Technology
ISAT	Integrated Summative Assessment Task
LMS	Learning Management System
NCV	National Certificate Vocational
OLC	Open Learning Centre
OECD	Organisation for Economic Co-operation and Development
PBC	Perceived behavioural control
SABS	South African Bureau of Standards
TAM	Technology Acceptance Model
TPACK	Technological Pedagogical Content Knowledge
TPB	The Theory of Planned Behaviour
TRA	Theory of Reasoned Action
TVET	Technical and Vocational Education and Training
UNESCO	United Nations Educational, Scientific and Cultural Organization
USB	Universal Serial Bus
UTAUT	Unified Theory of Acceptance and Use of Technology
WLAN	Wireless Local Area Network
WWW	World Wide Web
4IR	Fourth Industrial Revolution

CHAPTER ONE
Background to the study

1.1 Introduction and Background

Information and communications technology (ICT) provides access to information via telecommunications such as the Internet and other communications media. ICT is the most powerful development of our time, and is continually evolving in a manner and to the extent that it is referred to as the Fourth Industrial Revolution (4IR). It is predicted that humankind will undergo a complete behavioural change which will result in a new global identity. Education has thus far remained relatively set in its old ways. These developments and the recent outbreak of the novel and deadly virus, COVID-19, have presumably changed the education landscape forever, thus presenting opportunities for educators to utilise ICT more effectively in education to improve the learning experience of learners and the quality of teaching.

ICT refers to the grouping of computers, media technologies and telecommunications, and ICT's use includes the processing, tracing and tracking, collating, manoeuvring and presenting of communication information of a system. It further encompasses the information technology connection and the hardware and software used (Onodugo, C 2016). In the next section, ICT in education is discussed.

1.2 Information and Communications Technology (ICT) in education

ICT provides a plethora of tools to manage data and allow accessibility to a variety of content. Education as a basic human right in South Africa is stated under Section 29 in the Bill of Rights (South Africa, 1996), which assures each individual the right to a basic education, including adult and further education. The evolution of ICT has allowed specialists the opportunity to explore numerous possibilities. According to Oliver (2002), ICT is a force able to effect change in various aspects of human life, including the way we communicate with one another, teach, compile a shopping list, gain access to information, bank, shop online and even buy meals online, for example Uber Eats.

The current global pandemic, COVID-19, has accelerated the adoption of online learning at many institutions. Higher education institutions are forced to make use of alternative teaching methods and to provide support to students remotely. Academic

activities were set to continue during national lockdown in South Africa and technical and educational training (TVET) colleges had to move with digital trends in attempting to salvage what could be saved of the 2020 academic year.

ICT in education occurs when the traditional classroom setting is replaced by ICT tools or where ICT tools are incorporated in lessons. The chalkboard, which traditionally is generic to any lesson or classroom, is replaced by digital, interactive whiteboards, while students' smartphones are used during lessons to access various websites to gather information. Kreijns (2013) claims that the use of ICT augments the teaching and learning experience.

International research studies have shown that ICT can attempt to improve the student's overall learning experiences. Wadi and Sonia (2004) state that the use of ICT has enabled the education industry to remain relevant in a fast-developing virtual age.

According to Hare (2007), once lecturers use ICT correctly, it can assist in providing access to education, thereby increasing the quality of education and aligning concepts in the classroom with practice in the workplace. Despite the extent to which ICT awareness is becoming popular in the teaching and learning process, the way it is used is an illusion in many colleges, owing to poor ICT competency levels among lecturers who use ICT facilities in teaching (Brosnan, 2001). According to Coz and Marshall (2007), the efficacy of the learning experience is determined by the subject and sort of ICT resource used in the lesson.

In the section below, the Department of Higher Education and Training is discussed and TVET colleges are explored for the purpose of this study.

1.3 Department of Higher Education and Training

The vision of the Department of Higher Education and Training (DHET) is to provide a comprehensive post-school system that allows South African citizens access to specific education and training to attain the economic and social goals set by the department, hence contributing to addressing the developmental needs of the country. The department aims to develop a well-educated and highly skilled labour market able to compete globally. (Department of Higher Education and Training, 2020).The

department aims to achieve this mission by increasing participation in the post-school system and by improving quality and efficiency in institutional systems. Various types of institutions resort under the department; however, only a TVET (technical and vocational education and training) college is the focus of this study. In the next section, the evolution of TVET colleges in South Africa is addressed.

1.4 History of technical and vocational education and training colleges in South Africa

Students at TVET colleges receive an education aimed at an array of occupations, career or business opportunities (Moodie, 2008). In some instances, students may qualify for admission to study at a university. The age restriction for admission to a TVET college is 16 years or older. The target group comprises senior adolescents and adults dedicated to complete the education and training programme successfully. For many students who enrol at TVET colleges, it is seen as a second chance after having failed to complete their secondary education successfully. Students can anticipate the setting of the TVET college to be somewhat different from that at school, where more ICT tools are present and accessible to them in this digital era.

At TVET colleges, lecturers encounter students from diverse backgrounds; many come from impoverished, previously disadvantaged communities plagued with social ills such as gangsterism and drug abuse. For this reason, it is also important that when lecturers use ICT tools they use them wisely, guarding against offending any student while using these media. Offence taken might be related to social economic status, financial status, sexual orientation, or race.

In answering the research questions, this study explored the manner in which lecturers at a TVET college utilise ICT in classrooms. The researcher used validated interview questions and interpreted the findings, exploring the utilisation of ICT at a TVET college. Factors such as student participation, retaining student attention, availability of resources, and IT support are all vital to the success of TVET institutions.

The researcher conducted the research at Boland College, Paarl, to explore the utilisation of ICT in business subjects. Boland College is an award-winning and South African Bureau of Standards (SABS) approved leader in further education and training in the Boland region. For this study, the use of ICT tools comprises computer and

laptop usage, data projectors, the use of online videos, e-learning, Moodle, electronic communication, cloud computing and AB Tutor, a software program which allows the lecturer to monitor student activity, assist, demonstrate and send files. In the next section, the ICT tools used at Boland College are discussed.

1.5 Location of Boland College

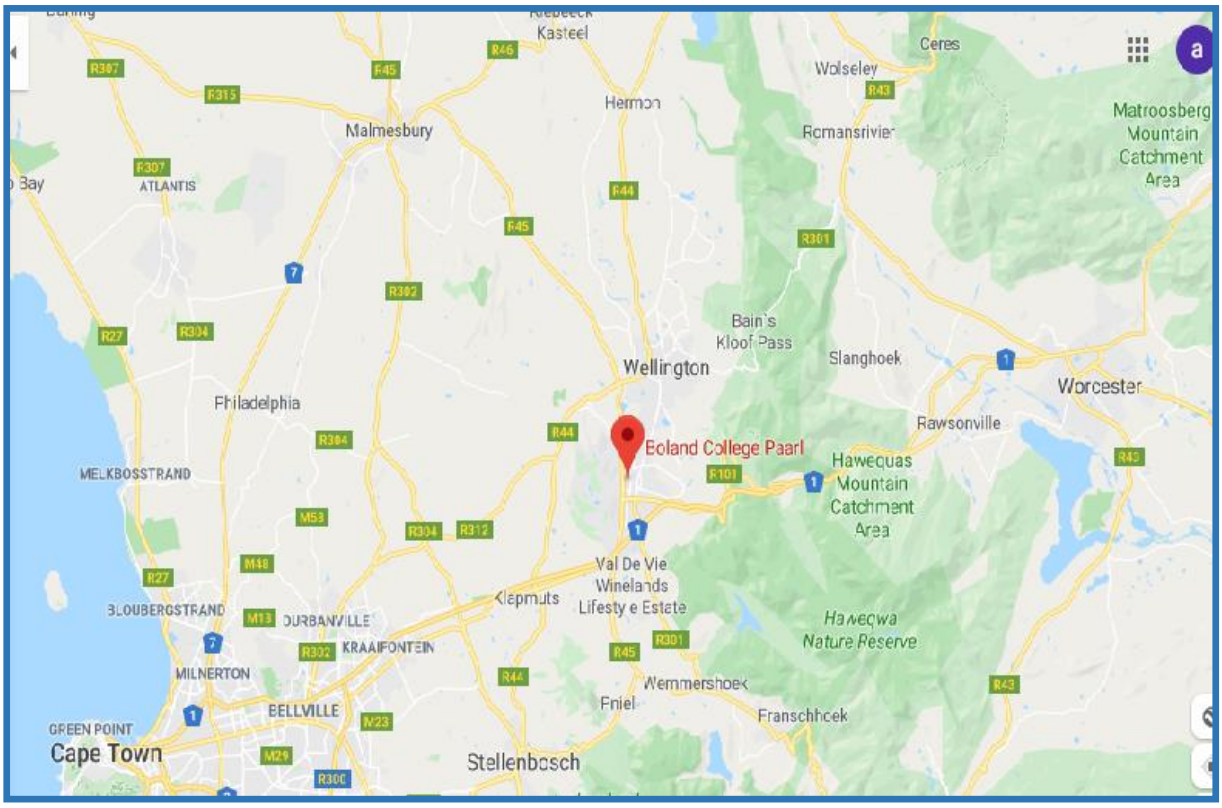

Figure 1.1 Location of Boland College

1.6 Current ICT tools used at the TVET college

Not all classrooms at Boland College are equipped with a desktop computer, keyboard, mouse, data projector and speakers. As part of the orientation of new lecturers, a laptop is issued by the IT department, together with all access control information, for example, passwords to all platforms. Boland College has a devoted e-learning division (Boland College, 2020), which constantly develops lecturers' skills by providing training, endeavouring to enhance, encourage and support lecturers to adopt a more blended learning approach. The e-learning platform allows students to have access to their subject plan, follow up on missed lessons, do revision and make use of peer learning. Upon registration, each student receives an email address from Boland College for educational use. The email option is used by lecturers to send homework or revision activities to students. Boland College also makes use of email

to convey important information to students. Students may keep their email address for three years after the successful completion of their studies. In the next section the Learning Management system will be discussed.

1.7 Learning Management System (LMS) – Moodle

Boland College makes use of a software application, called LMS, as an administrative and communicative tool, which includes the processes of recording, tracking, reporting and providing educational courses. Material can be delivered to students, tests can be administered, other assessments can be monitored, and student progress can be tracked. Although the main focus of LMS is online learning delivery, it can also be utilised for other activities. A blended approach to teaching is used at the college. In the next section the global pandemic, COVID-19, is discussed and how this has influenced ICT use.

1.8 Current global COVID-19 pandemic and its influence on the use of ICT

On 5 March 2020, the first confirmed case of the 2019–2020 pandemic was announced in South Africa by Zweli Mkhize, Minister of Health. President Cyril Ramaphosa declared a national state of disaster in South Africa on 15 March 2020. This declaration announced limited travel, discouraged use of public transport, forced school closures, and prohibited gatherings of more than 100 people. On 23 March 2020, the President issued a national lockdown from 26 March 2020 to 16 April 2020. The initial lockdown was extended on 9 April 2020, initially scheduled to last until the end of April 2020. The lockdown caused all schools and higher education institutions to close early for the March recess. This unforeseen event forced those institutions not yet using ICT to look at alternative ways to deliver teaching and learning material to learners and students. In the next section, the measures implemented by Boland College during the lockdown period are discussed. Although the research took place before the Covid-19 cases emerged in South-Africa, the section below will give insight on how the college adapted to the impact of the pandemic on teaching and learning.

1.9 Measures implemented by the TVET college during national lockdown

Lecturers at Boland College were encouraged to make use of the Moodle platform, as discussed above, to communicate with students. Lecturers could make use of any other means to stay in contact with students during this challenging time. Lecturers with comorbidities lectured remotely for some time until the re-opening of TVET

colleges. Lecturers made use of Microsoft Teams and Zoom to teach from home. Class representatives were responsible for switching on computers and the data projector to display the lesson on the whiteboard. Other alternative methods were to audio- or video-record lessons and distribute them to students. WhatsApp groups were created, whereby class representatives acted as the direct liaison with lecturers if the rest of the class groups could not be reached. Concerned students contacted lecturers on subject material and preparation for assessments. There were also concerns that not all students would participate on the available platforms, therefore lecturers were advised to keep a record of students who would, for example, exit a WhatsApp group created for academic purposes. Some students did not complete and submit online assessments, while others did not read their emails, even if they had the means to do so.

One of the other issues highlighted was the lack of internet availability for students, data and laptop shortages. A possible solution was to allow students to return to the residences in order to regain access to Wi-Fi facilities and computers. The heads of department were asked if all lecturers had access to their work email during the lockdown period, as this could pose a serious challenge if important and relevant information could not reach all lecturers. In addition, lecturers had to make use of their own Wi-Fi facilities at home for work purposes. In response to this issue, campus management indicated that staff members who needed access to the campus premises for Wi-Fi facilities during the lockdown period, could contact them to arrange access to the premises. In the next section, the external support available to lecturers and students during the national lockdown is discussed.

1.10 External support to TVET college lecturers and students during lockdown

Several publishers provided e-resources during the lockdown period to assist lecturers and students. The e-resources comprised previous examination papers, PowerPoint slides, interactive tests, lecturer and student support material, videos, lecturer guides and textbooks. These e-resources would be at the lecturers' disposal until the end of the lockdown period, or the end of May 2020. In the next section, the rationale for the study is discussed.

1.11 Rationale for the study

This study aimed to assess the use of ICT among lecturers at Boland College, Paarl campus. The study is context based and therefore specific to the setting where the research was conducted. The institution's ICT tools and resources are generic to that specific institution, catering to the needs of that campus. The outcome of the study is expected to assist management of TVET colleges to address the plans to further implement ICT in their classrooms and reap the concomitant benefits and which will serve as a foundation for further research on the integration of ICT in education. The findings of this study will also assist TVET college management in augmenting the current ICT systems in place, thus aligning the institution with the national goal of greater integration of ICT into the education system.

An example of such an initiative is the Khanya project (Western Cape Education Department launched in April 2001). Although the Khanya project was developed for school implementation, the researcher believes it is a relevant initiative which could be adopted by the DHET. The Khanya Technology in Education Project was developed to assist with the quality of teaching instruction in schools in the Western Cape. Through support in curriculum development and how it is delivered, the Khanya project places disadvantaged schools in a position to grant ICT access to learners and provide training in ICT to educators at various schools. The aim of the project is to constantly seek methods to bridge the gap in ICT skills and competence among teachers or facilitators. Benefits of the Khanya project include assisting leaners to improve and enhance their way of thinking and critical reasoning, essential to mastering twenty-first century demands, which may include literacy and numeracy skills, problem solving, flexible and creative thinking, a sense of lifelong learning, and ethical responsibility.

The next section discusses the main objective and specific objectives of the research.

1.12 Main objective

The main purpose of this study is to investigate the usage of ICT, if any, by lecturers at a TVET college in Paarl, Western Cape.

1.12.1 Specific objectives

These objectives relate directly to the research conducted, underpinned by a literature review. The specific objectives include the following:

1. To explore the ICT tools available at Boland College.
2. To investigate the measure of ICT utilisation in the classroom.
3. To enquire into the effectiveness of information and communications technology tools utilised.
4. To probe whether the use of ICT creates an improved, participative learning environment.
5. To investigate the factors that influence lecturers' use of ICT in their classrooms.

1.12.2 Research questions

1. Which ICT tools are available at the TVET college?
2. How are the available ICT tools used by lecturers in their classrooms?
3. How effective are the ICT tools used in relation to pedagogy, teaching and learning?
4. How does the utilization of ICT influence TVET teaching and learning?
5. Which factors influence lecturers' use of ICT in their classrooms?

For the purpose of this study, the use of ICT tools comprises computer and laptop usage, data projectors, the use of online videos, e-learning, Moodle, electronic communication, cloud computing, and AB Tutor, a software program which allows the lecturer to monitor student activity, assist, demonstrate, and send files.

1.13 Delineation

The study focuses on exploring how lecturers in the Department of Office Administration use ICT in their classrooms. Geographically, the study is limited to one campus (Paarl) of the five campuses. In the next section, ethical considerations are discussed.

1.14 Ethical considerations

Ethical considerations are essential to the quality and validity of any type of study. Before the study commenced, the researcher obtained permission from Boland College and ethical clearance from the Cape Peninsula University of Technology. The study was approved by the Research Ethics Committee at the Cape Peninsula

University of Technology, and an ethics certificate was issued (see Appendix B). While conducting the study, the researcher abided by a number of protocols and ethical considerations to protect the privacy and integrity of participants.

To protect the privacy and anonymity of participants in the study, their names were neither requested nor stated in the research. Prior to commencement of the study, all participants received a permission letter to inform them of their rights and privacy. All results are presented anonymously. Each participant had the right to withdraw from the study. In the next section, the research procedure is discussed.

1.15 Research procedure

On 30 July 2019, the principal of Boland College granted provisional approval to conduct the research (See Appendix C), which was standard DHET protocol, and which allowed the Research Ethics Committee of the Cape Peninsula University of Technology to grant the ethics clearance certificate (see Appendix B) for the study on 12 September 2019. The researcher commenced with interviews on 21 October 2019, and concluded on 5 November 2019. A 100% response rate was achieved. The researcher had to plan carefully when interviews could take place, taking into consideration academic activities, assessments, moderations, monitoring, and quality assurance. In the next section the limitations of the research are discussed.

1.16 Limitations of the research

This study was undertaken at one of the five Boland College campuses. The study could be expanded for future research by including all five campuses (Caledon, Paarl, Stellenbosch, Strand, and Worcester) of Boland College. In the next section, the methodology is discussed.

1.17 Methodology

In this study, the researcher conducted in-depth interviews as part of a qualitative study. In-depth interviews are a qualitative data collection method that involves direct, one-on-one engagement with individual participants. The research was conducted at a TVET college in Paarl, Western Cape. The sample size of the research consisted of 13 participants in order to explore their utilisation of information and communications technology in their classrooms. In the next section the research instruments used during the study are discussed.

1.18 Research instruments

A qualitative research technique, in-depth interviews, was used for this study, and involved conducting intensive individual interviews with an adequate number of respondents to explore their perspectives on a particular idea. An interview is a conversation for gathering information. A research interview involves an interviewer, who coordinates the process of the conversation and asks questions, and an interviewee, who responds to those questions (Easwaramoorthy, 2006). In the next section the paradigm of the research is discussed.

1.19 Paradigm

Researchers use significance-oriented methodologies, namely, interviewing or observing participants, where they rely on a subjective relationship between the researcher and subjects. Interpretivism allows the data to be categorized in themes and categories, providing meaning and purpose to the respondents' experiences and perceptions (Myers, 2008). Through the interpretivist paradigm, the researcher will obtain lecturers' understanding of ICT and its use in the classroom. In the next section, the research methods used for the study are discussed.

1.20 Qualitative and quantitative research

A qualitative research approach studies a human phenomenon in its natural context. This is seen as an important aspect, as research is seen through the eyes of those that have experienced it. It focuses on the individual's experiences and how these experiences appear to the individual.

The qualitative method is a social phenomenon explored from the viewpoint of the participant. Data collection for the current study took place either in the participant's classroom or in his or her office. This study encompassed all 13 lecturers in the Department of Office Administration at Boland College. The researcher decided that a qualitative research method would be most suited to this study, as lecturers' experiences and perceptions were explored.

Quantitative research, on the other hand, is used on larger research groups and utilises numerical data to determine, among others, occurrence and distribution of phenomena. Researchers use quantitative research when they want to obtain objective, conclusive answers.

The next section outlines the research design.

1.21 Research design

The researcher made use of a qualitative research method for the purpose of this study. Interpretivism directs the methodology in the data analysis, which is anticipated to be comprehensive. Interpretivism is a particular philosophical perspective with regards to ontology and epistemology which refers to assumptions about knowledge, what constitutes acceptable, valid, and legitimate knowledge, and how we can communicate knowledge to others. In the next section, the population of the study is discussed.

1.21.1 Population

According to Gravetter and Forzano (2006), the set of individuals in whom the researcher is interested in to use for his or her study is seen as the population. The target group for this study was 13 lecturers from the Department of Office Administration at the Paarl campus of Boland College. The next section explains the sampling method used for the study.

1.21.2 Sampling method

For the purpose of this study, the target group consisted of 13 lecturers from the Department of Office Administration at the Paarl campus of Boland College. A convenience sampling method was used for the study. This means that the participants were easily accessed, being on the same premises as the researcher (Punch, 2009). Participation in the study was voluntary. In the next section, data analysis is discussed.

1.22 Data analysis

This study employed a thematic analysis approach to data collection. Themes and categories were developed in agreement with the concepts derived from the literature exploration and conceptual framework.

The purpose of this study was to make recommendations derived from the data collected. Stages in the data analysis process follows; during and after each interview notes were made by the researcher the researcher read through the entire text for an overall understanding of the text. Concepts related to the words of the participants

were identified and documented. Audio-recordings were transcribed precisely in order for the researcher to go back and read everything which emerged from the data-collection process. In the next section, the development of the interview schedule is discussed.

