The attitudes of FET teachers towards the use of technology in the classroom

By

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Declaration

I declare that the dissertation/thesis, which I hereby submit for the degree MEd at the University of Pretoria, is my own work and has not previously been submitted by me for a degree at this or any other tertiary institution.

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Dedication

I dedicate this research to my Mom and Dad for always supporting and encouraging me throughout this study. A special dedication to my best friend who has consistently been with me from day one, not forgetting to mention God for always giving me strength when I felt like giving up.

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Abstract

The implementation of technology in classrooms has not been an easy process for schools. More importantly for teachers, as they are responsible for ensuring that the implementation of technology in the classroom is a success. Some teachers may not use technology in the classroom because they have negative attitudes due to external variables that they may encounter.

The purpose of this investigation was to identify whether FET teachers' attitudes towards technology in the classroom are positive or negative and reasons behind those attitudes. The study aimed to find out what external factors may influence attitudes of FET teachers towards the use of technology in the classroom. This qualitative study was conducted in two public secondary schools, located in a township as a single case study. Data was collected using interviews, field notes and Likert scales. From each school, two young teachers aged 23-30 with less than ten years teaching experience were selected and two older teachers aged 45-60 with more than ten years teaching experience.

Findings showed that there are teachers who do not use technology in the classroom because they have negative attitudes towards it due to load shedding, lack of resources, theft, etcetera. Furthermore, there are some teachers who highlighted they have positive attitudes towards the use of technology in the classroom because it helps with learner engagement and classroom management. It can also be said that young teachers have a more positive attitude towards the use of technology in the classroom as opposed to older teachers.

Keywords: age, attitudes, FET teachers, perceived ease of use, perceived usefulness, technology, Technology Acceptance Model

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List of abbreviations

SMT	School Management Team
SGB	School Governing Body
TAM	Technology Acceptance Model
PU	Perceived Usefulness
PEOU	Perceived ease of use

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Chapter 1: Introduction and background

1.1 Introduction and background

Technology has profoundly taken over our daily lives; it can be alluded that it is our "daily bread" and one cannot function without it since we use it for shopping, finding directions and reading (Harris et al., 2009). Since its inception, technology has contributed generally to each and every activity in various disciplines (Jannah et al.,2020). Over the last two decades, cellular devices have found their way into society which has had a great impact on how people interact with one another (Jannah et al., 2020). Given the hasty advancement and change technology is bringing to society, its impact is significantly changing the working environment (Jannah et al., 2020). This can only mean that its penetration is transforming the working systems hence the introduction of sensors, clouds, mobile communicators and robots to mention a few (Jannah et al., 2020).

A vast number of people have come to take for granted that we work and live in a digital era (Scott, 2015). Currently technology has progressed exorbitantly, from the introduction of computers to using touch screens and talking devices (Unser, 2017). The evolution of technology allows continuous and remote monitoring; it is not a fixed component (Paternot et al., 2021). Technology usage has become more crucial in our everyday life; the prevalence of possessions of devices has become very high to a lot of people (Daud et al.,2020). Instead of engaging with the surroundings learners prefer interacting with their gadgets (Daud et al., 2020).

The word technology is a vital word in many fields including education (Ghavifekr & Rosdy, 2015). It is not only used for fun and personal purposes but also for professional purposes and educating learners (Unser, 2017). Technology is the skills and methods used to achieve certain goals. It is the methods, applications, practices and theories that are utilised to meet desirable ends, especially commercial and industrial ends (Heymans, 2007). Technology has become the main driver of civilisation in recent times thereby being described as the greatest gift of mankind (Jannah et al., 2020). Technology consists of a variety of hardware which include computers, smartboards, cell phones, etcetera (El-Hussein & Cronje, 2010). A revolution of digital learning is underway (Hemingway et al., 2015).

More often technology is associated with cell phones but there is also technology education as a school subject and educational technology (Lazar, 2015). “Digital technologies are changing the learning landscape and connecting classrooms to learning environments beyond the school walls” (Hemingway et al., 2015). Technology education as a school topic is one of the eight subjects chosen by learners in the grade 7-9 as part of their curriculum (Makgato, 2014). Since the inception of technology as a school subject teachers have been struggling with carrying it out especially in rural schools (Makgato, 2014). Studies show that the execution of technology as a school subject has triggered a serious need for in-service technology teacher training as part of teachers’ professional growth (Makgato, 2014). It is alluded that effective digital technologies must be used along with effective pedagogies to improve communication in a teaching context (Scott, 2015). A vast number of teachers feel that technology education as a school subject has a place in the Further Education and Training sector (Lakhana, 2014).