1.23 Development of the interview schedule

A set of personal questions were asked, for example, the reason for the lecturers' choice of education as a profession.

In the second section of the interview schedule, the participants were asked what their understanding of information and communications technology was. The participants had to give an example of information and communications technology they used.

In the third section of the interview schedule, the participants had to explain what information and communications technology in education meant. Questions included how ICT can help students in the classroom, how ICT can assist lecturers in the classroom, and what the advantages of using ICT are. Each participant had to explain limitations experienced while using ICT in the classroom. Participants also had to explain how ICT can assist lecturers with subject content.

In the fourth section of the interview schedule, the ICT tools available at the TVET college were explored. Questions included which ICT tools are available, if these ICT tools are sufficient for the number of students enrolled at the college, the accessibility of the ICT tools, and to whom faulty ICT tools are reported. Questions also attempted to establish how lecturers retain students' attention and how they prevent offending students during lessons while using ICT.

In the last section of the interview schedule, Section 5, questions regarding the ICT skills and knowledge of lecturers were asked. Participants had to rank their level of competence in ICT and explain whether they are comfortable using ICT in their classrooms. In the next section, the aspects of validity and reliability are discussed.

1.24 Validity and Reliability

Creswell and Piano Clark (2007) argue that even though validity in quantitative and qualitative research examines how rigorous the process has been, there are still

differences between the two. Qualitative research encompasses both internal and external validity and reliability. Haradahn (2017) considers that “validity refer to the authenticity of the results that is, whether the research measures what it intends to measure. According to Haradhan (2017) reliability of the results tests whether the same results can be attained using a similar methodology. The researcher made use of pre-approved interview questions, validated to measure their intended indicator. In the next section, access negotiation is discussed.

1.25 Access negotiation

Boland College is the researcher’s current employer and she therefore had access to staff members’ email addresses and had face-to-face contact with the participants. A meeting was convened with the campus manager, where the researcher explained what the study was all about. The campus manager explained the process of approval to conduct research at a TVET college. The researcher had to send an email with a permission letter attached to the principal of Boland College. The principal’s secretary replied, attaching an application form which the researcher had to complete and submit together with supporting documents. Upon receipt of approval to conduct the research, the researcher contacted the lecturers who all had to complete a consent form and had to agree on a date for the interview.

1.26 Data capture

The researcher made use of Microsoft Excel to capture data collected during the interviews. Graphs were created from the data captured on the various Excel spreadsheets.

1.27 Summary of Chapter 1

This chapter furnished the background to the research setting as well as the research problem and research objectives of the study. An outline of the research methodology was also provided, as well as reasons for the selected methodology.

1.28 Outline of the research study

The following section provides an outline of the five chapters of the research report.

Chapter 1 Introduction

In this chapter, an introduction to the research is presented. The research problem and objectives of the study are also explained. The chapter further provides background information and the context that informs the phenomenon of the study. The research methods and the rationale for the study are explored.

Chapter 2 Literature review

This chapter presents the literature review underpinning the study, together with a description of the phenomena investigated. The key findings from articles used in this research are presented in this chapter.

Chapter 3 Models and theories

Chapter 3 presents theoretical frameworks and models that constitute the theoretical and conceptual framework of the study. The frameworks and models used in this research include the Technology Acceptance Model (TAM), The Theory of Planned Behaviour (TPB), the Technological Pedagogical Content Knowledge (TPACK) Model, the Theory of Reasoned Action (TRA) and the Unified Theory of Acceptance and Use of Technology (UTAUT).

Chapter 4 Methodology

The chapter recaps the research problem and the objectives of the study. It also articulates the main research questions that informed the study. A qualitative research method was adopted for this research. The researcher made use of in-depth interviews for data collection. Convenience sampling was used in this study.

Chapter 5 Discussions and findings

The main data findings of the study are presented in this chapter. Qualitative data was presented and categorised according to the main themes, which were consistent with the key objectives of the study. This chapter further presents an analysis of the key findings from the study.

Chapter 6 Conclusions

In this chapter, the conclusions, recommendations and limitations of the study are presented. The chapter further identifies possible areas for future research. The next chapter discusses the literature explored during this research study.

CHAPTER TWO

Literature Review

2.1 Introduction

In order for the researcher to explore the existing literature on the topic of this study, the following was implemented: The concept of information and communications technology was focused on, as well as conceptions of ICT. For the purpose of this study, the ICT tools referred to comprise the use of computers, laptops and data projectors, online videos, e-learning, Moodle, electronic communication, cloud computing and AB Tutor.

In this chapter the following key themes were explored: the definition of information and communications technology; ICT in education; the incorporation of ICT in education; using ICT for effective teaching; educators' attitudes towards the use of ICT; use of the Internet in teaching, and vocational education and training; lecturer competencies for internet use in teaching; funding to assist the use of the Internet; advantages of using ICT in education; limitations on the use of ICT in education; and barriers to the use ICT in classrooms.

2.2 Conceptions of information and communications technology explored

This study explored how lecturers use ICT in their classrooms at Boland College. Various factors influence how and if lecturers use ICT in their classroom. These factors may include lecturer ICT skills and knowledge, their age, willingness to learn new things, attitude and whether they have support from management, as well as technical support at the TVET college.

2.3 Information and communications technology in education

ICT utilisation in the classroom is vital in providing students with the opportunity to acquire and apply much-needed modern-day skills. Technology is changing every day and educators should keep up with these changes and adapt to them accordingly. The researcher will discuss the factor of change management in the conceptual framework developed after exploring the literature regarding effective ICT usage. ICT attempts to streamline obsolete ways of teaching and learning methods. The researcher agrees with this statement, as many educators are set in their old ways of teaching and delivering lessons because of the difficulty in adjusting to new methods. It will thus not be an easy transition for many; however, it is imperative in the current digital era.

Loveless (2003) states that using ICT enables educators to create interesting and attractive lessons that can assist students to understand content more easily. A variety of interactive multimedia is important for future education, and needs to be combined effectively in teaching and learning, specifically in an educational institution. The researcher believes that when making use of interesting methods of teaching, for example, teaching with the help of ICT tools, lessons could be more interesting to students and also keep their attention for longer periods. Old-fashioned ways of teaching, relying only on chalk, blackboards and textbooks as teaching aids, are rapidly changing as educators seek new ways to teach and deliver lessons in their classrooms. ICT tools facilitate the delivery of lessons, and students can relate to these methods as they were born in this new era with digital access to most things.

Bottino (2003) argue that teaching and learning can be improved by introducing ICT in classrooms. The quality of teaching and learning can be improved by integrating ICT into education. The researcher agrees that content delivery to students can be enhanced, given that the quality of the content is checked first to make sure that it is correct and relevant to the topic or subject. New methods and materials can be acquired when making use of ICT, which might not have been the case otherwise. Here the willingness to learn construct, as explained in the contextual framework in Chapter 3, is accentuated.

Edozie et al. (2010) argue that life skills and capabilities of individuals can be improved by ICT facilities. Furthermore, to Olelewe and Amaka (2011), those judged to be skilled in ICT frequently use a variety of teaching and learning technologies: internet, laptops or computers, video cameras and multimedia equipment to improve the teaching and learning process. Consequently, both educators and students will interact with adequate knowledge required to retrieve, recall and analyse information for decision making in an environment conducive to learning. The researcher concurs, as it will be difficult for lecturers to use various and updated ICT tools if they themselves are not equipped with the necessary skills to use these tools. How will it be possible for an educator to deliver a lesson effectively if not confident with the method of teaching?

In the next section the meaning of ICT incorporation in education is discussed.

2.4 The meaning of ICT incorporation in education

Pelgrum and Law (2003) note that the fast-growing technological community has encouraged students to adapt quickly in order to survive. Individuals are forced to stay abreast of changing technology in order to be up to date in the current digital world. In other words, lifelong learning was established in an information community.

ICT-integrated education is seen as a facilitator for change, nurturing skills to solve problems, examining ways to think critically, and encouraging student-centred learning. Students should not entirely be dependent on what they receive from their educators, but learn to be responsible for their progress. ICT use encourages student participation at a new level: students can use their cell phones in class for various reasons, to either video or audio-record the lesson for future reference, to find information on a certain topic, and participate in online quizzes which can be marked electronically by lecturers. Student assessments can be returned electronically, whether by email or uploading on an e-learning platform at the institution. These assessments can also be submitted online by students.

Electronic marking of assessments will be the norm, with no physical handling of scripts. The current global pandemic, COVID-19, is known to be transmitted from the inhalation of droplets from sneezing or coughing, or when touching a contaminated surface. It is known that the virus can survive on surfaces for a period of time (Guan et al., 2020).

Three reasons are furnished by Kozma (2005) for ICT's incorporation in education.

Economic: ICT can play a significant role in preparing students for the world of work, thereby supporting economic development. If students are not prepared for a world away from a learning environment or institution, it can be a difficult transition into the real world, working and having responsibilities other than academic work.

Social: Investment in ICT develops the sharing of knowledge, making government services more accessible, increasing cultural creativity, and ultimately increasing social unity. The researcher fully agrees with this statement, as sharing knowledge and skills accompanies using ICT, as not all users are equipped with the skills set for the effective utilisation of ICT in classrooms. This culture of sharing can lead to

increased morale among colleagues in the workplace, in being part of a team where colleagues are aware that there is someone available and willing to help in times of troubleshooting. The construct of skills and competence of lecturers was explored during the development of the conceptual framework for this study in Chapter 3.

Educational and pedagogic: ICT can develop the way education is modified and thereby improve the overall way education is managed. Pelgrum and Law (2003) identify three reasons for ICT's use in education: attempting to acquire much-needed modern skills, augmented productivity, and a better education system. It has been found that various types of ICT tools can be linked to teaching and learning. These tools may include the use of desktop computers, laptops, data projectors, the Internet, video clips, audio-recordings and other multimedia tools. Some ICT tools are used for general purposes, while other applications have been created specifically for educational uses.
In the next section the use of ICT for effective teaching is discussed.

2.5 Using ICT for effective teaching

There is a need for trained individuals who can use ICT for exploring new ideas, changing the mind-set of communities, and enabling creative thinking. Lesson planning today should not only focus on the syllabus, but also help to teach students much-needed skills in this modern, digital world.

These skills will assist them when they enter the world of work and in their daily lives, because the way we use ICT does not stop with education or academia. It is relevant in our day-to-day operations, such as compiling an electronic shopping list and sharing that shopping list with a spouse, cell phone banking, managing retail clothing accounts online, purchasing items online, paying the television licence online, and paying traffic fines, among others.

In order to use ICT resources effectively in an ICT-enhanced classroom, Adegbenro et al. (2015) note that effective teaching relies on the content and pedagogical knowledge of the lecturer pertaining to the use of ICT in the classroom. The teacher has to be aware of what he or she wants to achieve when making use of ICT during lessons. Planning is very important, and therefore the teacher needs to know the relevance of the ICT tool to the topic. An educator can be embarrassed by content

wrongly presented in the absence of thorough planning prior to the lesson. Inappropriate content may be presented, and incorrect information may be circulated easily if one is unsure of what one wants to achieve.

The next section presents ICT usage in the classroom.

2.6 ICT usage in classrooms

Lei and Zhao (2007) stresses that solutions to ICT resources could only be effective if they are context-specific and sustainable. When making use of ICT resources it is important to address the issue of relevance as well as targeting the specific needs of the target group. Technology on its own does not influence development, but it should be used in collaboration with users that understand the effective use of ICT. Those who use various technologies should have the necessary skills and knowledge to use them optimally, thus promoting development in different spheres of human endeavour.

Researchers throughout this literature exploration agree that the individual using the ICT tools should have the necessary knowledge and skills to do so. The researcher believes that this is relevant to this study, and the conceptual framework was developed in accordance with these constructs. According to UNESCO (2004), the three main approaches for ICT use by teachers in classroom are: Integrated approach: This is an attempt to improve certain concepts and skills within a subject. In the integrated approach, student learning is enhanced because they are confronted with challenges to their existing knowledge and given deeper insights into the subject studied.

Enhancement approach: This is an attempt to utilise ICT resources to enhance the topic with current activities and relevant lessons. The way content is displayed gives students the opportunity to create their own explanations. Complementary approach: This uses ICT resources to enhance student learning. The complementary approach enables students to concentrate on more challenging and subject-focused tasks (UNESCO, 2004). Various methods of ICT utilisation require educators to have an extensive knowledge of ICT and to be able to fit its use either into their existing pedagogy or to extend their pedagogical knowledge so they can accommodate ICT effectively in their teaching (UNESCO, 2004).

2.7 Reasons for educators' use of ICT

In response to why teachers make use of ICT, it was established that the use of computers benefits students, while students benefit by using the computers themselves. Educators perceive the use of ICT as a way of stimulating students' interest in the subject. According to Tella et al. (2007), relevant and accurate information is available to students via ICT. It is, however, imperative to check information thoroughly before distributing it to students or using it during lessons, as information can be irrelevant or incorrect. The use of ICT can also stimulate lifelong learning through promoting positive attitudes. Rapidly developing technology could be a motivator to stay abreast of the latest trends, equipping oneself with the necessary new skills in the technological field.

The above researchers concluded that the intention to use computers played a significant role in ICT utilisation. Educators also perceive the use of ICT as improving the way students can remember work done in the previous lesson, finding new ways to stimulate students, and providing constructive feedback in an orderly and secure way. The manner in which feedback is provided can either boost students' confidence or destroy their self-esteem.

The set of ICT skills currently needed by educators is discussed below.

2.8 ICT skills needed by educators

According to Almoswai & Rashid, 2017 the use of YouTube in teaching and learning is one example of a required skill. Deemed vital for innovation, personal growth and social development, educators and students alike can utilise ICT to equip themselves for the ever-changing labour demands and survival skills required today. ICT-based education equips current students, with the necessary technological skills to compete and survive in the global digital environment.

Three approaches to ICT competencies are expressed by UNESCO (2008). These approaches are: technological literacy, knowledge deepening, and knowledge creation. These approaches are seen as part of a developmental range, and each approach has different outcomes for amendments in education and improvements to the education system, plus different outcomes for changes in the elements of the

education system: pedagogy; educator practice and professional development of staff; curriculum and assessment; and school organisation and administration.

As technology continuously changes and becomes more vital to education, the role of the educator too changes, meaning the educator needs to be willing to learn new things as pedagogies change. Different classroom management skills are essential to integrating ICT in education. Whether integration takes place successfully can depend on the way educators plan and structure their classroom environment to adapt to non-traditional methods of teaching. This could be a difficult transition for those who do not want to move with the stream of technology advancements.

In the next section, educators' attitudes towards the use of ICT are discussed.

2.9 Educators' attitudes towards the use of ICT

Many researchers have studied the reasons why educators find it difficult to incorporate ICT in their lesson presentation and teaching methods (Lau & Sim, 2008; Chigona & Chigona, 2010). If educators are not entirely at ease in using ICT, they will not easily incorporate it in their way of teaching (Lau & Sim, 2008; Chigona & Chigona, 2010). According to Albirini (2006), the successful outcome of ICT usage is embedded in the attitudes of the users. In other words, if an educator's attitude is negative towards the use of ICT, it will impact the extent of his or her acceptance of technology and its use. The researcher believes that the assistance of management may also have an impact on the attitude of staff members. Management support and participation have an impact on the development and incorporation of ICT in higher education institutions.

In the next section, the use of the Internet in TVET colleges is discussed.

2.10 The use of the Internet in teaching and vocational education and training

The use of internet multimedia applications that allow the integration of video, audio and text, permits personalised learning to students' learning styles and therefore promotes the participation of lecturers and students in learning, thereby improving the teaching process. A broad selection of databases is available to students via the World Wide Web (www), where they can access a wide range of knowledge and content to expand the process of teaching. According to Parchoma (2014) having access to a wide variety of information is assists with problem solving and gaining new knowledge.

The developing internet bring forth features that did not exist previously and allow participation together with interaction in learning environments.

The next section discusses the competencies of lecturers in using the Internet in teaching.

2.11 Lecturer competencies for internet use in teaching

Poor lecturer skills and knowledge are among the factors which have an impact on internet use in classrooms (UNESCO, 2011). Skills and competence are constructs explored by the researcher in the conceptual framework for this study. Conole (2010) found the reasons for adopting online educational practices to be complex and multifaceted, but largely associated with the requisite skills among educators. Furthermore, the Organisation for Economic Co-operation and Development OECD (2016:49) states “the use of digital technologies in formal education and vocational training has the potential to improve learning, although the outcomes depend on the capacity to link these tools to effective pedagogy”. How well the resources available are linked to pedagogy is important, as they can either enhance the learning process if used effectively or be harmful if irrelevant.

A study by Loogma et al. (2012) notes the sustainability of e-learning interventions at vocational education institutions is dependent on lecturers’ skills and competencies. Once again, the construct of skills and competence manifested during the exploration of the literature is evident.

The section below addresses the aspect of funding to assist the use of the Internet.

2.12 Funding to assist the use of the Internet

The accessibility to and conservation of computers, access to technical support, access to consistent internet connectivity, and continuing professional development are some of the institutionally correlated factors that are contingent on the availability of sustainable funding. According to Porter et al. (2014), when adding ICT in teaching instruction, one can accept certain additional costs may occur. In the current worldwide situation with the COVID-19 pandemic, data costs and Wi-Fi availability were foregrounded. Lecturers having to work from home and engaging with students on online platforms is challenging. Not all lecturers have access to their work emails, and

not all students have access to Wi-Fi or have computers to assist them during this time. Some students make use of WhatsApp entirely, and this also requires data. Lecturers are in constant communication in respect of challenges and how to assist one another, sharing ideas and knowledge.

George (2014) argues if educators do not have the necessary resources it will hinder ICT integration in education. This argument is supported by the above situation staff members of Boland College and all other educational institutions find themselves in at present. The fact that some ICT tools are available solely on campus premises is not much help during lockdown. The author additionally identified a lack of funding for initial financing for the deployment of ICT infrastructure, maintenance costs, technical support and training, and professional development as key factors hindering the effective use of ICT.

The merits of using ICT in education are discussed in the section below.

2.13 Merits of using ICT in education

Cox, Preston and Cox (1999) concluded that the using ICT for educational purposes can contribute to creating lessons that are fun and interesting. Thus will allow educators and students to enjoy themselves, where diversity can be addressed, the motivation of students can increase, and productive learning environments can be created.

Traditionally the focus has been on the average needs of the class, but ICT allows educational institutions to focus on the needs of the individual. Students with special needs can also benefit from ICT, because information can be easily accessible to them. ICT can be used in a variety of ways across year plans, and curriculum planning can make use of ICT to assist with learning processes. Word processing, for example, can be used by students to develop the appearance and quality of their assignments. The teaching and learning process is changing in different ways, abandoning traditional methods and using creative ways to present subject content to students and in classrooms. Educational targets and achievement of educational goals can be obtained by effective use of ICT in education. The findings of Amin (2016) reveal a few effects of a digital classroom on the teaching–learning process. Students, who perform better when doing certain tasks at their own pace, can also benefit from ICT because it will adapt to their specific needs. The Internet provides a wide range of information

and resources to its users, allowing them access to resource-based learning. ICT can improve students' presentation skills, with regard to special effects and sounds that can be added to slideshows. ICT will help keep students actively involved in the learning process, through practical, interactive activities. The use of ICT can also stimulate a sense of independence, as students are free to explore areas where they can, for example, choose their own design template in Microsoft PowerPoint, Excel, Access, and Word, and produce quality multimedia products.

In the next section, the monitoring of student activities by means of a software program, AB Tutor, is discussed.

2.14 AB Tutor as a means to monitor student activity in computer laboratories

The following benefits and features accompany the use of AB Tutor in computer laboratories. The lecturer can manage his or her classroom as follows: switch on computers; logon and off to computers remotely; schedule remote shutdown or start up; block printing and the use of USB drives. The following are listed as ways to control applications: set boundaries to applications, or log off from applications; launch applications remotely; be aware of which applications students have running and close inappropriate applications. AB Tutor also allows lecturers to monitor computers in the following ways: watching screens remotely; monitoring groups simultaneously; running applications can be monitored to ensure they are applicable to what is being done; record and view student activity and play back student screen activity. The demonstration and sharing feature on the AB Tutor program enables the user to broadcast the tutor screen to students with audio, show a student's screen to others with audio and switch between student demos. File management is another feature used to distribute and/or collect files from students**,** for optional compression during the transfer of files. Monitoring of internet usage is an important aspect in computer laboratories, therefore AB Tutor can be beneficial to institutions limiting web browsing to specified sites, blacklisting specific sites, providing notification when students visit specified sites, sending email notification of violation, and viewing active webpages at a glance.

In the next section, the researcher states the research questions and objectives of the study.

This chapter seeks to find solutions to the research questions presented in Chapter 1. The research questions are listed below.

2.14.1 Research Questions

1. Which ICT tools are available at the TVET college?
2. How are the available ICT tools used by lecturers in their classrooms?
3. How effective are the ICT tools used in relation to pedagogy, teaching and learning?
4. How does the utilization of ICT influence TVET teaching and learning?
5. Which factors influence lecturers' use of ICT in their classrooms?

In the next section the limitations of the use of ICT in education are discussed.

2.15 Limitations of the use of ICT in education

A number of research studies have provided reasons that can possibly have an impact on the use of technology in higher institutions. Some of these factors include inadequate infrastructure, easy access to computers, and lack of planning for the utilisation of technology (Smerdon et al., 2000). Further factors include lack of training and development of staff, staff burnout, and inadequate time for application of ICT resource lessons (Cox, Cox & Preston. 1999). According to Brosnan (2001), lack of skills, motivation levels and the fear of making mistakes are factors affecting teachers' use of ICT during lessons.

Emans (2002), cited in Moya et al. (2011), claims that many teachers and learning institutions view the use of ICT as intimidating because of lack of skills and resistance to using ICT. According to Jaway (2003), numerous governments face challenges in adapting their higher education system to the demands of a fast-changing technological and social order; this concurs with the findings of Maier and Warren (2000).

Youssef and Dahmani (2008) refer to numerous factors, such as "online gaming, use of Facebook, chat rooms, and other communication channels as alleged shortcomings of ICT use in education, because students easily switch to these sites at the expense of their studies". Students privileged to have access to the Internet at home, can be

easily distracted by social media platforms, which will lead to less time spent on assignments and revision. The ICT tool, AB Tutor, used at Boland College, has assisted lecturers to monitor and even catch students cheating during assessments. How ICT influences student learning or progress depends on how it is used. Literature has shown that if lecturers are not comfortable with or do not have the necessary skills to use ICT, it will influence the outcome of ICT utilisation. This was argued by Alemneh and Hastings (2006) and Minishi-Majanja (2007). The lack of expertise and knowledge of educators in using ICT in education thus constitutes a barrier to the use of ICT in their classrooms. According to Lam (2000), factors such as lack of time, procurement of equipment and resources also play a role whether ICT will be used or not.

In the next section, the barriers to the use of ICT are discussed.

2.16 Barriers to ICT use in classrooms

2.16.1 Barriers in computer laboratories

A barrier can be explained as any situation that makes it difficult to make progress or to achieve a goal. Students can be confused by the Internet and the large quantity of information available to them, resulting in the educator having to spend time controlling websites irrelevant to the learning content. A measure implemented at Boland College was that of AB Tutor in computer laboratories. AB Tutor is a software program used at Boland College that allows the lecturer to monitor student activity, assist students while busy with activities, demonstrate, block students from using the Internet while lecturers are busy with a lesson, and send and retrieve files to students.

As stated above, having computers in classrooms enables remarkable learning possibilities, but it can also be disruptive during the learning process. Social media, electronic communication and online games are just a few of these constant distractions for even the most dedicated students. Students ill-equipped to evaluate relevant information can also pose a risk to the use of ICT in classrooms.

Computer viruses are also a potential barrier in computer classrooms. If there is not updated computer virus software available in computer classrooms, it can pose a risk to the software programs loaded on the computer. The vast number of students and lecturers making use of the same computers is risky, with the use of Universal Serial Bus (USB), also known as memory sticks, and other external devices which can

transfer viruses from one device to another. The technical ability of educators, as well as the challenge of regularly connecting to the Internet to download updates, prevents them from using freely available virus protection software on their computers. Educators are also concerned about the time-consuming efforts to prepare lessons at home, to arrive at their workstation and the content on the USB was presented as shortcuts, were no longer available and could not be viewed or accessed.

In the next section, the ergonomic factors surrounding ICT use are discussed.

2.16.2 Ergonomic factors in ICT implementation

The use of ICT in classrooms can also have negative physical effects, if ergonomic factors are not considered in classrooms. Poor vision, wrist injuries, stiffness, and neck and back pain may occur in frequent users.

2.16.3 Plagiarism in ICT

Plagiarism can also occur among students using ICT, as students tend to make use of the 'copy and paste' option, which stifles their originality and creativity. Students can easily copy each other's work in computer laboratories if they cannot complete their own activities or assessments on time. When students are well equipped in the use of ICT, it is a quick and efficient way of completing tasks like typing and printing, instead of orally presenting something or writing it down. Students who struggle with ICT might need extra time from educators to assist them during lessons.

In the next section, technology and infrastructure are discussed.

2.16.4 Technology and infrastructure

Technology can also be a limitation in the use of ICT for educational purposes. The cost of electricity is soaring and the maintenance of computer parts is costly. Another barrier in South Africa is the electricity supply. The implementation of load shedding by the national electricity provider, ESKOM, is also hazardous to equipment. Sudden power outages can cause computers and other electronic equipment to fail, thus creating extra unforeseen expenses for institutions. When using computers and the Internet, it also is essential to install anti-virus packages. When there is an inadequate power supply and the Internet is slow, the use of ICT can also be interrupted.

In the next section, intrinsic and extrinsic barriers to lecturers' use of ICT in education are discussed.

2.17 Intrinsic and extrinsic barriers to ICT use

Educators have used various categories to classify barriers to the use of ICT in the classroom. According to Becta (2003), there are two categories: extrinsic and intrinsic barriers. Extrinsic barriers are barriers not directly relevant to educators, but that have an impact in teaching extrinsically.

A study by Al-Alwani, (2005) defined extrinsic barriers as barriers which are related to the external environment and not to individuals, and intrinsic barriers on the other hand are related to individuals.

Other researchers group the above-mentioned barriers in two categories: educator-level barriers and institution-level barriers. According to Becta (2003), barriers can be classified based on whether they refer to individuals (educator-level barriers), such as lack of confidence, lack of time, and resistance to change, or to the institution (school-level barriers), such as the absence of effective training in solving technical problems and lack of access to resources.

Balanskat et al. (2006) classify barriers as micro-level barriers, such as those related to teachers' attitudes and approaches to ICT, and meso-level barriers, such as those related to the institution. They also add a third group, macro-level barriers, which are those related to the wider educational framework. Other researchers refer to the barriers as those pertaining to two types of conditions: material and non-material. According to the classification of Pelgrum and Law (2003), material conditions refer to the number of computers or copies of software. Non-material barriers refer to educators' ICT knowledge and skills, the difficulty of integrating ICT in instruction, and insufficient time.

The following list provides examples of intrinsic barriers:

2.17.1 Intrinsic barriers

Intrinsic barriers may include barriers directly related to educators and which can have an impact on teaching intrinsically.

- **Lack of confidence**

  According to Salehi and Salehi (2012), the majority of educators' response were that if they lack confidence, it can stand in the way of ICT integration. It was found from the bulk of the educators, that they knew how to use ICTs but they were not confident in how to use these resources or how to manage teaching through these resources. If the necessary ICT tools are not available to lecturers, this will militate against their use in their classroom.

- **Lack of teaching competence**

  It was found that the majority of the teachers knew how to use ICT on a personal basis, but lacked the necessary skills and familiarity with the application of ICT in daily teaching and learning activities. It is one thing to use ICT in other facets of life, but not everyone can use it for teaching purposes.

- **Resistance to change & negative attitudes**

  According to Jamil & Shah (2011), if teachers have positive attitudes towards the use of technologies professionally they will not have a problem to adapt and embrace change. They tend to be more likely to implement ICT in their teaching practice. One of the constructs in the developed conceptual framework was change management, and the willingness of users to adapt to changing environments.

Below are examples of what can be categorised as extrinsic barriers.

2.17.2 Extrinsic barriers:

- **Time constraints**

  Time is a common barrier in the use of ICT in the classroom, where educators have to adhere to the stringent requirements of the syllabus. Educators do not only have the responsibility of teaching, but also need to comply with other requirements, such as administrative duties and extra-curricular activities. Time

can be a constraint when educators have other responsibilities, and the preparation of ICT materials to deliver to students can be time consuming.

- **Absence of training**

  The absence of training is another common barrier occurring throughout the literature. According to Bingimlas (2009), lack of training in digital literacy, lack of pedagogical and didactic training in how to use ICT in the classroom, and lack of training in the use of technologies in science-specific areas are barriers to using new technologies in classroom practice.

- **Lack of access**

  If educators do not have access to relevant ICT resources, this can be a barrier to their use of ICT in the classroom (Joseph, 2012). Here the aspect of the lecturer's own Wi-Fi facilities and data usage comes into play, which could cause frustration.

A summary of the articles reviewed is presented in Table 2.1 overleaf.

Table 2.1: Reviewed articles

Article	Author/s	Key Findings
Challenges for using ICT in education: teachers' insights	Salehi & Salehi (2012)	Educators may be familiar with ICT and how to use it, but it does not mean that they use ICT in their day to day teaching. It was also found that insufficient technical support at schools and limited access to the Internet and ICT preclude teachers from using ICT in the classroom.
Factors that influence lecturers' internet use in teaching: an exploratory study of Gauteng public technical and vocational education and training (TVET) colleges	Mthembu (2018)	This research was done in a South African setting, hence was very informative and relevant to this research. The research setting was also conducted at TVET colleges. The study did not interrogate the integrated use of all the knowledge domains in teaching among lecturers.
Benefits of ICT in education	Bansal (2016)	The author found that even the way children do their homework has changed over time; instead of going to the local library as we all did once, information can now be searched for on the Internet. For some individuals it is not even necessary to leave the comfort of their homes. Inequalities were also identified since only a small group has access to certain ICT resources outside their academic institution. It has become evident that many learners need to make use of community centres to gain access to these resources.
Barriers to the successful integration of ICT in teaching and learning environments: a review of the literature	Bingimlas (2009)	Many barriers were identified throughout the study, even though the participants stated that they are willing and eager to make use of ICT tools in their classrooms. Major barriers identified were: lack of confidence, lack of competence, limitation of access to resources.
The roles of information communication technologies in education. Review article with emphasis to the computer and internet	Mikre (2011)	The author found that one of the areas in which the impact of ICT is important, is education. ICTs are changing the way lessons are presented in classrooms, and how educators adapt their teaching methods to accommodate ICT utilisation. It was found that an active, participative learning environment is created when making use of ICT in classrooms. The use of ICT gives greater responsibility of learning to the student.
Educators' perspectives about ICT enabled teaching	Dube (2017)	Although it was found that the participants had a positive attitude towards e-learning as a pedagogical tool, they had concerns that needed immediate attention.
An effective use of ICT for education and learning by drawing on worldwide knowledge, research, and experience: ICT as a change agent for education	Syed Noor-Ul-Amin	The researcher stated that the impact of ICT in education is expected to grow in the future as it is a change agent in various educational practices. It was also noted that using ICT now and in the future, will influence the process of teaching and learning, access to education, the quality thereof and the role ICT usage plays in academic performance .

Teachers' skills and ICT integration in technical and vocational education and training TVET: a case of Khartoum State – Sudan	Ramadan et al. (2018)	The findings of this research recommended that there should be a long-term strategic plan for ICT incorporation in the TVET system, providing technical institutions as well as vocational training centres with enough computer devices and internet connectivity such as WLAN service. ICT training should be integrated into certificate and diploma programmes to enable pre-service teachers to acquire the necessary skills needed for the TVET ICT programmes. It was also found that information and communications technologies in general are recommended for inclusion in the teacher-training programme. TVET lecturers will be able to utilise the ICT tools wherever they are to the advantage of students, in the presence of all the aids of practice.
Management attitude, support and integration of information communication technologies in higher education in Uganda	Moya et al. (2011)	The researchers found that in order for ICT to be effectively incorporated in education, a positive attitude from institutional management is needed. Management support and participation has an impact on the development and incorporation of ICT in higher education institutions. If the necessary resources and facilities are available, successful ICT utilisation will take place.
ICT integrated education: shifting role of teachers	Kaur, S (2017)	The study identified that ICT has greatly influenced the way people go about their daily duties or activities. It was found that the responsibility of educators is to rethink their methods of instruction and adapt to the changing teaching environment. The changing digital world is forcing educators to adapt in order to keep up with the fast pace.

2.18 Summary of chapter

In this chapter the main constructs from the theoretical framework, constructed for this study were systematically explored by making use of the available literature. The researcher identified the ICT tools available at the TVET college and explored whether lecturers are utilising these tools in a successful manner in order to enhance student learning. In chapter 3, a conceptual framework will be developed and explored to guide this study. In the next chapter the conceptual framework developed is discussed, as well as the models and theories explored.

CHAPTER THREE

Models and Theories

3.1 Introduction

The researcher decided that a conceptual framework was best suited to guide the exploration of lecturers' utilisation of ICT in their classrooms. The conceptual framework was conceptualised after compiling Chapter 2 and prior to reading other sources for this research. This framework guided the researcher during the research process to understand the phenomenon under investigation on factors that influence lecturers' ICT utilisation in their classrooms.

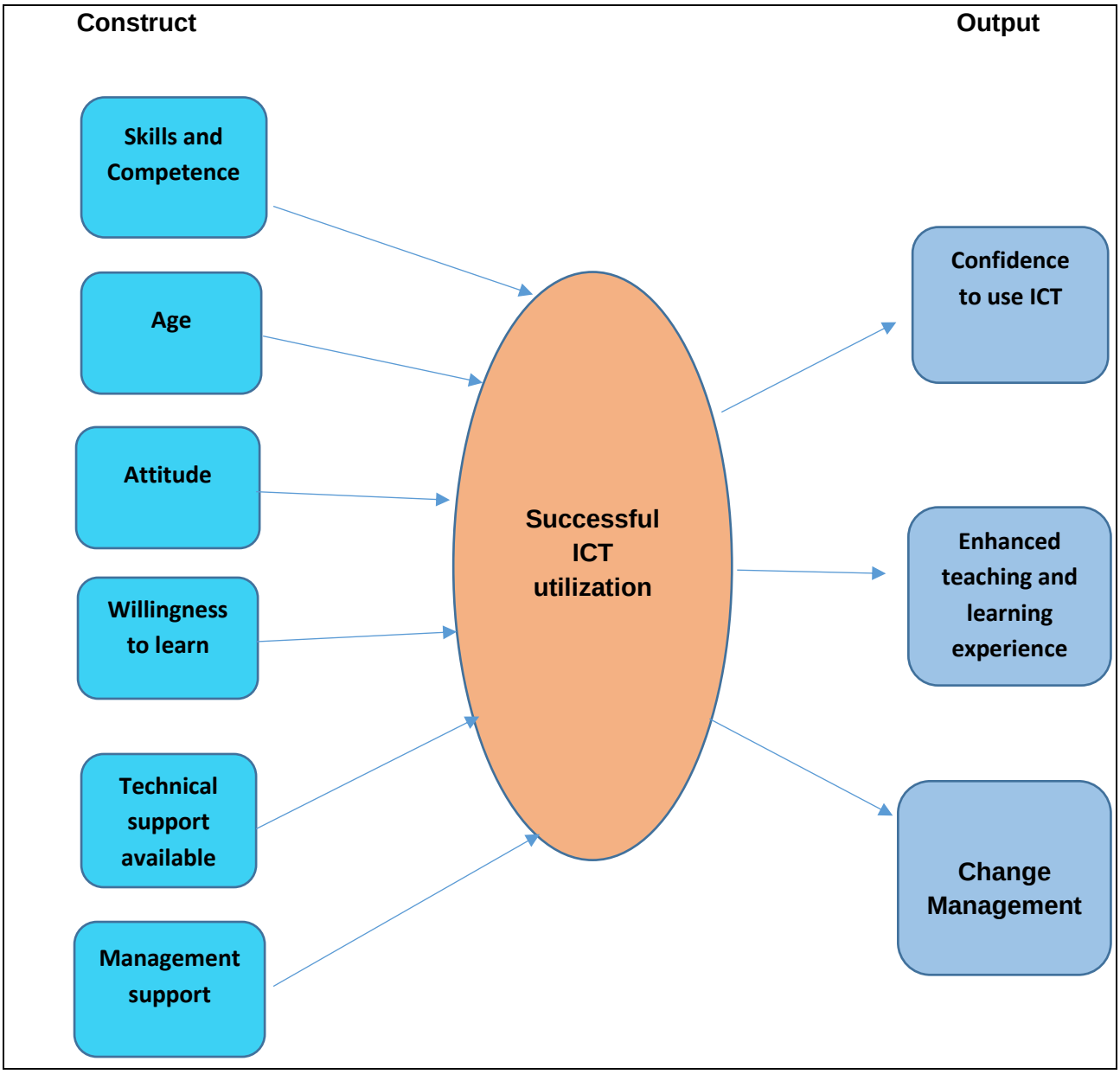

Figure 3.1: Conceptual framework

George (2014:23) states that “a framework provides evidence that a researcher has reviewed the literature, selected relevant theories and/or concepts and organised them into a structure which shows the boundaries of the present study”. The framework guides the research process towards understanding the phenomenon under investigation on factors that influence lecturers’ ICT utilisation.

A conceptual framework depicts the researcher’s conceptualisation of the relationship between variables during a research study and presents it diagrammatically.

In Figure 3.1, the conceptual framework on the successful utilisation of ICT consists of nine constructs which emanated from the literature review, prior reading, Chapter 2, and models and theories. These constructs were perceived to influence whether lecturers would use ICT in their classrooms or not. These constructs include lecturer ICT skills and competence, age, attitude, willingness to learn, and whether technical and management support is available to lecturers. In the next section each construct is discussed.

3.2 Constructs in conceptual framework

3.2.1 Lecturer skills and competence

It is presumed that the skills and competence of lecturers depends on their willingness and confidence to use ICT tools in their classrooms. The researcher presumes that if a user is proficient in ICT skills, he or she will be more eager to use ICT in the classroom.

3.2.2 Age

The age of lecturers will presumably have an influence on their current ICT skills and their willingness to adapt to the changing technological environment.

3.2.3 Attitude

The backgrounds of lecturers and the advantages and disadvantages they bring to the classroom, are vital factors. Lecturers’ home environments and their proclivity towards the education system are among the factors that influence their attitudes towards teaching and learning and their willingness to change initiatives. Consequently, it is

argued that if lecturers' attitudes towards ICT utilisation are negative, they will tend not to use ICT in their classrooms.

3.2.4 Willingness to learn

Lecturers' willingness to learn new things will also play a role; ICT is continually developing and changing, and we need to keep up with these developments to remain relevant. Negative beliefs and expectations, the absence of or inefficient lecturer training, and low motivation are some factors that could influence lecturers' willingness and ability to adopt change initiatives (Levin & Nevo, 2009).

In the next section, management and technical support available to lecturers is discussed.

3.2.5 Management and technical support

This aspect focuses on the support lecturers get from management with regard to ICT and availability of tools. It is noted that each TVET college's needs are different with regard to providing tools or platforms for ICT. Some managers have an open-door policy, where staff members can come in and discuss comfortably what their problems or issues are. A paucity of facilities and physical resources has a debilitating influence on the teaching performance of lecturers (Fullan, 2007). Management is also the link lecturers have with the top structure, such as the Department of Higher Education and Training, and trade unions. If staff members know they have technical support available in the event something were to go wrong, they will be more eager to use ICT.

3.2.6 Confidence to use ICT

The confidence levels of lecturers play an important role in whether they are comfortable in using ICT, especially for lessons in the classroom with an audience of students.

3.2.7 Enhanced teaching and learning experience

As technology is changing and evolving daily, it is evident that it can have numerous benefits in the education sector. Exposing students and learners to new and exciting ways to learn or to do novel activities could be very stimulating and rewarding.

3.2.8 Change management

It should be accepted that everyone is not eager to adapt to changing environments, especially if teaching has been done in a certain way for a substantial period of time. Some people become set in their ways and find it tremendously difficult to change or to adapt to change. Technology, changing as rapidly as it does, makes it difficult to work with people that do not adapt to the times. Institutions should promote change and embrace new things in the workplace, thus through example encouraging those less keen to adapt to also try something new.

3.3 Theoretical framework

3.3.1 Introduction

Sekaran and Bougie (2010) state that the theoretical framework is “the foundation on which the entire research” rests. When existing theory is the source for conceptualising the research questions and theoretical propositions of the study, a theoretical framework is constituted. It thus provides evidence that the researcher made sense of the relation among the factors that influence the research problem.

In the next section, the researcher discusses the models explored during the research study.

3.3.2 Models explored

3.3.2.1 Technology Acceptance Model

This model is known as Technology Acceptance Model (TAM). The researcher investigated the Technology Acceptance model (TAM) by Davis (1989) because this model focused on the integration of ICT in education, which is a key proposition of this study.