Educational technology is the operative use of technological tools in learning (Lazar, 2015). It is the process of aiding learning and enhancing presentation by using, managing and creating suitable technological procedures and resources (Lazar, 2015). Educational technology is concerned with the best possible application of technology developments to educational problems (Delgado et al., 2015). As an academic discipline it prepares individuals to be knowledgeable about learning resources, analysing and devising solutions to problems (Delgado et al., 2015). Using technology in education has not only made school work easier and faster but it has enriched contributions and knowledge to high productivity levels for both learners and teachers (Jannah et al., 2020). It is alluded that the introduction of technological tools such as software in education improves learning (Jannah et al., 2020). The presence of technology in education is indeed a vital aid for improved teaching and learning as numerous industrialised countries who have utilised technology have improved in education (Jannah et al., 2020).

Studies show that the inception of technology in education improves instruction, knowledge, critical thinking and also creates more learner-centred classrooms (Kilinc et al., 2016). It has become so easy for students to access technology, nowadays they can engage with their teachers in new ways (Scott, 2015). The learning conversations have become more egalitarian and it no longer happens in the classroom only but also

on the internet (Scott, 2015). Digital technologies provide advanced mechanisms to aid reform-based methods and improve learner involvement (Hemingway et al., 2015). It is transforming traditional classes into energetic learning spaces where learners can work together with teachers and their peers to apply and construct data (Hemingway et al., 2015). Students can now tweet and vlog and by so doing they enter into a new discourse with the public in a way that we would not have imagined (Scott, 2015).

With the employment of the "No Child Left Behind Act of 2002", technology has improved the method of teaching and learning (Sabzian et al., 2013). Some teachers have switched from a traditional teacher-centred way of teaching to a technological way of instruction (Unser, 2017). Technology acts as a knowledge transferor in most countries and it has changed the way in which people think, live and work (Ghavifekr & Rosdy, 2015). The use of technology in schools has improved drastically and this is because of a recognition that learners must be skilled in order to survive in the digital world (Bang & Luft, 2013). Although technology has taken over the world of business and people's daily lives, it has brought about seclusions in education (Harris et al., 2009). This is evident in that some schools still do not have technological implementations while some have it, but many in which technology has been implemented lack proper skills to maintain it and this leads one to have a negative attitude towards the use of technology in the classroom (Harris et al., 2009). The spread of the internet is worldwide but the capability to successfully receive it is not (Scott, 2015). It can be hindered by political, cultural infrastructure and language limitations that restrict access to digital resources and digital interaction (Scott, 2015).

This study will explore the attitudes of FET (Grade 10, 11 and 12) teachers towards the use of technology in the classroom. It will look at how educators behave or respond when confronted with the use of technology in the classroom.

1.2 Context

The first school that will be used for this study is in a township called Mamelodi East. The township is best known for crime, theft and drug abuse. Most learners in the school are from disadvantaged backgrounds and a few are from privileged backgrounds. The school is a Quintile 4 non-fee-paying school, and it is state owned. The school has 38 teachers and 1169 learners. Technology at this school was implemented in 2011. The school now has a computer lab, smartboards and FET learners at the school now have tablets. Technology was introduced in this school

because teachers saw that a lot of learners were glued to their phones, so it was best to give them tablets that had educational resources such as past exam papers and study guides. They specifically chose to give learners tablets since they were used to coming to class with their cell phones and that became a distraction for teachers.

The second school that will be utilised is located in Mamelodi West; it is also a Quintile 4 non-paying school. The school has 47 teachers and 1105 learners. The learners are from low socio-economic backgrounds where the unemployment rate is high. The school also has introduced technological teaching aids like smartboards to make teaching and learning for Grade 10, 11 and 12 learners an easy process. The introduction of technological teaching aids started in 2013. Technology was introduced in this school because FET teachers had a high workload to deal with, and if they continued to use the traditional method of teaching which entailed writing on a chalk board and reading from the textbook, the school performance would not improve. Teachers in general carry a lot of work so the use of smartboards made it easier for them to teach and learn, because now teachers could simply open a class activity on the smartboard instead of writing it down on the chalkboard, which is time consuming.