The acceptance of ICT by its users depends significantly on how users perceive the worth of the innovation, how much effort it will take to comply with the innovation, and also their behaviour intentions. Perceived usefulness refers to the measure of perceived gains of utilising the technology for improved job performance. Perceived ease of use points to the measure of user-friendliness of the innovation.

The value and efficacy of certain systems were previously measured by the TAM theory. TAM is a profound theory in information systems research. Over many years, TAM has developed and grown with more variables, furnishing reasons for individuals' acceptance of technology.

The Technology Acceptance Model centres on the process of adopting new technologies. The attitude and intention to accept an innovation are strongly associated with perceived usefulness and ease of use of the technology (Davis, 1989). Computer technology literature criticises TAM for inadequate empirical and analytical rigour. Highlighting system features, this model neglects addressing the social influences of new computer technologies. This model was adopted for this study because it provides reasons why users accept technology.

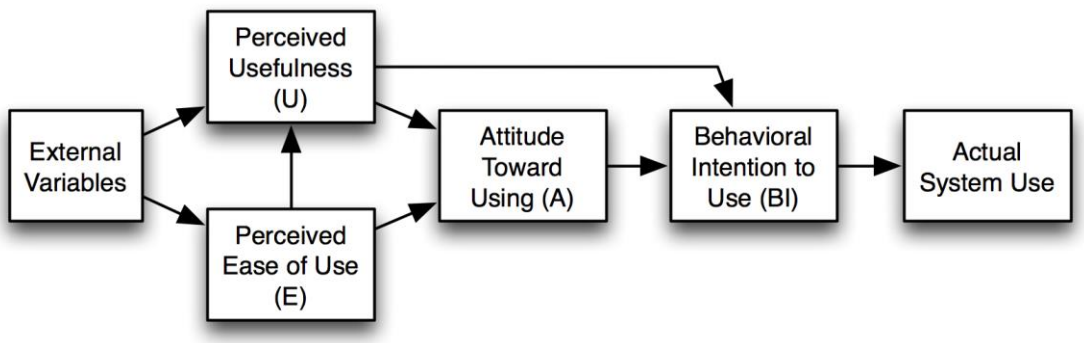

Figure 3.2: Technology Acceptance Model

3.3.2.2 The Theory of Reasoned Action (TRA)

Researchers Ajzen and Fishbein (1980) developed the Theory of Reasoned Action (TRA). Three aspects constitute this theory: behavioural intention, attitude, and subjective norms. This theory indicates that the beliefs of an individual can influence his/her attitudes, which can then construct a behavioural intention which can be seen as an individual's cognitive ability to execute a specific behaviour. Attitudes and subjective norms are the two main focus areas in the TRA model which can impact an individual's intention. Attitudes include beliefs about the evaluation of executing certain behaviours. This model was suitable for this study, because it is widely used in predicting users' behaviour.

3.3.2.3 The Theory of Planned Behaviour (TPB)

An educator's use of computers can be conceptualised by the theory of planned behaviour (TPB). The TPB is a strict model which was further developed by Ajzen (1988) on the research of reasoned action, inspired by previous work done by Fishbein and Ajzen (1975). According to the TPB, perceived behavioural control, subjective norms and attitude are all facets of the decision-making process.

Three categories, argued by Ajzen (1988), are assumed to direct human actions. The first category states that the intention to perform a given behaviour depends strongly on the individual's feelings towards, and beliefs about, that behaviour. The second category pays attention to the influence of perceived social pressure on the behaviour of the individual and the motivation to perform the intended behaviour.

According to Fishbein and Ajzen (1975:302), "it is unlikely that a person will perform a given behaviour if the person suspects that those important to him are not in agreement with that behaviour". The third category of TPB predicts the individual's estimation of level of difficulty in performing the behaviour (perceived behavioural control). If two people compete in a difficult assignment, the more confident and motivated one will likely conquer (Ajzen, 1991).

This theory comprises two important facets: the first facet asserts that control over behaviour promotes motivational intent; and the second facet posits that there could be a potential direct connection between behavioural control and the desired behaviour (Ajzen, 1988).

Intentions might not be enough to implement particular behaviours if you encounter a lack of resources, and when the attitude, motivation and the perceived control of the individual are low. There is evidence of a positive relationship between users' attitudes and computer usage. The argument is that most individuals first contemplate the consequences of their actions before performing the actions. On the other hand, the model states that people think about something calmly and rationally and will use information which is available to them to suit their abilities.

Certain emotional aspects are not considered by the model, such as any form of threats, anxiety, fear and moods. The individual's perception of being able to control his or her behaviour is a benefit of this model.

Ajzen (1985) proposed the Theory of Planned Behaviour (TPB) as an extension of TRA. Its main premise is the individual's intention to perform the proposed behaviour. TPB, however, also addresses behaviours that are not volitionally controlled. In fact, TPB broadens the scope of the TRA in adding the perceived behavioural control (PBC) element. PBC accounts for those situations, which depend on situation and actions of others, and behaviours cannot therefore be completely controlled. TPB has been successfully applied in study settings for predicting desired sustainable behaviours (Alias et al., 2015). Although this model is an extension of the TRA model, it was not chosen for this research because this model did not consider the emotional aspects of accepting ICT.

3.3.2.4 Technological Pedagogical Content Knowledge (TPACK) Model

The research on factors that influence internet use in teaching utilises the Technological Pedagogical Content Knowledge (TPACK) framework for technology use in teaching. This model, however, is more commonly used in primary and secondary education and not in vocational teaching; for this reason this model was not suitable to adapt for the purpose of this study.

This is a widely used framework for technology integration in teaching and it illuminates three sets of knowledge domains which include technology knowledge, pedagogical knowledge, and content knowledge for effective integration in pedagogy (Chai & Koh, 2014).

While it is a widely used framework, Tomte, Enochsson, Buskqvist and Kårstein (2015) caution that most studies on the implementation and validation of the TPACK framework are largely focused on primary and secondary education, and not vocational education. Nonetheless the TPACK framework has evolved and is widely regarded as a theoretical tool for understanding and assessing a range of competencies on technology use in instruction.

According to Koehler and Mishra (2008) who originally introduced the TPACK framework, teachers need to demonstrate a three-dimensional level of knowledge constructs that include curriculum content and pedagogical knowledge as well as technology knowledge in order to develop higher levels of cognitive development among students through the use of technology.

3.3.2.5 Unified Theory of Acceptance and Use of Technology

Venkatesh et al. (2003) formulated the Unified Theory of Acceptance and Use of Technology (UTAUT) model, which combined the most cited acceptance models. The most prominent influencing factors were social influence, perceived effort, conditions for facilitation, and performance expectancy. The intention to use the available technology was dependent on how these played out in a real-life situation. Experience, voluntariness, gender and age are predicted to influence the mentioned factors that constitute the UTAUT model.

UTAUT provides a mechanism for management in educational institutions to establish the success rate for newly implemented technology innovations. Those users who are less keen to adapt to new technology innovations could be another focal point for researchers to understand why they don't want to accept these new technologies. This model was considered for this research because it can predict 70 percent of individual differences in the usage intention and actual use of ICT.

Table 3.1 Comparison of theories explored

Model	Advantages	Disadvantages	Gap identified	Suitable for this research or not
Technology Acceptance Model	Provides reasons why users accept technology	Ease of use was initially not included in TAM	Does not consider factors such as age and education levels	Yes
Theory of planned behaviour	Best supported socio-psychological theories that predict human behaviour	More suited as optional choice when users have the option to choose between various systems	Emotional aspects are not considered	Not suitable
TPACK	Combining content knowledge, technological knowledge and pedagogical knowledge simultaneously	Difficult to establish boundaries of different knowledge areas within TPACK model	Does not focus on education at vocational level	Not suitable
Theory of Reasoned Action	Can be used to predict a wide range of behaviours	It assumes that actions are under volitional control (Kurland, 1995).	Does not specify the beliefs that are operative for a particular behaviour	Yes
Unified Theory of Acceptance and use of Technology	It can predict 70% of individual differences in the usage intention and actual use	Does not have technology culturation as one of its constructs	Technology culturation	Yes

3.4 Summary of chapter

Advantages of each model emerged during the exploration of the various models. The following models were considered during this research: the Technology Acceptance Model, because it provides reasons for users' acceptance of technology; the Theory of Reasoned Action, because it is widely used in predicting users' behaviour; and the Unified Theory of Acceptance and Use of Technology**,** because it can predict 70 percent of individual differences in the usage intention and actual use of ICT.

This study was influenced by exploring the Technology Acceptance Model (TAM) in collaboration with the Theory of Reasoned Action, and the unified Theory of Acceptance and Use of Technology. TAM refers to "perceived usefulness", and could be applied to this study where lecturers consider the benefits of ICT usage before they actually use it (Bhattacherjee, 2001). The researcher explored if the following factors could be perceived as beneficial. These benefits could include: more relevant content, bringing real-life scenarios into the classroom, understanding subject matter better, increased learning experience, making the learning process fun, and creating an inclusive and participative learning environment.

Secondly, TAM focuses on "perceived ease of use", which applies to this study where it is presumed that lecturers first contemplate whether all the effort and planning involved in implementing ICT in classrooms is worth it. This study considered the construct of skills and competence of lecturers.

The skills and competence of users make it easier to adopt technology; in other words, if the lecturer has the necessary skills and competence, he or she will be more likely to use it (Andoh, 2012; Bauer & Kenton, 2005; Franklin, 2007; Simpson, 2008; Wozney, Venkatesh & Abrami, 2006). The above- mentioned will ultimately lead to confidence to use ICT.

The researcher attempted to ascertain through an interview schedule whether lecturers had technical support available at the TVET college and if any formal ICT training was provided upon their commencement at work. The researcher could then agree or disagree that this model fails to understand that individuals seldom act in isolation from others (Abbasi et al., 2016). According to TAM, the attitude of users

determines their behaviour and the behaviour has an impact on whether technology is accepted or not. TAM influenced this study because it was found by previous researchers that top management and the provision of technical support are very important determinants of ICT utilisation (Bullock, 2004).

The conceptual framework was based on some of the constructs found in the UTAUT model: age, lecturers' level of experience, and willingness to learn. The researcher explored whether the age of a lecturer influenced whether or not he or she would use ICT in the classroom and if a lecturer's willingness to learn also depended on how he or she could adapt to the changing digital era (Williams et al., 2015).

The researcher made use of the TRA model's construct "attitude" to add to the conceptual framework of this study. The researcher believes that lecturers' attitude is imperative in ICT utilisation. A positive attitude is believed to promote the use of ICT and if a lecturer has a negative attitude to ICT implementation, he/she is more likely not to use it in the classroom (Kurland, 1995).

The next chapter focuses on the research methodology, which includes the following:

The research paradigm; the rationale for qualitative data-collection methods; the research design; deductive research approaches; the population for this research; the sample methods used; the convenience sampling method used; the validity and reliability of the research; data collection and fieldwork; how the interview schedule was developed; the interview guide; data coding and analysis; how data was analysed; qualitative data evaluation and transcription; the limitations of the study; and the ethical considerations for this research.

CHAPTER FOUR
Methodology

4.1 Introduction

In order to meet the research objectives stated in Chapter 1, the researcher decided on a qualitative research method and conducted in-depth interviews to explore how lecturers use ICT tools in their classrooms. The researcher obtained all the necessary ethical clearances to conduct the research at a TVET college. Based on the research objectives, the interview schedule was developed and classified under four main themes.

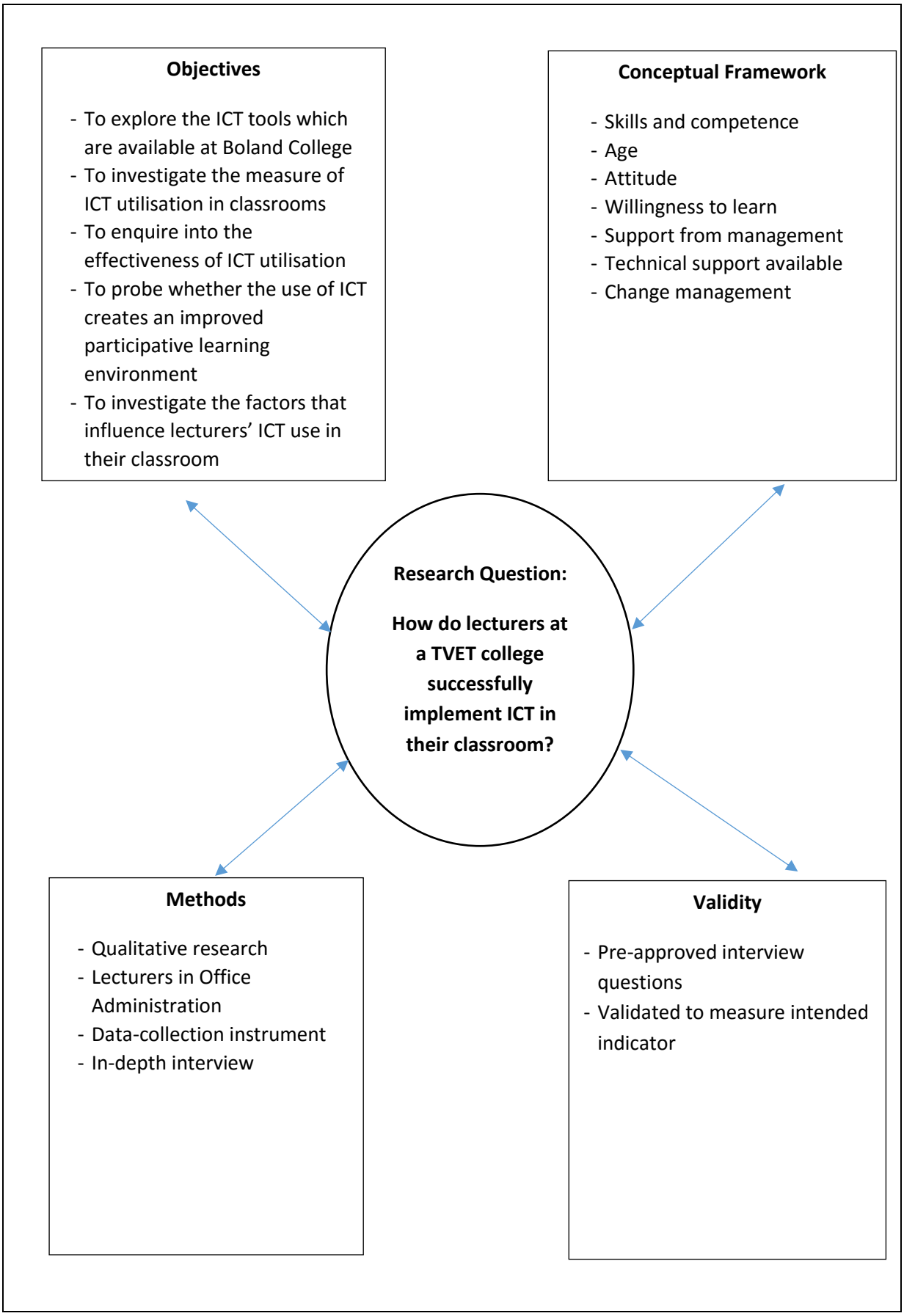

Figure 4.1: Illustration of research methodology

4.2 Qualitative and quantitative research

A qualitative research approach was adopted for this research study in the form of an in-depth interview. This is seen as an important aspect as research is seen through the eyes of those that have experienced. It focuses on the individual's experiences and how these experiences appear to the individual. Data collection took place, either in the participants' classrooms or in their offices. The researcher decided that a qualitative research method would be more suitable for this study, as lecturers' experiences and their subjectivity were explored. The next section outlines the research design.

Quantitative research is used on larger research groups, and this study employed 13 lecturers for the research sample. There are 13 lecturers in the Department of Office Administration at Boland College, and they work with the researcher in this department. Quantitative research methods collect numerical data from a chosen cohort of people, then deduce or extrapolate generalisations from the results to a larger group of people, explaining a phenomenon. Quantitative data are therefore more objective than qualitative data, rendering conclusive answers.

4.3 Paradigm

Antwi and Hamza (2015) state that the world is comprehended by individuals through a personal lens. A research paradigm is "the set of common beliefs and agreements shared between scientist about how problems should be understood and addressed" (Kuhn, 1970). This paradigm uses significance-oriented methodologies, namely, interviewing or observing participants, relying on a subjective relationship between the researcher and subjects.

4.3.1 Interpretive paradigm

Interpretivism is a rational choice to analyse qualitative data, which are nuanced in context and culturally determined, permitting these subjective data to be clustered in meaningful themes and categories (Bassey (1999). Furthermore, the meaning that participants attach to their experiences and attitudes, are greatly influenced by their social- and cultural beliefs and make-up. This paradigm allowed the researcher to employ the selected categories and themes to analyse the data collected in this study.

4.3.2 Critical analytical approach

During this study, the constructs explored in the conceptual framework were critically evaluated, judging the nuanced circumstances at the TVET college under investigation.

4.4 Rationale for qualitative data-collection methods

During the collection of qualitative data, interview protocols were used to gather in-depth information from lecturers on ICT use in teaching. The interviews collected data on the availability of ICT facilities sand tools, and the characteristics and manner of use of ICT in teaching and learning.

According to Koh and Chai (2014), qualitative methods are most effective to capture contextual nuances, namely, the attitudes and standards important in the integration of ICT in teaching, and which cannot be effectively explored through quantitative methods. Furthermore, qualitative methods are effective for understanding participants' common experiences and the meaning that they attach to these experiences in developing a deeper understanding of the phenomenon (Creswell, 2003; Creswell, 2007).

In gaining a more comprehensive understanding of the phenomenon, qualitative data from several participants was used (Creswell, 2007). Additionally, the use of several data sources assisted in minimising researcher bias and providing a better assessment of the study.

4.5 Research Design

The researcher made use of a qualitative research method for the purpose of this study. Interpretivism directs the methodology in the data analysis, which is anticipated to be extensive, loaded with content. Creswell (2008: 5), "research designs are plans and the procedures for research that span the decisions from broad assumptions to detailed methods of data collection and analysis."

4**.5.1 Inductive and deductive research approaches**

Induction starts with the specific and transfers to the general, whereas deduction moves from the general to the specific. New phenomena and observations are likely to be analysed inductively, whereas widely accepted laws, rules and principles are

likely to be analysed deductively. The concepts, principles and procedures of ICT use and tools are well conceptualised and documented, therefore the researcher opted for a deductive approach to data collection. The researcher therefore developed and espoused a conceptual framework for this study.

The next section describes the data-collection instruments used for the study.

Table 4.1: Questions used to address the research questions

Question number	Research questions	Addressed by interview question
1.	To what extent are ICT facilities and tools for lecturers available at the TVET college?	4.1 Which ICT tools are available at your TVET college? 4.2 Are these tools sufficient compared with the number of students enrolled at the college? 4.3 Are these tools easily accessible to all students? 4.4 If any of these tools are faulty, to whom do you report it, and does the responsible individual attend to the problem?
2.	To what extent are the available tools at the TVET college utilised by lecturers for their teaching instruction?	4.5 How would you describe your utilisation of these tools? 4.6 Do you have technical support at your college? 5.3 Are you comfortable to use ICT tools in your classroom? Substantiate your answer. 5.4 How would you handle a situation where a student knew more than you, when making use of ICT?
3.	How effective are the ICT tools used in relation to pedagogy, teaching and learning?	4.7 Can you notice a difference in students grasping content when making use of ICT to explain certain content? For example, in using a video. 4.8 How do you prevent offending students when using ICT in the classroom? 4.9 Do you thoroughly check materials before distributing them to students? And for what reason? 4.10 How do you maintain student attention during lessons when making use of ICT? 4.11 In computer labs, how do you monitor student participation and activity?
4.	How does the utilization of ICT influence TVET teaching and learning?	4.10 In your opinion how can ICT help students in classrooms? 3.4 What are the advantages of using ICT in the classroom? 4.8 How do you prevent offending students when using ICT in the classroom? 4.10 How do you maintain student attention during lessons when making use of ICT? 4.11 In computer labs, how do you monitor student participation and activity?

4.5.2 Sample method

The target group for this study consisted of 13 lecturers in the Department of Office Administration at the Paarl campus of Boland College. Participation in the study was voluntary. In the next section, the types of probability and non-probability sampling methods are explained. The most important probability sampling methods are simple random sampling and stratified random sampling.

4.6 Types of non-probability sampling

There are various types of non-probability sampling, like quota sampling and snowball sampling, which were not applicable to this study. The following sampling methods apply to this study.

4.6.1 Convenience sampling

A convenience sampling method was employed for the study. Convenience sampling is a type of nonprobability sampling where members of the target population that meet certain criteria, such as easy accessibility, geographical proximity, availability at a given time, or the willingness to participate are included for the purpose of the study (Punch, 2009). The participants were easily accessed because everyone lectured on the same campus**.** Convenience samples could be 'accidental samples', as the cohort may simply fit the bill. The researcher made use of convenience sampling because she had access to the participants on a daily basis, being colleagues at the TVET college and they worked in the same department, which is Office Administration.