The benefits of such technological teaching aids in both schools have reduced the workload of teachers. Many FET teachers struggled with time management and covering the CAPS content, but the introduction of technological teaching aids has improved their time management. Teachers can now cover the content in time and have time for revision when it is time for exams.

1.3 Rationale

Attitudes of individuals towards technology will differ according to the way in which technology was introduced to them (Kilinc et al., 2016). The attitude of a teacher who was in the field for more than ten years will differ from a newly appointed one when confronted with the use of technology in the classroom (Kilinc et al., 2016). Today's generation of learners is surrounded by technology and they are more intrigued and enthusiastic to use it as a tool of learning (Tatli et al., 2019). Hence we find a lot of learners being more engaged in the lesson when a teacher uses technological teaching aids as compared to a teacher who does not use them (Bang & Luft, 2013).

Growing up in the 21st century and seeing teachers having negative attitudes towards the use of technology in the classroom has made me curious as to what it is that makes

them have negative attitudes. In my high school days, smartboards and IPads were technologies that were supposed to be used in the classroom. Technological resources were there but teachers did not use them, if they got a chance to use it, they would always ask us to help them switch on the smartboard or IPad. By the time we were done assisting them, the teacher's time would be up and they would just tell us: "Homework is on page 26". You ended up not learning anything for the day. Some teachers would come in class and not use the smartboard at all and when asked why, they would say they are traditional teachers, and they are not familiar with smartboards. Others would not admit that they did not know how to use smartboards and it would be very difficult to assist them because they would say "we think we know better". Although technology was available in our school, we did not get a chance to use it properly because teachers were illiterate when it came to technological devices and no proper training was provided for them as to how they should utilise technological devices.

My career choice of becoming a teacher was influenced by my experience in high school. If technology was utilised, we would have understood some of the content better. For instance, there were some of the topics where I think if the teacher presented the topic using pictures or videos it would have been a great lesson and learners would have understood it better. Many educators had negative attitudes when using technology in the classroom. Hence, I chose to be a teacher, I wanted to be that teacher who would have a positive attitude when using technology and motivate other teachers to view technology as a valuable tool in making education and learning a success.

My journey of teaching practicals has made me realise that the introduction of technology in schools has made it difficult for some teachers to partake in the process of teaching successfully. Although many schools have technological teaching aids such as smartboards, computer labs and tablets, some teachers still use traditional methods. This was evident in my teaching practical whereby newly appointed teachers responded positively towards technology in the classroom as unlike older teachers. Newly appointed teachers were using smartboards, tablets and computer labs for teaching and learning while older teachers were using chalkboards.

It can be alluded that negative attitudes from teachers are due to illiteracy in the use of technology (Kilinc et al., 2016). A lot of teachers are not technology literate hence they do not respond well to the use of technology in class (Kilinc et al., 2016). This study is worth conducting because it will compare the attitudes of FET teachers (traditional and newly appointed) towards the use of technology in the classroom and in that way, it will bring about awareness and influence the teachers who have negative attitudes towards the use of technology in the classroom.

1.4 Purpose statement

The purpose of this investigation was to identify if FET teachers' attitudes towards technology in the classroom are positive or negative and reasons behind those attitudes. The study aimed to investigate what external factors may affect attitudes of FET teachers towards the use of technology in the classroom. It also aimed to find effects of using technology in the classroom. Studies show that a lot of traditional teachers have a negative attitude towards the use of technology in the classroom (Adegbenro et al., 2017). Hence, this study is necessary because it will look at how both the attitudes of traditional teachers and newly appointed teachers differ.

1.5 Problem statement

Given the rise in technological changes in education, schools are seen as the most appropriate place to introduce technology (Mukhari, 2016). The use of technology in classrooms is often taken for granted by educators (Adegbenro et al., 2017). A lot of schools have now implemented the use of technology in their classrooms but the problem lies with the attitudes of educators towards it (Adegbenro et al., 2017). A lot of teachers do not embrace the use of technology in class and this can hinder the learning process of learners (Mukhari, 2016). It is alluded that a lot of teachers cling to the traditional methods and they tend to have a negative attitude towards the use of technology in the classroom (Adegbenro et al., 2017).

One out of three teachers feel well equipped to use technology in class (Raulston, 2009). Although teachers appreciate the rewards of using technology in class they sometimes find it challenging to implement it smoothly and effectively (Johnson et al., 2016). A large number of teachers become reluctant to use technology in class because they are uncomfortable with their own level of technology capability (Raulston, 2009). Still to date, most teachers trust that old teaching approaches are the best (Oriji, 2016). The incorporation of technology in the classroom comes with its

own barriers (Hamutoglu & Basarmak, 2020). Researchers allude that there are many barriers that inhibit teachers from using technology in class (Baek, 2008). There are external and internal barriers that contribute to teachers having negative attitudes towards the use of technology in the classroom (Hamutoglu & Basarmak, 2020). Internal and external barriers are aspects that can hamper the implementation of using technology in class (Zwane & Malale, 2018). Barriers are defined as conditions that can hinder a process or make it difficult to achieve an objective (Schoepp, 2005).

Internal barriers include beliefs within a teacher such as preferred teaching methodologies, teachers' opinions, attitudes, self-confidence and views on instructional technology and the will to change (Rogers, 2000). Teachers are responsible for the successful use of technology in class, although there is a variety of technological resources, they can still choose to use or not use those resources in the classroom (Johnson et al., 2016). External barriers are said to be factors that one cannot control (Izci, 2016). It is the inability of a teacher to access technological tools and assistance needed to implement the use of technology in the classroom (Ardiç, 2021). External barriers include lack of access, lack of proper planning, low administrative support and technology support (Rogers, 2000).

It is alluded that internal barriers are more difficult to overcome as compared to external barriers (Ardiç, 2021). In the last 30 years it has been evident that external barriers have been overcome, for instance it is possible for an educator to undergo training and develop a skill of using technology in the classroom but there is no training that will change the educator's attitude towards the use of technology in the classroom (Ardiç, 2021). Until these barriers are addressed the integration of technology in the classroom will not be a success.

Successful teaching and learning is not dependent on the readiness of resources; there might be a lot of resources but if educators do not know how to utilise them it becomes a problem (Makgato, 2014). Studies reveal that educators who have negative attitudes towards the use of technology in the classroom are due to not having computer skills hence their perspectives towards using technology in the classroom will differ from a person who is computer literate (Mustafina, 2016). The inability to cope with technology and fear of utilising technology has made a lot of teachers respond negatively towards the use of technology (Mukhari, 2016). Hence

we find a lot of schools end up using the computer labs as staff rooms (Mukhari, 2016). It is assumed that a teacher who possesses a positive attitude concerning technology is likely to be motivated to use technological aids in the classroom (Mustafina, 2016).

1.6 Research questions

1.6.1 Main research question

- What are the attitudes of FET teachers towards the use of technology in the classroom?

1.6.2 Sub-research questions

- What effect does the use of technology in the classroom have on FET teachers?
- How easy and useful do FET teachers perceive technology?
- What external factors (challenges or benefits) influence the attitudes of FET teachers towards the use of technology in the classroom?

1.7. Literature review and theoretical framework

In Chapter 2, the literature will be reviewed. A variety of scholarly sources will be looked at as to what their own views and opinions are about the topic and research questions. Researchers' views on the attitudes of FET teachers towards the use of technology in the classroom will be discussed.

Theoretical framework will then be examined after the literature review. The theoretical framework will try to brainstorm the key concepts in this investigation with the aims of solving research questions. The "Technology Acceptance Model (TAM)" will be utilised as a tool to solve the why and how questions pertaining to the attitudes of FET teachers when using technology in the classroom. In this way, it will be easy to deduce variables that will have an influence on the teachers' attitudes towards the use of technology in the classroom.

1.8. Methodology

In Chapter 3, a discussion of the methodology will be looked at. Chapter 3 will give a discussion of techniques that will be employed in order to determine if teachers' attitudes are negative or positive and reasons behind those attitudes.

1.9. Data analysis and findings

After interviews have been conducted, the data collected from the interviews will have to be analysed to check whether the research questions of this investigation have been solved or not. In Chapter 4, findings will then be discussed as to what was deduced from the interviews. By the end of this chapter, we should be able to allude what FET teachers' attitudes towards the use of technology in the classroom are, what effects the use of technology in the classroom has on FET teachers and the extent to which technology is effective in the classroom for FET teachers. Lastly, we should be able to identify the challenges and benefits (advantages and disadvantages) for FET teachers when they use technology in the classroom.