4.6.2 Purposive sampling for the qualitative interviews

Through purposeful sampling, the researcher recruited all 13 lecturers in the Department of Office Administration, who agreed to participate in the study. These 13 lecturers were selected for in-depth interviews. The purposive sampling technique assisted in achieving the objectives of the study, which is focused on lecturer ICT usage, as it purposively selected lecturers who use ICT tools in their classrooms for in-depth interviews.

Purposive sampling is also known as judgement sampling, whereby the researcher intentionally chooses those participants that meet the selection requirements. As a non-random technique, it requires no underlying theories and no adherence to the

number of participants (Du Plooy-Cilliers et al., 2014). The researcher's concern is recruiting individuals who are able and willing to provide the required information.

4.7 Validity and reliability

Validity refers to the ability of the research design to measure what was planned to be measured, thus determining the authenticity of the results (Mustafa, 2011). Creswell and Piano Clark (2007) point out that validity and reliability differ in quantitative and qualitative research designs, even though the quality of data and results in both is assessed. Lewis (2009) argues that "reliability determines whether the study can be replicated when using a parallel methodology". The researcher made use of pre-approved interview questions which had been validated to measure their intended indicators.

For this reason, the quality of research is related to the generalisability of the result, and thereby to testing and increasing the validity or trustworthiness of the research. Triangulation is typically a test for improving the validity and reliability of research or evaluation of findings. Triangulation may include multiple methods of data collection and data analysis, but does not suggest a fixed method for all research. The methods chosen in triangulation to test the validity and reliability of a study depend on the criteria of the research. Qualitative enquiries distinguish between internal and external validity and also internal and external reliability.

4.7.1 Truthfulness

Credibility:

Confidence in the truth of the findings. An interview guide was developed to be used during interviews with each participant. The researcher engaged with the data for a period of time and and wherever the researcher was unsure about a statement, it was further enquired exactly what was meant (Lincoln, 1985).

Transferability:

In achieving transferability of the findings, the researcher continually paid attention to ensure that the process was rigorous in its documentation and execution, and traceable, allowing the study to be replicated (Lambert, 2012).

Dependability:
A clear description of the research design and implementation protocols, also pertaining to data collection and analysis, enhanced the dependability of the study. The study protocols were clearly presented and sufficient details were provided in anticipation of very similar findings given similar contexts (Creswell, 2003).

Confirmability:
All relevant information pertaining to the study was in safekeeping as proof the data and findings of the study were genuine and that the entire research process was authentic and well scrutinised (Shenton, 2004).

4.8 Data collection

4.8.1 Research instruments

A pilot study was not considered for this research because of time constraints, and the need to conduct the research on a larger scale across all campuses at the TVET college was not necessary.

A qualitative research technique, namely in-depth interviews, was used for this study, which involved conducting individual interviews to explore their perspectives on how effectively they use ICT in their classrooms.

4.8.2 Development of the interview schedule

A set of personal questions were asked, for example, the reasons for the lecturer's choice of the education profession.

In the second section of the interview schedule, the participants were asked what their understanding of information and communications technology was. The participants had to give an example of using information and communications technology.

In the third section of the interview schedule, the participants had to explain what information and communications technology in education meant. Questions such as how ICT can help students in the classroom, how ICT can assist lecturers in the classroom, and what the advantages of using ICT are, were asked. Each participant had to explain limitations of and barriers to teaching and learning while using ICT in

the classroom. Participants also had to explain how ICT can assist lecturers with subject content.

In the fourth section of the interview schedule, the ICT tools available at the TVET college were explored. Questions were asked to establish which ICT tools are available, and if these ICT tools are sufficient to cater for the number of students enrolled at the college, the accessibility of the ICT tools, and to whom faulty ICT tools are reported. Questions were also asked to establish how lecturers retain student attention while making use of ICT during lessons, and how they intervened when students contravened the rules of classroom ICT usage during lessons.
In the last section of the interview schedule, Section 5, questions regarding the ICT skills and knowledge of lecturers were asked. The participants had to rank their level of competence in ICT and explain whether they were comfortable in using ICT in their classrooms.

4.8.3 Access negotiation

Boland College is the researcher's current employer and therefore the researcher had access to staff members' email addresses and had face-to-face contact with the participants. A meeting was convened with the campus manager, where the researcher explained the purpose and scope of the study. The campus manager explained the process of approval to conduct research at a TVET college. The researcher sent an email with a permission letter attached to the principal of Boland College. The principal's secretary replied, attaching an application form which the researcher had to complete and submit together with supporting documents required. Upon receipt of approval to conduct the research, the researcher contacted the lecturers, who all had to complete a consent form, and on return of the consent form, arranged a date and time for the interview to be held. In the next section, the validity and reliability of the study are explained.

4.8.4 The interview guide

After the researcher introduced the participants to the topic of the study, the participants were reassured that confidentiality would apply throughout the study. Thereafter participants were provided with a consent form (Creswell, 2003). The interviews were conducted; each interview took approximately 25–30 minutes and was audio-recorded with the participant's consent, and later transcribed.

4.9 Data coding and analysis

By coding qualitative data, themes are assigned to similar clusters of data, which are labelled and organised to be able to draw relationships between themes. This process is thus intrinsic to thematic analysis. Common keywords and information which emerged during interviews will be used to develop themes for this study.

In Chapter 5, the discussion of findings, the researcher made use of data collated from the 13 participants, analysed and discussed. The following common themes were explored during data collection: Information and Communications Technology (ICT); Information and Communications Technology (ICT) in education; ICT tools available at the TVET college; and ICT knowledge and skills of lecturers in order to determine how each participant (lecturer) effectively makes use of ICT in the classroom.

4.9.1 Data capturing

The researcher made use of Microsoft Excel to capture some of the data collected during the interviews. Graphs were created from the data captured on the various Excel spreadsheets.

4.9.2 Data analysis

The approach to data analysis was deductive, based on thematic analysis. The researcher derived applicable themes and categories from the qualitative data obtained from the study in accordance with the constructs from the literature review and the conceptual framework.

The researcher, during data analysis, did the following: audio-recordings were transcribed precisely for the researcher to go back and read everything which emerged from the data- collection process. The text was read repeatedly to familiarise herself with the data to gain a holistic and comprehensive view of the text. The researcher linked the words of the participant (concept) to related themes. These concepts were later placed into bigger categories (Du Plooy-Cilliers et al., 2014). Audio-recordings were transcribed word for word to ensure authenticity of the collated data.

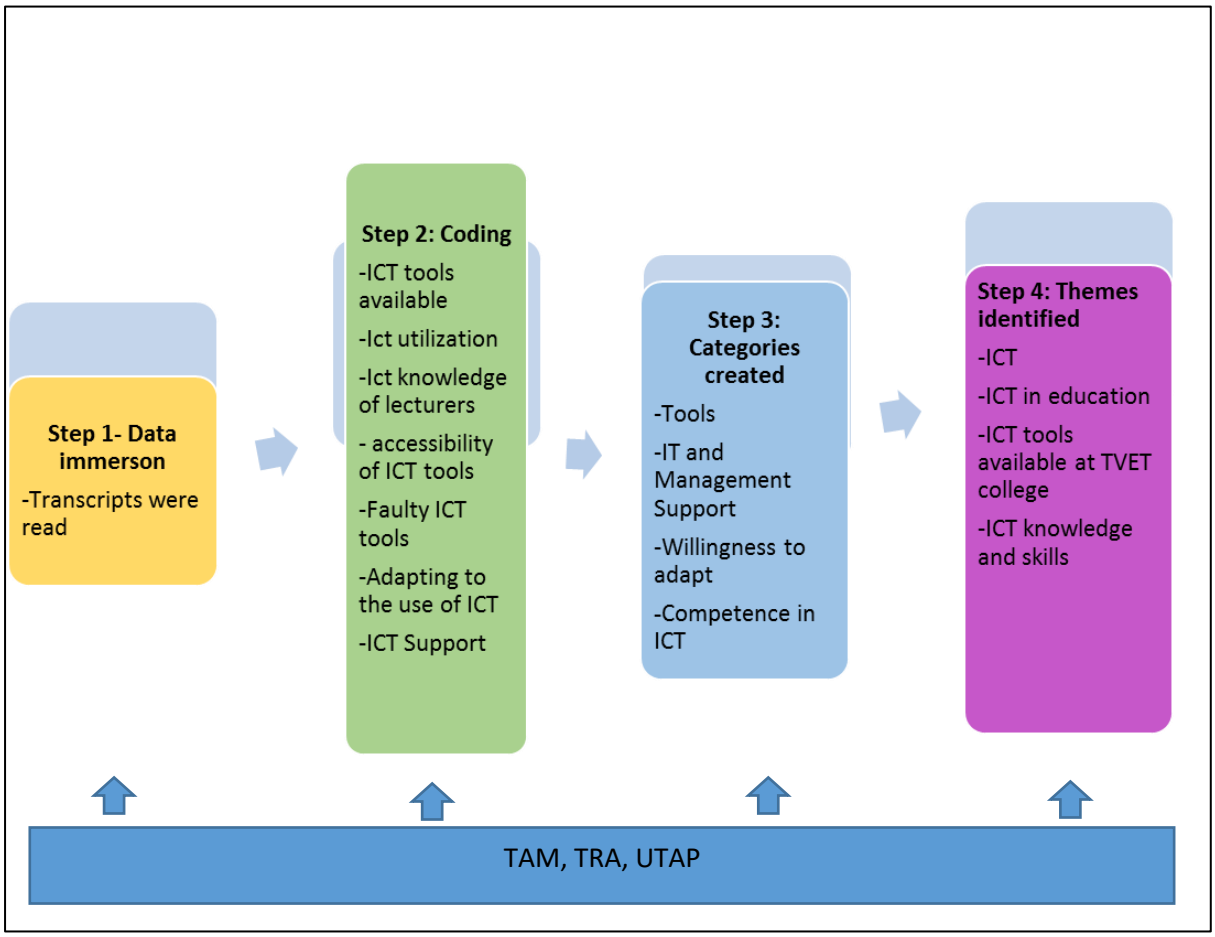

Figure 4.2: Data analysis process

The above mentioned figure explains how the researcher, transcribed the data which was collected in step 1. Step 2 followed, where coding took place and common key words were identified to create the various categories stated in step 3. The categories assisted the researcher in the development of the themes of the study. The three theories which were considered during the study are shown at the bottom of the figure which demonstrate that the models were consulted during the process of data analysis.

4.10 Demarcation of the study

The study focused on exploring how lecturers in the Department of Office Administration use ICT in their classrooms. Geographically, the study was limited to one campus (Paarl) of the five campuses. Boland College has five campuses: Caledon, Paarl, Stellenbosch, Strand, and Worcester. In the next section, the limitations of the study are noted.

4.11 Limitations of the study

Even though the purpose of the study was to investigate the nuanced experiences and attitudes of a single campus, because of the context-specific challenges and experiences of lecturers, a design across campuses could have rendered more comprehensive results. In the next section, the ethical considerations are noted.

4.12 Ethical considerations

Ethical considerations and issues are of paramount importance in ensuring the required quality and validity of any study. Before the study commenced, the researcher obtained permission from Boland College and ethical clearance from the Cape Peninsula University of Technology (see Appendix C). The study was approved by the Cape Peninsula University of Technology, and an ethics certificate was issued (see Appendix B). While conducting the study, the researcher adhered to a number of study protocols and ethical considerations in protecting the integrity and anonymity of participants. Prior to commencement of the study, all participants received a permission letter to inform them of their rights to privacy and anonymity. The data obtained during the interview were tabulated based on a coding system. All results were presented in an anonymous manner. Each participant had the right to withdraw

from this study at any stage of data collection, without providing reasons, and with no implications.

4.13 Summary of the chapter

The researcher conducted in-depth interviews with 13 participants at a TVET college in Paarl, Western Cape. The researcher obtained ethical approval from the Cape Peninsula University of Technology, as well as approval to conduct research from the TVET college prior to commencement of the research. Data collection was done in a confidential manner, and the names of the participants were not disclosed throughout the study. Participants had the right to withdraw from the study at any time during the research. Consent was obtained from all the participants before the commencement of data collection. This chapter also discussed the ethical considerations and delimitations of the study.

CHAPTER FIVE
Findings and Discussions

5.1 Introduction

In this chapter the researcher lists the key findings which emerged from the research conducted and discusses the findings. The ICT tools available at the TVET college were identified during this study, as well as their availability. How lecturers use ICT in the classroom was explored through this research as well as the influence of ICT use on an improved learning environment.

5.2 Descriptive Data

The number of years teaching experience of participants are shown in the figure below.

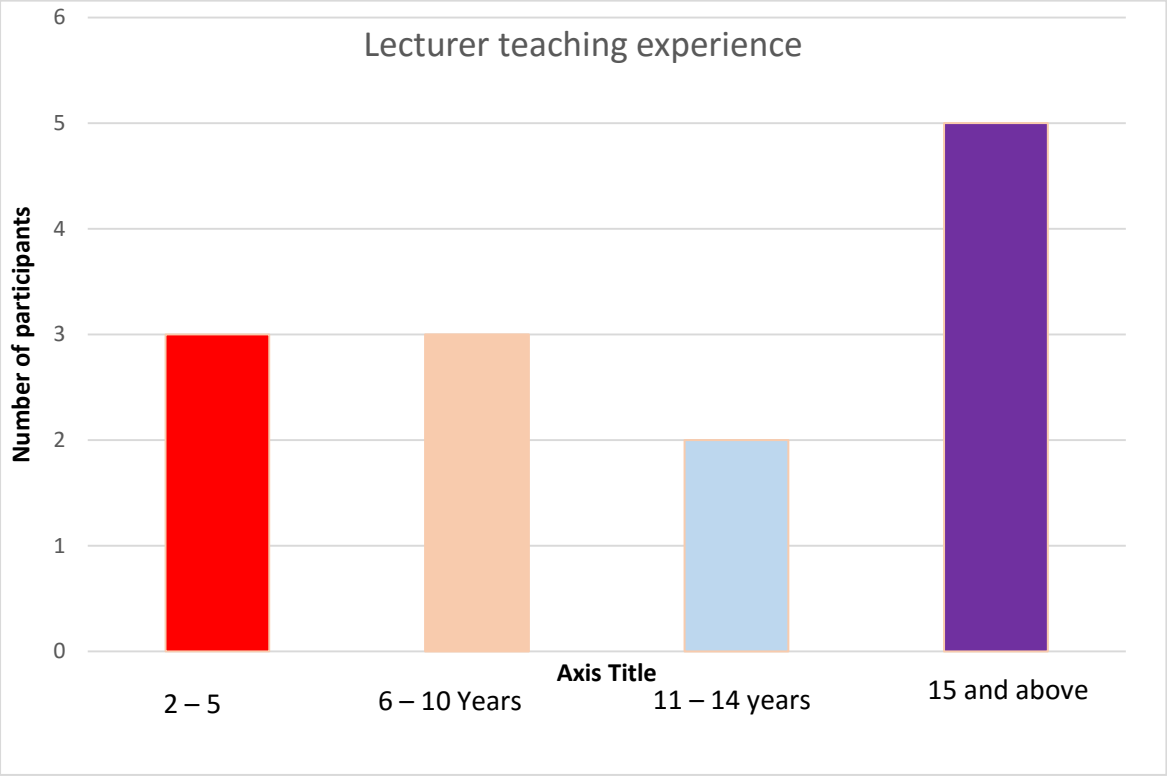

Figure 5.1: Lecturers' years of teaching experience

The above figure illustrates the number of years' teaching experience each participant had. Three (23%) of the lecturers had between 2 and 5 years of teaching experience. Three (23%) of the lecturers had between 6 and 10 years of teaching experience. Two

(15%) of the lecturers had between 11 and 14 years of teaching experience. Lastly, five (39%) lecturers had 15 years and more teaching experience.

In the figures overleaf, the self-assessment level of ICT competence of participants is shown.

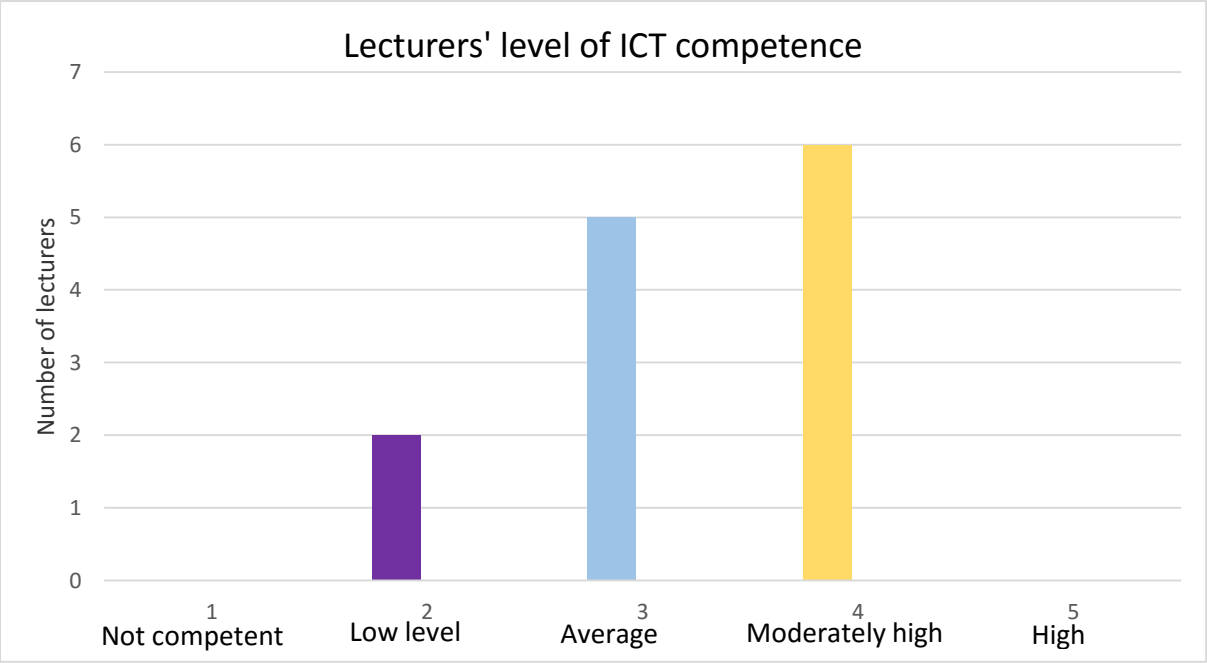

Figure 5.2: Level of ICT competence of lecturers

In Figure 5.2, the results of the self-assessment level of ICT competence of lecturers are illustrated. Of the participants, 15% described their level of competence as low, while 38% described their level as average, and 46% considered themselves to be moderately competent. The age of the lecturers has an impact on their ICT competence. The participants between the ages of 30 and 40 years were calculated as 23%, and were comfortable with technology and its constant changes. The 31% aged between 41 and 50 years understood the importance of adapting to the rapid changes in technology and ICT in general.

The participants aged between 51 and 60 years stated they were aware of ICT and its emerging fields, but were unable to keep up with these changes all the time. They also admitted that their age played a role, and the era in which they were brought up did not include all these latest tools and resources. Furthermore, 8% of the participants

stated they were on the verge of retirement, and admitted that there was a great deal they were unaware of in respect of ICT but that the importance of its use was understood. The figure overleaf displays the distribution of the age of participants.

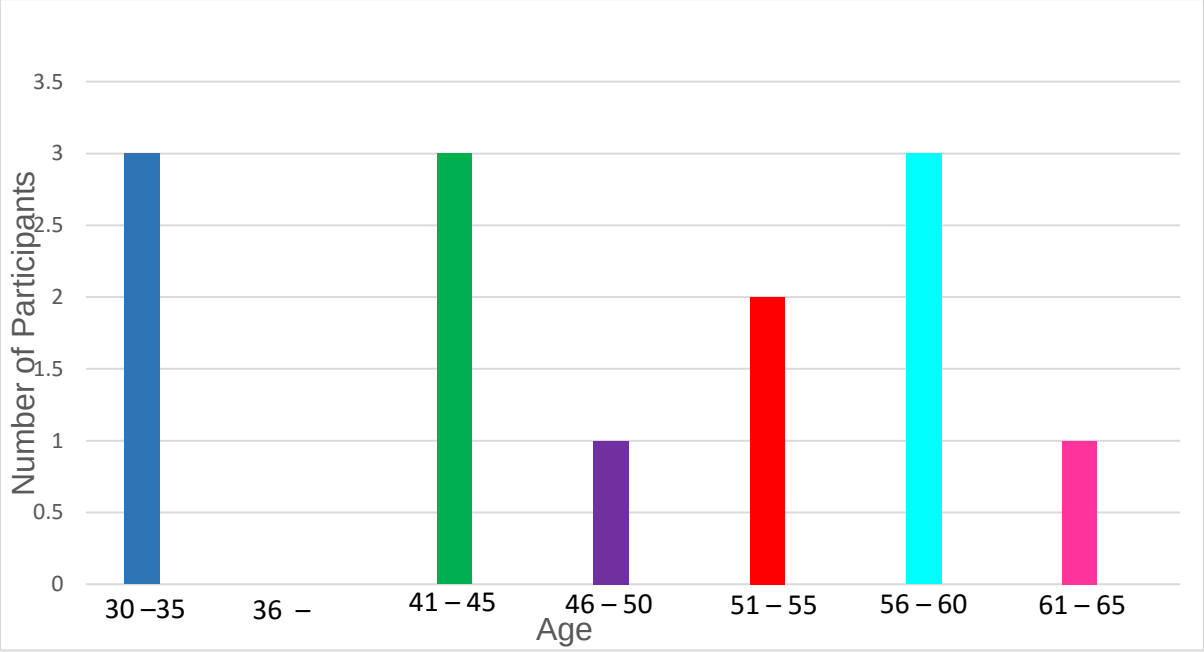

Figure 5.3: Distribution of the age of participants

The following figure shows the percentage of participants confident in ICT usage in the classroom.