1.10 Summary

The term technology has been discussed in Chapter 1. The background of School A and School B has been outlined. The problem has been discussed in-depth as to how the use of technology in the classroom links to the attitudes of teachers. The purpose of this study has also been identified and the research questions were outlined. The following chapter will focus on the literature review and the theoretical framework.

Chapter 2: Literature review and Theoretical framework

2.1 Introduction

Chapter 2 will deliberate attitudes in detail, to get a clear understanding of how attitudes of FET teachers influence the use of technology in the classroom. Attitudes can be complicated hence Chapter 2 will also discuss its components such as the cognitive, affective and the behavioural components. It is imperative to comprehend components of attitudes as it will assist in identifying whether attitudes of teachers when confronted with technology are behavioural, cognitive or affective.

Teachers' attitudes when confronted with technology in the lesson will be discussed as well as whether attitudes of teachers when confronted with technology are positive or negative. Reasons behind positive and negative attitudes of teachers will also be outlined. There is a variety of external aspects that can cause educators to have negative or positive attitudes when including technology in their lessons. Aspects such as self-efficacy, teacher's age, training and support, beliefs and attitudes will be discussed. It is believed that teachers do not only have negative or positive attitudes, but they can be influenced by certain external factors which will be discussed thoroughly in Chapter 2 and 4.

Writings on the use of technology will also be discussed, for example how technology is utilised in the classroom. Questions such as why using technology in class is significant will be answered. Literature pertaining to whether educators are incorporating technology in their lessons will be looked at. Benefits and challenges of utilising technology in class will be discussed.

Literature on how using technology in class enhances learner engagement, will also be reviewed. Aspects such as learner performance will be discussed on whether learners perform better when a teacher uses technology in the classroom or not. A comparison of traditional methods and the utilisation of technology in the present century will also be looked at, questions such as how learners are coping in this forever changing world and what strategies teachers are using in class to adapt, will be outlined. Learners must be armed with abilities that will enable them to survive in the 21st century. Literature will be reviewed on how teachers are going to equip learners with skills needed to survive.

Nowadays classrooms comprise of a variety of learners with different learning needs that need to be met. This is a huge goal as teachers must ensure that they accommodate every learner. Literature will be reviewed on how teachers implement technology in the classroom with diverse learners. Aspects such as teaching strategies and learning styles will be reviewed and how teachers will accommodate learners' learning styles using the appropriate teaching strategy.

2.2 Attitudes

Attitudes are challenging to describe, the word on its own has brought about little consensus in the specialist connotations and specialist psychological realm to understand what is really an attitude (Cross, 2005). However some define it as a way of feeling and thinking about something (Praseetha & Malathi, 2019). An attitude is a learned disposition to feel, reason and act towards an object or a person in a certain way (Praseetha & Malathi, 2019). Attitudes are said to be compound mental practices that impact how people process data and to encourage behaviour (Martin et al., 2002). The meaning of an attitude has been explored in a lot of ways, psychological literature defines an attitude as "a mental tendency that is conveyed by assessing a specific thing with some degree of favour or disfavour" (Martin et al., 2002). It is a response to a situation, the response can be favourable or unfavourable (Al-Zaidiyeen et al., 2010). An attitude can either be negative or positive (Olufemi, 2012).

An attitude plays an important part in defining a person's reaction to a condition (Al-Zaidiyeen et al., 2010). Attitudes are an important concept of long-standing and sustained significance to social psychology (Bohner & Dickel, 2011). An attitude can be defined as a belief, feeling or reaction of an individual towards a phenomenon, person or event (Olufemi, 2012). Present thinking suggests that attitudes aid in forming cognitive relations which in turn may incline behaviours (Cross, 2005). Attitudes may influence a behaviour and it may also be influenced by a behaviour (Cross, 2005). Attitudes can be deduced by observing a person's response to a situation, they cannot be measured directly (Martin et al., 2002). It is supposed that they are concealed in themselves but they can cause behaviours and actions that are observable (Cross, 2005). They are an evaluation of how people feel about a certain issue (Cross, 2005).

They are the evaluative judgements that summarize and integrate affective, behavioural or cognitive reactions (Banaji & Heiphetz, 2010). It seems reasonable to believe that attitudes can be moulded through numerous kinds of social learning such

as childhood upbringing, although some of the evidence suggests that genetic influences may be essential (Martin et al., 2002). It is alluded that attitudes are not inborn traits of mankind but they are rather learnt and they can be modified (Olufemi, 2012). It is also assumed that attitudes change as individuals learn to associate the attitude with pleasant or unpleasant consequences or contexts (Cross, 2005).