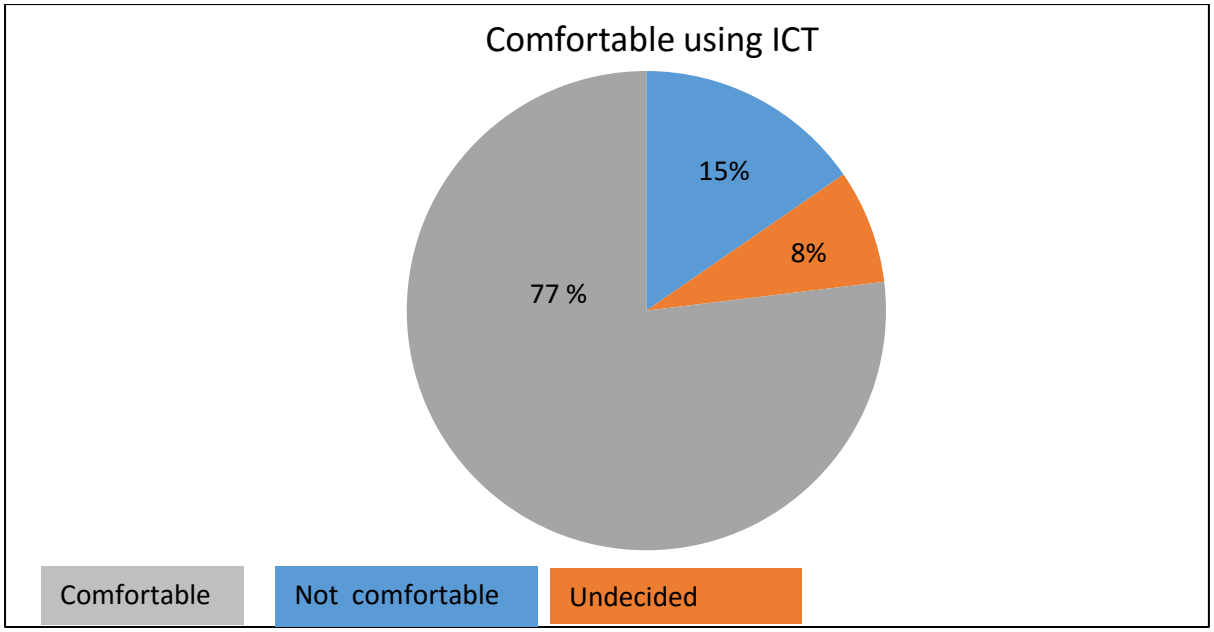

Figure 5.4: Lecturers at ease using ICT

In response to Question 5.3, whether lecturers are comfortable in using ICT in their classrooms, 77% of the participants stated they felt comfortable using those ICT tools available to them. The percentage of participants who stated they were not comfortable with ICT in their classrooms was only 15%, whereas 8% of the participants could not decide whether they were comfortable with the use of ICT or not.

5.3 Emerging themes

The following themes emerged out from the research, and the researcher attempted to explain these themes in greater detail.

5.3.1 Theme 1: ICT as the technical tools of lecturers, the institution, and students

The overall understanding of ICT among lecturers at the TVET college was very broad. The evidence suggests that their understanding of ICT included technological tools provided by the institution such as computers, the internrt via WiFi as well as students' and lecturers' own devices. They could explain in simple terms what it meant to them and how they applied it in their classrooms. It was stated by Museveni (2006), cited in Moya et al. (2011), that users do not have a choice but to use ICT, as it is seen as a

necessity in a technology- and knowledge-driven era. Combining information technology with other technologies, with the focus mainly on communication technology, can be described as information and communications technology. ICT can be used in various activities in the learning as well as working environments of individuals. For the sake of authenticity, the grammatical structure of the sentences has not been changed.

Participant 2: "Using information and communication technology to broaden the students' view of the work, to get another viewpoint or another lecturer's style of teaching and also how another lecturer explains stuff to the students and lastly getting used to other lecturing styles."

Some lecturers had only minimal understanding of what they could actually use as ICT tools in their classrooms. Some of the tools available at the college are not used by all lecturers. It is evident from their responses that they are unaware of what can be used in the classroom to implement ICT usage effectively. Lecturers are encouraged to share best practices and what works for them in their lectures. This makes it possible to learn from others and see how one can perhaps adapt one's own way of teaching in one's own classroom. One can also learn how lecturers use ICT tools in their classrooms and apply it to one's own method of teaching.

It was found during the data-collection period that lecturers have access to the following ICT platforms at the college for use in the classroom: computers or laptops, internet connection, and data projectors.

Participant 7: "ICT for me is everything that allows people to interact digitally. It can be from computers, Wi-Fi, social media." The response to this question from Participant 12 was, "I just think it's using any kind of media base, any shape or form or size and applying it in the classroom."

There are many other ICT tools which could also have been mentioned under this theme and in response to the question of what their understanding of ICT is.

5.3.2 Theme 2: ICT has the potential to broaden students' engagement in the classroom

According to Mandal and Mete (2012), ICT in higher education is seen as mainstream. ICT is widely used in the development of learning materials, the manner in which content is shared and delivered, and the way students communicate with one another and with lecturers, as well as in administrative tasks and also in academia. It is important to keep in mind that although there are educators who enjoy using ICT, there will always be those who do not bother with it, and of course those educators that do not even have the basic resources to access ICT tools (John & Wheeler, 2008).

Participant 11: "ICT is quite important at the moment in education because it is a way of involving all of the students within your classroom. Your students don't only want to sit with a textbook, they want to see things in front of them. They want to experience the technology and because technology is also evolving. I mean, that is the way that you keep them involved in your lessons as well."

ICT in education was well explained, because the participants are aware of the new digital era and new ways to engage or involve students in lessons through the use of ICT in the classroom.

The integration of ICT in classrooms needs serious consideration in order to increase the competency of the country's educators. This will help the national education system to achieve higher success rates in all kinds of education assessments and to strengthen the existing labour force. In order to enhance the use of ICT in the classroom, the government needs to promote ICT usage in the classroom and to invest in high-level training sessions for teachers and lecturers. The teacher's role is paramount in successfully negotiating new policies and initiatives.

Participant 12: "Bringing the world into the classroom … and trying to make whatever we're doing and talking about relevant to their roles and to see why they do need to know, for example, how to write a letter or how to speak to somebody, because if they don't, they remain educationally poor for the rest of their lives."

The digital era makes it possible for lecturers to explain some subject content by means of digital examples or illustrations, which can make it easier for students to grasp. This brings the outside world to the classroom and makes students see the link between the content of the subject and the real world.

Participant 1: *"*I don't need to repeat myself. I upload my lesson and the child can go and listen to the lesson in his own time and his own space. So now, you know, you put your lesson on the system and the child has access to it and it is also awesome that it is available when I'm absent."

As stated above by Participant 1, recording lessons works very well in the classroom; in the event of absenteeism the student can access the recorded lesson on the e-learning platform in his or her own time. This method is also useful when revision needs to be done: students can go back and listen to the recording and revise the work. Recordings can also be sent via other platforms, whether by email or WhatsApp. In this difficult time during the COVID-19 pandemic, institutions are forced to make use of ICT for teaching and learning purposes. ICT transcends the geographical gap or barrier and allows students to interact with their lecturers virtually, with the help of computers and internet connectivity.

Participant 3 indicated that "if used correctly and if used strategically, it can be more fun, like with the one program that I referred to in my previous question. You can use it for students, divide them into groups to have competitions in class, in order for it to be fun".

At the beginning of effective ICT implementation, it is important to ensure educators and students can make the best use of ICT. Thus, preparations for technology-based teaching and learning begin with proper implementation and support by top management. If the implementation process of technology integration in schools takes place appropriately initially and continuous maintenance is provided, ICT integration in schools will benefit both teachers and students greatly.

By creating a competitive classroom environment, it becomes more exciting for students to engage. In the statement above, Participant 3 mentioned that having digital competitions in class was a good way of involving students and making learning fun. It is important that the content is applicable in attaining the objectives set by the prescribed syllabi. It is believed that when using ICT, a blended learning approach is used which uses face-to-face contact as well as digital interaction.

Including students in the lesson and in the overall classroom environment is an advantage of incorporating ICT in education. This method allows for accommodating participation during lessons.

Participant 11: “Inclusive education is quite important within a classroom environment, and I think that it is usually if you make everyone involved, they will feel that they belong within the classroom environment as well.”

Student participation is also promoted when students are involved by means of playing games or participating in quizzes, providing a different approach. Making use of ICT in classrooms can promote cognitive abilities, for example, when students download an online application which they can use to improve the retention of content and which provides different study techniques. These applications can also assist with self-testing, which can help students decide how and what to study through metacognition.

According to **Participant 12**, ICT can help students in the classroom in the following ways: “It makes them look relevant. If they can see other people using it or making big mistakes using English and then being turned away or made fools of in the public eye, then they'll realise it’s actually quite important to be able to express yourself accurately and to get a job and to be hired for even small, menial jobs even in a basic way to kind of get a job. If you can't speak to anybody, tell them that she wants to do that.”

Some lecturers felt that ICT was very relevant to their subjects, as they could easily incorporate ICT during their lessons. It could be used to find examples of topics or modules under discussion, to bring students closer to the world of work and reality, and was also a means of departure from the traditional dependence on the prescribed textbook. The responsibility however lies with the lecturer to check the additional ICT materials to be used for relevance to the subject as a whole as well as to the specific module.

5.3.2.1 Limitations or barriers to using ICT in the classroom

A number of factors influence the use of ICT in classrooms, such as skills of lecturers, Wi-Fi availability, lecturers’ willingness to adapt to the changing technological environment, and actual time available in class to complete the syllabus, among others.

According to **Participant 10,** the following aspects are limitations of ICT in the classroom: “Firstly, the level of training that the teacher/lecturer has. Personally, I started quite late in upskilling myself. Yes, it sounds a bit strange. I'm fifty-five years old and I wasn't quite eager enough to grab the opportunity with both hands at first; I'm just honest, I was afraid. I was afraid of change.”

ICT has a number of limitations, according to **Participant 11**: “If you're not the type of person that makes use of videos or you don't make use of technology and if you’re not computer literate. They will be limitations for you. But if you are good with a computer, you make use of the video clips, you show them slide shows, etc. There will be no limitations for you. The other limitation will also be the college environment that you are in. Other limitations include resources available in your classroom environment, access to Wi-Fi. It also depends on the working environment that you find yourself in and if you are computer literate or if you make use of the slides or technology within your classroom environment, then ICT assists lecturers with subject content guaranteed.”

Researchers like Higgins (2004) notes that obtaining the necessary funds for ICT can be a problem, although ICT in education improves the teaching and learning process.

In the next section the ICT tools available at the TVET college are discussed.

5.3.3 Theme 3: ICT tools available at the TVET college

Overall, the tools available at the TVET college include Moodle, the Open Learning Centre (OLC), computer classrooms, e-learning, Wi-Fi, and AB Tutor monitoring software. Accessibility, however, is problematic. The Open Learning Centre can accommodate only 20 students per session.

Participant 2: “We have free access to the Wi-Fi system so we can Google, we can use YouTube videos. We have a Moodle program, but I haven't received any training on the Moodle program, and is there an Open Learning Centre where they have access to computers, where they have access to someone that can help them when they struggle with something, for instance, Excel.”

Another important aspect which manifested throughout the interviews was that all lecturers found it imperative that all materials be checked before distribution to students. The fact that anyone can post information on Google poses certain problems, therefore the lecturer needs to check the site beforehand. The relevance of the content is also important, because one can easily show material which is irrelevant or even harmful or ambiguous to students.

Participant 4: “Yes, we definitely need to check all videos, especially from YouTube, because sometimes the language is not always appropriate. I would check the contents of the video, whether it is applicable and has it been used in the classroom previously, before we use it”.

In the next section the findings regarding the sufficiency of ICT tools available at the TVET college are discussed.

5.3.3.1Sufficiency of ICT tools at the college

According to **Participant 7,** the number of computers at the Open Learning Centre is insufficient. “No, especially if the classes get too big. Then you sit with students that have to share a computer at the Open Learning Centre, especially if it comes to assessment time. I think there are only 20 computers available. So then, it's not really sufficient, [but] they can go there whenever they want. But the tools there is not enough.”

Participant 9: “The OLC is open from a certain time to a certain time and they can do their tasks, print, and do whatever research they can do on these tools; it is however insufficient compared to the number of students enrolled at the college.”

The Open Learning Centre has only 20 computers, and class groups can sometimes consist of 40 students. Students then have to share the computers, or take turns to work on the computers. When the OLC is fully booked, students who do not have access to a computer have to wait until a computer classroom is available to do research, print or type assignments. Computer classrooms are accommodated on the timetable for class groups, and lecturers also have to work according to the timetable to access these rooms with their students. In the next section, the access students have to ICT tools at the TVET college is discussed.

5.3.3.2 Accessibility of ICT tools to students

Participant 4: “With regard to this, we do have the Open Learning Centre that is available for the students from 08.00 in the morning until 16:00 and they can go anytime during the day when they are free. They can go and do their research.”

Participant 9: “A lot of my students come back to me and say that they all see it is booked or it's full or they couldn't get access, they couldn't print out their work.”

Not having access to ICT tools is stated as a barrier to successful implementation of technology (Kay, 2006). Access to ICT tools were a hindrance to successful integration (Doering, Hughes & Huffman, 2003). Educators claim that having the use of a computer contributes to the development of their personal productivity skills, which include marking books, lesson planning, delivering presentations, and having the opportunity to learn how to facilitate lessons that involve student use of technology with content-area topics (Dexter & Reidel 2003; Grove, 2004).

Participant 11: "referring to the Moodle platform, if the program is currently not working or needs to be updated, then the students cannot make use of it. And some students don't have a compatible smartphone to make use of Moodle".

Many students only have access to computers or any form of ICT resource at their academic institution. The Open Learning Centre (OLC), which is available for students to use at the TVET college, has only 20 computers. The majority of class groups range from fewer than 20 to 40 students in a classroom, especially in the NCV programmes. Most of the time students need to take turns to work on the computers in the OLC, or they have to sit together and do their research together. This situation, on the other hand, could encourage collaborative practices among students, which is positive.

Research done by Pelgrum (2001) states one of the difficulties in incorporating ICT in education at institutions is the lack of sufficient computers and ICT tools for the number of enrolled students.

Participant 13: "Yes, especially now with the Wi-Fi that is available to them. They don't need to go to the OLC waiting for computers or having to go to a computer class waiting for a computer. So it's typically available to them."

Researchers generally agree that an institution might have the resources available for ICT utilisation; however, they are not always available and accessible to all students. One of the provisos of ICT utilisation in education is accessibility to decent equipment. Emans (2002), cited in Moya et al. (2011), rightly posits that it is important that learners as well as teachers have access to the latest ICT equipment on a regular basis. There might be computer laboratories available at many schools, but having sufficient equipment might necessitate redesign of a school's computer laboratories.

5.3.3.3 Who is responsible for faulty ICT tools?

The TVET college has a technician on campus who attends to all the problems relating to ICT. The technician can be reached on his cell phone or staff can send an email and the individual will attend to the issue. He can either physically go to their office or classroom or access their computers or laptops remotely. If the IT technician cannot assist with the problem, he refers it to the IT manager who is stationed at the Boland College head office in Stellenbosch.

Participant 2: "The IT support guy at the campus is responsible for faulty tools and usually he does it quite efficiently, tries to resolve the problems as quick as possible."

The data collected proved that the IT specialist at the college attends to faulty equipment quite efficiently. This can enhance the morale of lecturers, knowing in the event of faulty ICT, a highly capable and skilled technician is at hand to attend to the problem.

Participant 8: "Yes the person responsible is on the campus and he is very eager to assist, but we need to contact head office if there's a problem that cannot be fixed on campus."

Participant 10: "We have an IT specialist who is permanently employed by the college or at the college and luckily he is quite competent actually. Excellent.
I think most times he attends to problems very quickly and effectively, and I must mention that he's quite good at what he's doing".

The person responsible for faulty ICT equipment at the college refers the issue to head office if it is a problem that he cannot fix on site. The IT manager who is situated at the head office will than assist the staff members either remotely or with the help of the IT technician on site.

5.3.3.4 Technical support at the TVET college

Participant 3: "Yes, we do have technical support. There is somebody on campus, if there is a problem regarding any ICT, they do assist as soon as possible. So, if I ever had problems regarding my computer or with my connections, then there was help immediately."

Participant 10: “Yes, we do have a thing that is the one that I was mentioning, this guy who he's permanently appointed by the college. He is a specialist and gives us support on a regular basis. But then also what is important to know is that all the support that we get is to work with some programs. We get some training in certain programs. So, yes, of course, we do have support.”

For the successful integration and utilisation of ICT in the classroom, it is imperative that technical support is available when needed (Dexter & Riedel, 2003; Doering, 2003; Bullock, 2004; Grove, 2004). While educators may have good personal productivity skills, their knowledge of how to use ICT for instruction is often limited. Technical support for instructional use can come from cooperating educators, other on-site personnel, or the institution’s resources.

Participant 11: “We do. And once again that is shown and some of my brighter colleagues who work in the computer world and they’re very, very helpful when I need them.”

It was concluded by Lewis (2003) that when educators do not have good technical support in their classrooms, it is impossible for them to side step the obstacles hindering their use of ICT. Pelgrum (2003) posits that one of the most prominent barriers for primary and secondary teachers was insufficient technical assistance. Sufficient technical support is, however, available at the college, according to all participants. There is an IT technician on the campus and the individual attends to problems as soon as possible after they have been reported. The IT technician either goes directly to lecturers, or accesses their computers or laptops remotely to solve the problem. If the IT technician is unable to solve the problem, the issue is transferred to the IT manager, who is situated at the head office.

One of the constructs in this study’s conceptual framework was management support, and it was found by Hawkins (2002), cited in Moya et al. (2011) that educators need support from their management and administration to execute their duties effectively. If technical support is given by management, it will assist with the enrichment of using ICT in the process of teaching and learning.

Disruption in the teaching and learning process is often caused by technical problems. This can lead to frustrated educators as well as students. This can discourage

educators, who ultimately do not want to use computers because of fear of equipment failure since they are not given any technical assistance.

Various problems related to technical problems pose a barrier to using ICT. These problems may include, but are not limited to, low connectivity, virus attack and printer failure, Türel and Johnson's study (2012), however, reports a few exceptions. Schools in countries like the Netherlands, United Kingdom, and Malta have recognised the importance of technical support to assist teachers to use ICT in the classroom (Yang & Wang, 2012).

5.3.3.5 Grasping of content

The use of technology or any visual aids can assist lecturers to explain certain concepts which are normally difficult to understand. Numerous researchers concur that when educators use visual aids in their lessons, it can lead to the outcome of better understanding of content and better concentration over a continued period of time (Sims et al., 2002). With the help of visual content of learning materials, the retention of information can be increased for learners (Bester & Brand, 2013).

According to **Participant 2,** students grasp the content of the subject more easily and quickly when using ICT tools. "I think it's to their benefit because they get more involved and it's just not working out of a textbook. They tend to get bored and not interested in the subject, but as soon as you change the way of lecturing, they are more involved."

It was found by this study that some of the educators saw ICT as an important instrument in the process of teaching and learning, and thus started to use it in their classrooms by incorporating it into their lessons. By relating what is taught to real-life situations with the use of ICT, the participants claimed that it was much easier for their students to understand concepts.

These findings were consistent with those of Cuban (2001), who stated that academic institutions should be made more resourceful and dynamic through the transformation of the teaching and learning process into an engaging and active process connected to real life, in preparation for students' future jobs.

Participant 3 makes use of online quizzes to check the students' understanding after a lesson was taught using ICT tools. "You can give them a quick quiz after you've taught a lesson. It's after you spoke about a particular topic. Then you can use an online social media or online quiz to show to the class and you can give them a time limit to complete it. You can also then observe their knowledge. So, yes, you can definitely check if they understand by seeing how many answers they've answered correctly and incorrectly."

Lecturers felt that using ICT in classrooms would enhance student participation and keep them interested in the subject. The way the lecturer presents information can influence whether they are kept involved and one can easily see whether a student is on track and grasps the subject content. Sometimes it is easier to show students an animated video clip which explains something light-heartedly than simply stating the facts as presented in their textbooks. Online quizzes can be used by lecturers who have access to computer laboratories where students can participate in online quizzes, and these can be marked electronically. This is also a means of checking student progress to determine whether they grasped the content covered.

The next section discusses how participants responded to the question on how they avoid offending students while using ICT.

5.3.3.6 Prevention of being offensive to students

According to Young et al. (2008), many tend to forget that communication is a two-way process. Making use of ICT does not necessarily guarantee that communication took place. ICT can hinder levels of trust and the quality of communication, by the participants misunderstanding or being offended by the communication without any intent to offend.

Participant 3 stated that, "You have to make sure that the content is appropriate and whether it fits the audience and of course that it's appropriate for the student. It is important to respect the dignity of the student and to make sure that they feel comfortable with it. So obviously, I will make sure that the material being shown is not offensive."

During the exploration of the literature in this study, the researcher did not come across findings on how educators prevent offending students while using ICT in their classrooms. This is seen as a gap in the overall topic on ICT utilisation in classrooms. The researcher believes that this topic is important in a diverse classroom setting.

During data collection, the participants were aware of why they ought to check or pre-screen materials which they intended to use with ICT tools.

Participant 9 "emphasised the importance of pre-screening the videos, watching them beforehand just to check that there's no language, bias or discrimination in the videos".

Students can easily be offended, and the lecturer can be faced with unpleasant situations if this occurs. The lecturers who participated in the interviews all noted why it was important to pre-screen materials intended for use during lessons. Not all information on the Internet is correct or current, but it might include offensive language use, or discrimination with regard to race, sexual orientation or religion. All content used or distributed in classrooms should be inclusive of different traditions and cultures, different religions, sexual orientations, etc., and respect for these differences should be encouraged. The language employed in classrooms while using ICT materials should be inclusive, and it should encourage students to value different viewpoints. Lecturers should bear in mind that their task is one of educating, and not persuading or pressurising students into a belief system.

In the section overleaf, the findings on how student attention is kept are discussed.

5.3.3.7 Retaining student attention

5.3.3.7.1 Introduction

Regardless of their teaching techniques, educators should have the ability to engage in activities that are able to retain the attention and concentration of students.

Using technology has the potential not only to maintain attention, but also to motivate learners to pay attention. Shelly et al. (2004: Chapter 6:8) established that technology has the potential to increase student motivation and class attendance. This is an important aspect, since so many of today's students from advantaged homes and families are not interested in learning or are not motivated to achieve (Barr & Parrett, 2008:6).

It seems that technology succeeds in capturing and maintaining the attention of learners during a lesson. Utilising technology creates a more interactive learning environment, which enables learners to use multi-modalities, resulting in better

attention and concentration for a longer period of time. It is not surprising, as children today are visual learners, having grown up with technology. Educators should take advantage of this phenomenon.

According to Mansilla and Oliviera (2012), many educators who wish not to use ICT tools in their classrooms are concerned about students' lack of attention during lessons.

Participant 3*: "*When using video clips in the classroom, try not to show too long, try to keep it short. When I do show a YouTube video clip, I would pause the video if it's a longer clip, you keep them focused that way; if it's a shorter video I will show the full one at once."

Participants who used video clips during their lessons all stated that the best way to retain student attention is to stop the videos intermittently, explain what was discussed, and ask a few questions before continuing. This method is also a way to ascertain whether the students understood what was said or explained. Captions can be used when playing videos to students in class, which allow students the opportunity to understand concepts explained in the video better. Inclusive learning is also be supported with these captions.

Participant 4: "The thing is, it is very easy in the classroom because a student sitting with his own computer in the class also gets to view the information on the screen available for the students. It's easy in the computer rooms because they're interested in technology, they are interested in what's happening. They don't have to study it, they see it, and they practise it because it is a practical subject. So, I do not really have a problem with keeping students' attention."

The above quotation refers to the difference between a classroom without computers and one fitted with computers. It is the opinion of Participant 4 that it does not take much effort to keep the attention of the students because they are interested in what is being explained, especially if the lesson is displayed to them on the screen in front of the classroom or even on their computer. The level of the students' skills or competence also influences their attention span in class; if students are not confident with their computer literacy skills, one would assume that they would rather pay attention to what is being explained by the lecturer, rather than keeping themselves

busy with alternative activities. Monitoring of students in computer laboratories is done at the college by a software program, AB Tutor.

Participant 4 explained the use of AB Tutor. “The student as well as you can see, if they're on the Internet, you can see what they are busy with in Microsoft Word and Excel. You can click on the name or the computer name. I can see specifically what the student is doing. But it gives you a glance of all the computers at one time”. **Participant 4** further explained that AB Tutor also allows you to upload resources, videos, stream videos, and YouTube videos, upload activities that they can do. You can block certain sites like on the Internet. You can block students if you see that they're not doing what they are supposed to do. You can have a conversation with a specific student alone that nobody else can see via AB Tutor.”

Based on the above quotations, it is evident that computer subject lecturers depend on the software program AB Tutor to assist them in monitoring student activity during lessons or periods. The program is very helpful to lecturers as well as students. Lecturers can monitor and track student activities, and students can benefit by viewing demonstrations on their computer monitors. In the event that a student struggles with a particular aspect, the lecturer can guide the student in the right direction by means of AB Tutor.

It has been proved that AB Tutor contributes to saving time, supporting duty of care, increasing student performance and contributing to significant energy cost savings. AB Tutor offers many features to help teach more efficiently with the use of ICT. Educators can monitor and support student activity using various features such as thumbnail view, chat and share. Broadcasts can be sent to each individual’s screen to create a more dynamic learning environment and reduce reliance on the whiteboard-centred layout. Student attention can be gained immediately by locking student workstations. The demonstration facilities can be used to allow peer-to-peer assessment and learning. Time can be saved with regard to setting up the class and during lessons with remote computer control.

In the next section, ICT knowledge and skills are discussed.

5.3.4 Theme 4: ICT Knowledge and skills of lecturers

Based on the findings of Mishra and Koelher (2006:1033), “how to teach with ICT is a different concept than knowing how to utilise it”. When educators equip themselves with new skills related to ICT, it does not mean that it is enough to develop a satisfactory understanding of how to use it in their classrooms.

Participant 1: “I would say the average level.”

Participant 6: “Also for moderately high level of competency.”

Participant 8: “I think then we rather go for 2, because I have a low level of competence.”

Participant 10: “I think at this point you will be pleased to hear that I can say, OK. Average in this case.”

Tella et al. (2007) note that having fundamental skills relevant to ICT use fuelled the school's management performance and communication processes between administrators, educators, parents, and students. Furthermore, the use of internet skills inspired teachers to collaborate in online enrichment of their own knowledge through the educational platforms and search engines.

It was found by Mansilla and Oliviera (2012) that most teachers and principals ascribe their reluctance to use ICT tools in their classrooms and schools to management inexperience. Refer to figure 5.2 pg. 60: Lecturer’s level of ICT competence.

The findings above state that all lecturers who were interviewed could classify their level of ICT competence and were willing to give reasons for the classification as well. Age featured as a factor, which influenced the ability or willingness to utilise ICT in classrooms. Research has shown that experienced or beginner educators’ competency in using ICT is a solid determining factor of their level of technology use in in the classroom (Demetriadis et al., 2003; Bauer & Kenton, 2005; Wozney, 2006; Franklin, 2007).

The findings of the study indicated that younger teachers had better ICT skills compared with their older colleagues. Alazam et al. (2012) concur with this finding. It was further supported by the findings of the Survey of the Department of Education and Science. McNamara and O’Hara (2008) found that teachers below the age of 30

years had high ICT skills and proficiency in the teaching process. Nonetheless, this shows that the management of TVET colleges should continue to develop and maintain skills improvement among lecturers by allowing them to attend workshops, seminars and training.

Given the accelerated development of ICT, all technical and vocational education and training (TVET) entities (school managers, teachers, students, and classrooms), should be ready to meet the new culture of teaching and learning based on twenty-first century skills requirements for educational technologies. According to Chai et al. (2017) and Göksün & Kurt (2017), to achieve these goals, the number of knowledgeable and skilled students who will lead economic development should be increased.

It was concluded by Albirini (2006) that the lack of teacher competency and access to computers in schools are major obstacles to teachers' acceptance or rejection, but the finding is not connected to negative attitudes towards computers also identified in his study. As such, serious work needs to mitigate non-compliance among teachers and lecturers, considering the fast-changing world of work. This situation also poses great concerns for stakeholders, policy makers and curriculum implementers. It was also found by Demetriadis et al. (2003) that if educators do not have the necessary knowledge and skills for ICT usage, it cannot be expected of those educators to include ICT in their teaching.

The results of a study conducted by Balanskat et al. (2006) found that in Denmark, "many teachers chose not to use ICT and media in teaching situations because of their lack of ICT skills rather than for pedagogical/didactic reasons, while it is no longer the case in the Netherlands. Hence, a dearth of teacher competence may be one of the strong barriers to integration of technology into education. It may also be one of the factors involved in resistance to change. Teachers need to be computer literate and have good skills and knowledge in using ICT to improve their teaching methods to meet the demands of twenty-first century teaching skills.

In the next section the findings on ICT training offered at a TVET college are discussed.

5.3.4.1 ICT training offered at Boland College

Technology is only a tool and should be utilised to remove the barriers and challenges present in the existing system. The use of ICT in education involves a major change in the way content is designed and delivered. It cannot be expected of educators to be exposed to these changes without the necessary training to use and apply ICT in their classrooms. In view of the fast-changing technology, it is required of institutions to arrange ongoing training to assist with the design of curricula and teaching materials, as well as the delivery of ICT-enabled education.

One finding of Pelgrum's (2001) study was that there were not enough training opportunities for teachers in using ICT in a classroom environment.

Participant 11: "No, there was no training done for us."

Participant 12: "Of course. Really the kind of training they did, I remember when we got to laptops was how to put your laptop on and then, how to download, how to use Word to a certain extent. We had Moodle training, but once again we didn't really use it very often, so you forget what you were trained to do."

Fundamentally, with new tools and methods of teaching, teacher training is essential if lecturers are to integrate these into their teaching. (Osborne & Hennessy, 2003) However, according to Balanskat et al. (2006), inadequate or inappropriate training leads to teachers being neither sufficiently prepared nor sufficiently confident to carry out full integration of ICT in the classroom.

In response to Question 5.2 of the questionnaire, 31% of the lecturers were not given formal ICT training upon their commencement at the college. Their colleagues assisted them where necessary, and if the need was identified, lecturers could indicate in which training they were interested. On the other hand, 69% of the participants stated that they were given ICT training upon their commencement as lecturers at the college.

Based on the findings, there is no evidence that formal ICT training for lecturing staff is compulsory upon commencement at Boland College. The staff assist one another where they can.
In the next section, the findings on how comfortable lecturers are in using ICT are discussed.

5.3.4.2 Comfortable using ICT in classrooms

Educators tend to choose the ICT tools they are confident in using. Everyone is not equally confident to use a wide range of ICT resources, and lack of confidence affects the way the lesson is conducted. Some educators are afraid of some forms of technology, and this inhibits their use in their teaching. The use of ICT has a constrained influence on the teaching and learning process when educators fail to appreciate that interactivity requires a new approach to pedagogy, lesson planning and the curriculum. Some teachers reorganise the delivery of the curriculum, but the majority use ICT to add to or enhance their existing practices. Teachers need to employ proactive and responsive strategies in order to guide, facilitate and support appropriate learning activities.

The use of ICT, especially in teaching and learning, is more about practicality compared with theory, and that is why teachers should be given time to learn and explore it, face the “trial-and-error” phase before they are completely comfortable with it and able to use it in teaching and learning.

In the next section, the findings on whether lecturers allow students to assist them in the classroom when making use of ICT are discussed.

In response to the question, “How would you handle a situation where a student knew more than you, when making use of ICT?, 100% of the participants welcomed the help of students in their classrooms in the event a student knew more than they did.

Participant 1: “If I were to say “No, you're not the teacher”, then you block the learning curve for the child. I'm an old lady, they know much better than me. So, I'm open. And it's your attitude towards them that will make a difference how the child is progressing, they feel so chuffed that they could teach me also and it always reminded me I am never too old to learn.”

Participant 3 stated: “I welcome different opinions, so, I don't in any way, shape or form. I don't say that the student is wrong, I welcome their ideas.”

Lecturers were all very keen to allow students to assist them if there were to be an incident where they needed assistance and a student could offer help to the lecturer. The extract above shows that knowledge is co-constructed, that teachers can also learn from students, highlighting the idea of our being lifelong students.

Table 5.1: Linking research objectives and questions with research findings

Research Objective	Research Question	Findings
1.To explore the ICT tools available at a TVET college	1. To what extent are ICT facilities and tools for lecturers available at the TVET college?	Computers for students are limited to computer labs and the Open Learning Centre. Laptops and computers available for each lecturer. Classrooms are fitted with data projectors and whiteboards. Moodle is an e-learning platform where lecturers can upload learning content for students and communicate with students.
2.To investigate the measure of ICT utilisation in the classroom	2. To what extent are the available tools at the TVET college utilised by lecturers for their teaching and instruction?	If lecturers are computer literate they are keen to use ICT in their classrooms. It was found that it takes time to pre-screen content before making use of ICT in classrooms The OLC must be pre-booked by lecturers if they want to take their class groups to do research or complete typed assignments.
3.To enquire into the effectiveness of ICT tools utilisation	3. How effective did the lecturers at the TVET college find the tools they utilised?	Lecturer skills play a role in the way they use ICT in their classrooms if at all. Participants stated that students' understanding of content can be noted when making use of ICT. Many participants made use of tests or quizzes after a form of ICT was used during a lesson, or used when a particular topic or module was explained. If technical support is not available it can be disruptive during the teaching and learning process. This can discourage lecturers from using ICT during lessons. Technical support is available at Boland College, whether physical or remote.
4. To probe whether the use of ICT creates an improved, participative learning environment	4. Did the lecturers at the TVET college find that the use of ICT in their lectures provided a more participative environment?	An increase in student participation when making use of ICT in classrooms emanated from the research. Inclusive education is promoted while incorporating ICT in classrooms. Student participation and activity can be monitored by a program used by lecturers in computer labs, AB Tutor, which allows lecturers to send and receive files, and demonstrate during lessons. Students' attention can also be retained, because lecturers are able to lock the screens of students while a topic or concept is being explained or demonstrated.

5.4 Summary of the chapter

In this chapter, the following key findings were identified: the ICT tools available at the TVET college, namely, Moodle, for lecturers and students to use to upload notes, assignments and activities; computers and laptops for lecturers; Lecturers audio-record their lessons and distribute amongst students in their absence; the Open Learning Centre with limited computers available; and computer laboratories on campus available as per a time table.

ICT utilisation in classrooms was identified and lecturers noted the following: online communication via email; uploading course material on Moodle; online quizzes to monitor understanding of concepts; and presentation of YouTube videos. Respondents could rate whether they were comfortable using ICT or not. This study identified that when ICT is used in the classroom, it promotes question and answer sessions, and students tend to grasp subject material faster and pay more attention to what is taught by the lecturer. Participants agreed that ICT increases student participation in their classrooms because it keeps them more interested in and intrigued by topics. The final chapter focuses on the research limitations, recommends future work, and provides concluding remarks.

CHAPTER SIX
Conclusion

6.1 Introduction

This chapter concludes the research, describes the limitations of the research, proposes future work, and furnishes recommendations. In this chapter, the study notes how lecturers use ICT in their classrooms at a public TVET college. The researcher also discusses whether the research objectives were met.

6.1.1 Overview of the study

In Chapter 1, the researcher introduced the study and its objectives, and background information on the topic was provided. Chapter 2 presented the literature review, focusing on primary perceptions of factors that impact ICT utilisation by lecturers in the classroom. In Chapter 3, models and theories were discussed which mapped the way the research took place. Chapter 4 explained the research methods adopted for the study. A qualitative approach was used to collect data by means of an in-depth interview, where 13 participants consented to participate in the study. Chapter 5 discussed the analysis and interpretation of the data collected. Chapter 6 presented the conclusion and noted the research findings with regard to the data collected. It further suggested possible avenues for future research.

6.2 Relevance of the research

This research could be relevant to top management at TVET colleges in respect of improvement or availability of ICT tools, and could assist ICT policy makers.

6.3 Contribution to the body of knowledge

This study might not provide new insights into ICT utilisation among lecturers at TVET colleges, but it describes the factors which influence the use of ICT tools and the availability of these tools. It was the first of its kind conducted in the particular setting. This study gives insight to campus management into the levels of lecturers' ICT skills and competence. This study can contribute to the Department of Higher Education and Training in developing ICT policies and implementation in classrooms. There are only a few studies that focus on ICT use in a TVET college setting In South Africa, as most research studies focus on school-level ICT use. This study seeks to contribute

to the use of technology to promote the quality of learning and teaching at TVET colleges.

6.4 Research limitations

This study was conducted at one specific TVET college, with a sample size of 13 participants. It therefore may not be applicable to all TVET colleges in South Africa. This study only explored lecturers' ICT use for teaching purposes and did not explore how ICT can assist with administrative duties. The perceptions of students on how ICT assists them in understanding content matter in classrooms were not addressed. Class observations could have been considered for this purpose. TVET management and IT support on campus were not interviewed during this study, to gain insight on their opinions.

This research explored which ICT tools are available at a public TVET college and which factors influenced the use of ICT tools by lecturers. The factors examined were lecturer age, attitude, skills and competence, management support, technical support, and their willingness to learn.

6.5 Summary of key findings

This section attempts to answer the research questions of this study, which include:

1. Which ICT tools are available at the TVET college?
2. How are the available ICT tools used by lecturers in their classrooms?
3. How effective are the ICT tools used in relation to pedagogy, teaching and learning?
4. How does the utilization of ICT influence TVET teaching and learning?
5. Which factors influence lecturers' use of ICT in their classrooms?

This study found that at the TVET college, the following ICT tools are available for use by lecturers: the Internet, computers and laptops, computer laboratories, data projectors, online videos, e-learning, Moodle, electronic communication, cloud computing, and AB Tutor, a software program which allows the lecturer to monitor student activity, assist, demonstrate and send files. Lecturers make use of audio-

recordings to send work to students via email or WhatsApp, also seen as a good way for revision, where students always have access to the recording.

An Open Learning Centre is available for students to use for research and assignments; lecturing staff can book a session for their class group, and this allows them access for that period. Alternatively, students need to make use of this centre after classes. The Open Learning Centre hosts only 20 computers, which makes accessibility difficult with larger class groups. This arrangement discourages its use by lecturing staff, as it is not feasible for students to share computers, take turns to do research, and type and print their assignments. The booking system for the centre works on a first-come first-served basis, and if you fail to book in advance, the chances of securing a time slot for your students are very poor. With COVID-19 safety regulations, only ten computers can be used at a time to accommodate social distancing.

The computer classrooms available on campus are all slotted in on the timetable for class groups, and lecturers also have to work according to the timetable to access these rooms with their students.

Lecturers make use of ICT tools in different ways; while some use Moodle to upload assessments or notes, others make use of email facilities together with WhatsApp. Lecturers use what works for them and what they see is available for students off campus; it is no use uploading or sending activities or assessments online, if students do not have access to Wi-Fi facilities while not on campus. In this study, it manifested how the software program AB Tutor assists with the tasks of the lecturing staff while teaching computer subjects. The program allows lecturers to monitor student activity and participation during lessons.

YouTube videos were a very popular use of ICT by the participants in this study; all found them to be an interesting way to bring the real world into the classroom setting. Videos were found to attract the attention of students and they tended to grasp certain content more easily. Participants mentioned how well online quizzes work in their classrooms, because it creates a fun and also competitive learning environment,

allowing students to access the e-learning platform to answer questions, with the computer providing the results.

The participants all agreed that ICT assists them to explain topics or modules easily; it creates a learning environment through fun and interesting ways of teaching or presenting certain work. The old-fashioned classroom is slowly being eliminated through ICT all over the world; it is, however, imperative to check if the content used is set specifically to reach the objectives of prescribed syllabi. Including students in lessons and in the overall classroom environment is an advantage that accompanies ICT in education. This method allows for accommodating participation during lessons.

The factors which stood out during this study were the age of lecturing staff, whether they have technical support at the TVET college, whether management support is available to the lecturing staff, and whether ICT training was provided upon commencement of their duties. This study found that even though ICT tools are available, it does not necessarily mean that all lecturing staff make use of them in their teaching.

6.6 Recommendations

Each classroom should be fitted with a desktop computer at the lecturer's disposal; however, laptops involve certain risks. Laptops are taken home by lecturing staff, and can be forgotten or stolen, leaving them without the resource to use ICT in their classrooms.

Wi-Fi should be widely available on campus, not just in specific areas where students can access it. This will assist those students who do not have internet connectivity at home. A problem which manifested during the lockdown period was the lack of data available to students; it is therefore recommended that the college decide on a stipulated data bundle to be made available to students for educational use at home.

The Open Learning Centre should be able to accommodate at least 40 students to allow full class group access. This will eliminate the practice of sharing computers which will also save considerable time. The operating times of the OLC should be

extended to at least two hours after the last class on the timetable ends. Students living in the residence should also be able to make use of the OLC after hours.
The findings suggest that audio-recorded lessons assist lecturing staff with revision and in having lessons sent to students who are absent. It should therefore be compulsory to record all lessons.

Online assessments, with all their associated benefits, should be considered, especially considering there is no handling of scripts and therefore no risk of contamination. Paperless marking is recommended as it is environmentally friendly, and lecturing staff are not burdened with the storing of records and scripts until the period before they can be discarded is over.

Online quizzes should be developed for all subjects in order to create a fun way to learn and be assessed during classes.

All lecturing staff should receive ICT training upon commencement of duties. This will also assist with continuous professional development. Each campus should have IT support available as well as IT pedagogical support person that can train staff and assist them to develop their own pedagogical skills.

6.7 Proposed future work

6.7.1 Theme 1: ICT as the technical tools of lecturers, the institution, and students

The study focused on only one campus of and one department at the TVET college. Therefore, future studies could include research across various departments on a single campus or across all five campuses. Document analysis did not form part of the research methodology during this study, therefore the ICT policy of the TVET college was not examined. Future research could include analysing the existing ICT policies and standard operating procedures.

6.7.2 Theme 2: ICT has the potential to broaden students' engagement in the classroom

The study focused on how 13 lecturers use ICT in the Department of Office Administration, and included subject lecturers who teach computer subjects. It is therefore recommended that future research be initiated that explores ICT use in all other departments and across other campuses. These departments consist of Tourism Management, Civil Engineering and Building Construction, Human Resource Management, Financial Management, Marketing Management, Management Assistant, and Hospitality and catering services at the TVET college. It is further recommended that future research focus on administrative duties and how ICT can assist lecturers in this regard. Another recommendation is the potential impact of smartphones on teaching and learning in TVET colleges.

6.7.3 Theme 3: ICT tools available at the TVET college

It is recommended that future research be conducted to explore how students understand concepts better when their lecturers use ICT in classrooms. A student-centred approach could be considered for future studies, where students' opinions are explored on how ICT used by their lecturers assists them in understanding subject content and how they perceive the availability and accessibility of ICT at the TVET college.

6.7.4 Theme 4: ICT knowledge and skills of lecturers

Future research could be conducted to explore the different types of ICT training offered to lecturers upon commencement of their duties. Future research could be conducted to explore whether public TVET colleges provide training on updated ICT programs, which could also assist in accruing continuous professional development points.

6.8 Concluding remarks

The study concluded that various factors have an impact on ICT use by lecturers at the TVET college. These factors include lack of training in ICT, insufficient computers and computer laboratories, and poor ICT infrastructure. Infrastructure issues around electricity provision and restricted Wi-Fi areas for students were identified. Although

having to face these problems can be frustrating for users, it should be kept in mind that ICT in education can assist in the development of new, innovative methods of teaching and learning, and a more participative learning environment. ICT in education encourages students to take responsibility for their learning; however, the relationship between lecturer and student remains a key factor. Even if the ICT tools are available, the lecturer is still the individual who needs to use ICT in lesson planning and presentation.

Participants stated that if uncertain about something or struggling with ICT tools, it is good to know that they have technical support and colleagues who can assist them. Previous researchers' findings concur with this study's, for example, Bullock (2004) opined that support from cooperating teachers and technical staff is a key determinant influencing teachers' use of technology resources. This research study also found that lecturers had mainly positive attitudes towards the use of ICT in teaching, and this partly explained their flexibility in using ICT in their teaching instruction at college.

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Appendix A: Application to conduct research

higher education & training
Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

DHET 004: APPENDIX A:

APPLICATION FORM FOR STUDENTS TO CONDUCT RESEARCH IN PUBLIC COLLEGES

1. APPLICANT INFORMATION

1.1.	Title (Dr /Mr /Mrs /Ms)	Mrs	
1.2	Name and surname	Michelle Joseph	
1.3	Postal address	73 Berg-en-dal Street Berg-en-dal Wellington 7655	
1.4	Contact details	Tel	021 860 1960
		Cell	071 283 6930
		Fax	
		Email	michellej@bolandcollege.com
1.5	Name of institution where enrolled	Cape Peninsula University of Technology	
1.6	Field of study	Business and Information Administration	
1.7	Qualification registered for	***Please tick relevant option:***	
		Doctoral Degree (PhD)	
		Master's Degree	√
		Other (please specify)	

2. DETAILS OF THE STUDY

2.1	Title of the study
The utilisation of ICT (Information and Communications Technology) in class by lecturers at a TVET college.	

2.2	Purpose of the study
The study will aim to assess the use of ICT among lecturers at Boland College. The outcome of the study will be expected to assist policy makers and management of educational institutions to address the integration of ICT into classrooms, in order to reap the concomitant benefits.	

3. PARTCIPANTS AND TYPE/S OF ACTIVITIES TO BE UNDERTAKEN IN THE COLLEGE

Please indicate the types of research activities you are planning to undertake in the College, as well as the categories of persons who are expected to participate in your study (for example, lecturers, students, College Principals, Deputy Principals, Campus Heads, Support Staff, Heads of Departments), including the number of participants for each activity.			
3.1	**Complete questionnaires**	**Expected participants (e.g. students, lecturers, College Principal)**	**Number of participants**
		a)	
		b)	
		c)	
		d)	
		e)	
3.2	**Participate in individual interviews**	**Expected participants**	**Number of participants**
		a) Lecturers	13
		b)	
		c)	
		d)	
		e)	
3.3	**Participate in focus group discussions/ workshops**	**Expected participants**	**Number of participants**
		a)	
		b)	
		c)	
		d)	
		e)	
3.4	**Complete standardised tests (e.g. Psychometric Tests)**	**Expected participants**	**Number of participants**
		a)	
		b)	
		c)	
		d)	
		e)	
3.5	**Undertake observations** *Please specify*		
3.6	**Other** *Please specify*		

4. SUPPORT NEEDED FROM THE COLLEGE

Please indicate the type of support required from the College (Please tick relevant option/s)

Type of support		*Yes*	*No*
4.1	The College will be required to identify participants and provide their contact details to the researcher.		*√*
4.2	The College will be required to distribute questionnaires/instruments to participants on behalf of the researcher.		*√*
4.3	The College will be required to provide official documents. ***Please specify the documents required below***		*√*
4.4	The College will be required to provide data *(only if this data is not available from the DHET).* ***Please specify the data fields required, below***		*√*
4.5	***Other, please specify below***		

5. DOCUMENTS TO BE ATTACHED TO THE APPLICATION

The following 2 (two) documents must be attached as a prerequisite for approval to undertake research in the College	
5.1	Ethics Clearance Certificate issued by a University Ethics Committee
5.2	Research proposal approved by a University

6. DECLARATION BY THE APPLICANT

I undertake to use the information that I acquire through my research, in a balanced and a responsible manner. I furthermore take note of, and agree to adhere to the following conditions:

a) I will schedule my research activities in consultation with the said College/s and participants in order not to interrupt the programme of the said College/s.
b) I agree that involvement by participants in my research study is voluntary, and that participants have a right to decline to participate in my research study.
c) I will obtain signed consent forms from participants prior to any engagement with them.
d) I will obtain written parental consent of students under 18 years of age, if they are expected to participate in my research.
e) I will inform participants about the use of recording devices such as tape-recorders and cameras, and participants will be free to reject them if they wish.
f) I will honour the right of participants to privacy, anonymity, confidentiality and respect for human dignity at all times. Participants will not be identifiable in any way from the results of my research, unless written consent is obtained otherwise.
g) I will not include the names of the said College/s or research participants in my research report, without the written consent of each of the said individuals and/or College/s.
h) I will send the draft research report to research participants before finalisation, in order to validate the accuracy of the information in the report.
i) I will not use the resources of the said College/s in which I am conducting research (such as stationery, photocopies, faxes, and telephones), for my research study.
j) Should I require data for this study, I will first request data directly from the Department of Higher Education and Training. I will request data from the College/s only if the DHET does not have the required data.
k) I will include a disclaimer in any report, publication or presentation arising from my research, that the findings and recommendations of the study do not represent the views of the said College/s or the Department of Higher Education and Training.
l) I will provide a summary of my research report to the Head of the College/s in which I undertook my research, for information purposes.

I declare that all statements made in this application are true and accurate. I accept the conditions associated with the granting of approval to conduct research and undertake to abide by them.

SIGNATURE	*MC Joseph*
DATE	29 July 2019

FOR OFFICIAL USE

TITLE OF STUDY: …….

DECISION BY HEAD OF COLLEGE

Please tick relevant decision and provide conditions/reasons where applicable		
Decision		***Please tick relevant option below***
1	Application approved	
2	Application approved subject to certain conditions. ***Specify conditions below***	
3	Application not approved***. Provide reasons for non-approval below***	
NAME OF COLLEGE		
NAME AND SURNAME OF HEAD OF COLLEGE		
SIGNATURE		
DATE		

Appendix B: CPUT ethics certificate

P.O. Box 1906 • Bellville 7535 South Africa •Tel: +27 21 4603291 • Email: fbmsethics@cput.ac.za
Symphony Road Bellville 7535

Office of the Chairperson **Research Ethics Committee**	**Faculty:** **BUSINESS AND MANAGEMENT SCIENCES**

The Faculty's Research Ethics Committee (FREC) on **12 September 2019**, ethics **Approval** was granted to **Mitchell Joseph (209181435)** for research activities of **Master of Business and Information Administration** at Cape Peninsula University of Technology.

Title of dissertation/thesis/project:	THE UTILIZATION OF ICT IN CLASS BY LECTURERS AT A TVET COLLEGE Lead Supervisor (s): Prof V Naicker

Comments:

Decision: Approved

	**12 September 2019**
Signed: Chairperson: Research Ethics Committee	**Date**

Clearance Certificate No | 2019FOBREC697

Appendix C: Boland College approval to conduct research

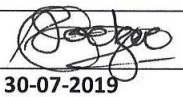
DHET 004: APPENDIX 1: APPLICATION FORM FOR STUDENTS TO CONDUCT RESEARCH IN PUBLIC COLLEGES

FOR OFFICIAL USE

TITLE OF STUDY: THE UTILIZATION OF ICT (INFORMATION AND COMMUNICATION TECHNOLOGY) IN CLASS BY LECTURERS AT A TVET COLLEGE.

DECISION BY HEAD OF COLLEGE

Please tick relevant decision and provide conditions/reasons where applicable		
Decision		***Please tick relevant option below***
1	Application approved	
2	Application approved subject to certain conditions. ***Specify conditions below***	✓
	The approval of the application is subject to the submission of the following documents: 1. Ethics Clearance Certificate issued by a University Ethics Committee 2. Research proposal approved by a University **Research may not commence without submission of the above documents.**	
3	Application not approved. ***Provide reasons for non-approval below***	

NAME OF COLLEGE	**BOLAND TVET COLLEGE**
NAME AND SURNAME OF HEAD OF COLLEGE	**MRS JJM COETZEE**
SIGNATURE	
DATE	**30-07-2019**

Appendix D: Consent to participate in a research study

Faculty of Business and Management Sciences
Ethics informed consent form

CONSENT TO PARTICIPATE IN A RESEARCH STUDY

Category of Participants (tick as appropriate):

Staff/Workers		*Teachers*		*Parents*		*Lecturers*	√	*Students*	
Other (specify)									

You are kindly invited to participate in a research study being conducted by Michelle Joseph from the Cape Peninsula University of Technology. The findings of this study will contribute towards (tick as appropriate):

An undergraduate project		*A conference paper*	
An honours project		*A published journal article*	
A master's/doctoral thesis	√	*A published report*	

Selection criteria
You were selected as a possible participant in this study because you are:

A lecturer at a TVET college and the researcher intends to explore how ICT is utilised in classrooms at a TVET college.

The information below gives details about the study to help you decide whether you would want to participate.

Title of the research:

The utilisation of ICT in class by lecturers at a TVET college. ……

A brief explanation of what the research involves:

The research I wish to conduct explores how lecturers in Office Administration use Information and Communications Technology (ICT) in their classrooms. This research could help improve the utilisation of ICT by lecturers at TVET colleges. The duration of the research will be approximately two months.

The sample comprises 13 Office Administration lecturers (five male and eight female lecturers) at the Paarl campus who will participate in interviews. Confidentiality and anonymity will be guaranteed. Participants have the right not to participate and to withdraw

at any time. All the information gathered during the process will be dealt with as highly confidential.

Procedures
If you volunteer to participate in this study the following will be adhered to:

1. The main research procedures will be explained to you in advance, so that you are informed of what to expect.
2. All interviewees will be treated with respect by the interviewer arriving on time for all the interview schedules and being well prepared.
3. An introduction with the interviewees will be done in order to break the ice.
4. All interviewees will be asked for permission to record the interviews and for the interviewer to take some notes where applicable.
5. In cases where there is no clarity, interviewees will be allowed to ask for confirmation or clarity of words/sentences/phrases to ensure accuracy of the data collected.
6. Participants will be told that their data will be treated with full confidentiality and that, if published, it will not be identifiable as theirs.
7. Participants will be given the option of omitting questions they do not want to answer or feel uncomfortable with.
8. Participants will be told that questions do not pose any realistic risk of distress or discomfort, either physically or psychologically, to them.
9. At the end of each interview all interviewees will be thanked for their time and for the information provided for this study.
10. Participants will be debriefed at the end of their participation (i.e., given a brief explanation of the study).

You are invited to contact the researcher should you have any questions about the research before or during the study. You will be free to withdraw your participation at any time without furnishing a reason.

Kindly complete the table below before participating in the research.

	Tick the appropriate column	
Statement	Yes	No
1. I understand the purpose of the research.		
2. I understand what the research requires of me.		
3. I volunteer to take part in the research.		
4. I know that I can withdraw at any time.		
5. I understand that there will not be any form of discrimination against me as a result of my participation or non-participation.		
6. Comment:		

Please sign the consent form. You will be given a copy of this form on request.

Signature of participant	Date

Researcher

	Name:	Surname:	Contact details:
1.	Michelle	Joseph	071 283 6930

Contact person: Michelle Joseph	
Contact number: 071 283 6930	Email: michellej@bolandcollege.com

Appendix E: Letter to participant

73 Berg-en-dal Street
Berg-en-dal
Wellington
7655

Dear Participant (Lecturer)

I kindly request your participation as lecturer to avail yourself for participating in a research study at college.

Please note that any information gathered during this research study will only be used for research purposes. This study and your participation are independent of your academic record and/or your future at college and will not be used in any way to prejudice any participant at college.

Your participation in the study will be completely confidential and anonymous. Your dignity will not be compromised and your name will not be mentioned. Any information you give will only be used to the benefit of the programme and will not be traced back to you.

At any stage, if not comfortable with the study, you have the right to withdraw from the process.

Please complete the slip below as proof of your written consent to participation in the study.
Your consideration is highly appreciated.
Thanking you in advance.
MC Joseph (student no. 209181435)
.....

RETURN SLIP
I ……..... (name of participant in print) agree to be a participant in the study. I understand the content of the consent letter. I further understand what the study is about as explained to me by the researcher. I understand that I may exercise my right to withdraw from the process at any point of time.

Signature of participant...

Appendix F: Interview schedule

Biographical Data:
Profile of Lecturer:

Age: ……..
Gender……
Qualification(s) obtained: …….
Tertiary institution(s) where studied: ……..
Number of years teaching at TVET College ……..
Pseudonym: ……..

Establishing rapport

1. The interviewer greets the interviewee with a firm handshake and direct eye contact. The interviewer conveys her gratitude to the interviewee for his or her willingness to participate in the study and explains the selection process to the participant.
2. The purpose of the study is to explore your utilisation of Information and Communications Technology in the classroom.
3. The participant is reassured that anonymity will be protected and that pseudonyms will be used. Furthermore, no information will be disclosed to any unauthorised person or party. Recommendations will be made to the Department of Higher Education and Training regarding the utilisation of ICT in classrooms.
4. The duration of the interview will be between 30 and 45 minutes.
5. The interviewer will ask whether the participant is ready to answer the questions.

Interview questions

1. General question
- 1.1 What made you choose the education profession?
- 1.2 What made you choose to lecture in the Office Administration department?

2. Information and Communications Technology (ICT)
- 2.1 What is your understanding of ICT?
- 2.2 Can you give an example of using ICT?

3. Information and Communications Technology (ICT) in education
- 3.1 What does ICT in education mean to you?
- 3.2 In your opinion how can ICT help students in classrooms?
- 3.3 How can ICT assist you as the lecturer in the classroom?
- 3.4 What are the advantages of using ICT in classrooms?
- 3.5 What do you consider limitations of using ICT in classrooms?
- 3.6 In which manner can ICT assist lecturers with subject content?

4. ICT tools available at your TVET college
- 4.1 Which ICT tools are available at your TVET college?
- 4.2 Are these tools sufficient compared with the number of students enrolled at the college?
- 4.3 Are these tools easily accessible to all students?

4.4 If any of these tools are faulty, to whom do you report it, and does the responsible individual attend to the problem?
4.5 How would you describe your utilisation of these tools?
4.6 Do you have technical support at your college?
4.7 Can you notice a difference in students' grasping of content when making use of ICT to explain certain content? For example, using a video.
4.8 How do you prevent offending students when using ICT in the classroom?
4.9 Do you thoroughly check materials before distributing them to students? And for what reason?
4.10 How do you maintain student attention during lessons when making use of ICT?
4.11 In computer laboratories, how do you monitor student participation and activity?

5. ICT knowledge and skills of lecturers

5.1 Describe your level of competence in ICT, on a scale of 1–5 (1. Not competent, 2 Low level of competence, 3 Average, 4 Moderately high level of competence, 5 High level of competence).
5.2 Did the college provide any training in ICT upon your commencement as lecturer? If 'yes', who provided the training?
5.3 Are you comfortable in using ICT tools in your classroom? Substantiate your answer.
5.4 How would you handle a situation where a student knows more than you when making use of ICT?

At the end of the interview:

The interviewer will thank participants for their participation in the study and inform them a copy of the transcription will be supplied to them to ascertain whether their words were reported exactly and whether they persist with their perceptions.

Appendix G: Declaration of editing

ELIZABETH S VAN ASWEGEN
BA (Bibl), BA Hons (English language & literature), MA (English), DLitt (English), FSAILIS

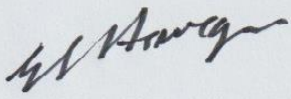
Language and technical editing | bibliographic citation

DECLARATION OF EDITING

11 Rosebank Place
Oranjezicht
Cape Town
8001

021 461 2650
082 883 5763
lizvanas@mweb.co.za

The master's thesis titled 'The utilisation of ICT by lecturers at a TVET college in Paarl, Western Cape' by candidate **Michelle Joseph** has been edited, all references have been checked for correctness and conformance with the CPUT Harvard bibliographic style guide, and all in-text citations have been checked against the references. The candidate has been advised to make the recommended changes.



Dr ES van Aswegen
27 August 2020

Appendix H: Turnitin originality report

The utilization of ICT in class by lecturers at a TVET college

ORIGINALITY REPORT

12%	10%	5%	5%
SIMILARITY INDEX	INTERNET SOURCES	PUBLICATIONS	STUDENT PAPERS

PRIMARY SOURCES

1	etd.cput.ac.za Internet Source	1%
2	theses.gla.ac.uk Internet Source	1%
3	www.ejmste.com Internet Source	1%
4	weelookang.blogspot.sg Internet Source	1%
5	uir.unisa.ac.za Internet Source	<1%
6	www.educ.cam.ac.uk Internet Source	<1%
7	www.cambridgetoafrica.org Internet Source	<1%
8	www.premiumessayhelp.com Internet Source	<1%
9	researchspace.ukzn.ac.za Internet Source	<1%