Attitudes tend to influence us throughout life, as an individual grows up they tend to acquire strong beliefs and feelings towards males, females, issues, government policies, etcetera (Olufemi, 2012). Attitudes are often learnt from others, make individuals similar to members of their groups, and are affected by persuasion or pressure (Albarracín et al.,2018). In addition, some attitudes are more strongly held and perhaps less open to change as compared to others (Martin et al., 2002). Attitudes are characterised by their strengths. Strong attitudes are impactful and durable while weak attitudes are inconsequential and fluctuating (Dalege et al., 2019).

2.3 Components of attitudes

Attitude is a term that is used each and every day (Breckler, 1983). People generally understand what is meant when one has a negative attitude towards, say, a person, an object or an event (Breckler, 1983). It simply means one does not like it (Breckler, 1983). Studies have shown that a few people possess attitudes that are greatly consistent with their beliefs and feelings while some possess attitudes that are less consistent (Huskinson & Haddock, 2006). According to Huskinson & Haddock (2006), attitudes are a complete evaluation of stimuli that are derived from the favourability of a person's cognitions, previous behaviours and affects (Huskinson & Haddock, 2006).

An individual's attitude is usually formed exclusively or primarily on the basis of three components which are behavioural, emotional or affective and cognitive components (Olufemi, 2012). There are things that you believe about something and the way you feel about them may have an effect on the way you are predisposed to behave (Ranganath et al., 2008). Attitudes are the neural and psychological form of readiness prearranged through knowledge, using a dynamic or directive effect upon a person's response to a situation or an object (Breckler, 1983). Now the question is: In what ways do people respond to a situation or to an object?

The behavioural component of an attitude is one of the ways in which people use to respond to an object or situation (Breckler, 1983). A behaviour is typically defined as

blatant actions of a person (Ranganath et al., 2008). It can be separated into two contrasting concepts which are good or appropriate behaviour versus bad, inappropriate or challenging behaviour (Karban, 2008). Behaviour is at the core of many fields but there is a lack of a consensual definition (Uher, 2016). However the definition has become a discussion and researchers now rely on their intuitive understanding and not on scientific definitions (Uher, 2016). This is the case as behaviour is so intrinsic and persuasive to daily life (Uher, 2016). A behaviour is a way in which one acts or conducts themselves towards others or towards a certain situation (Karban, 2008). Behaviours can be behavioural intentions, verbal statements and overt actions regarding a behaviour (Breckler, 1983). A behaviour can range from supportive and favourable (protecting, keeping) to hostile and unfavourable (destroying, discarding) (Breckler, 1983).

Attitudes are said to be strong predictors of a behaviour (Conner et al., 2021). Strong attitudes are assumed to be better in predicting behaviours as compared to weak attitudes (Conner et al., 2021). Thus attitudes have a behavioural component which is the likelihood to behave in a certain manner (Ranganath et al., 2008). The behavioural component of attitudes relates to expressions of behavioural action or intention (Garcia-Santillan et al., 2012). It is a behaviour which denotes the tendency to resolve or behave in a certain manner (Garcia-Santillan et al., 2012).

The affect or affective component is the second component that a person can utilise to respond to a situation (Huskinson & Haddock, 2006). The term affect is said to be an emotional reaction, gut response or sympathetic nervous action (Breckler, 1983). The affect component can be measured by observing physiological responses such as the galvanic skin response or the heart rate by assembling feelings, verbal information or moods (Breckler, 1983). The affective component links feelings and emotions (Galely, 2014). It associates attitude to the emotional parts which can be grasped in a spectrum, from positive recognition to negative deviation (Galely, 2014). Affect can vary from pleasurable (happy, feeling good) to not pleasurable (unhappy, feeling bad) (Breckler, 1983). It is emotions and feelings brought forth by an attitude object (situation or an individual) (Breckler, 1983).

It can also be alluded that the affective component of attitudes talks about sentiments or emotional state allied with an attitude object (Haddock & Maio, 2008). The affective

component is based on preferences or emotional experiences. Both negative and positive effects can arise from those experiences (Kwon & Vogt, 2009). Negative and positive effects create independent contributions to “satisfaction or dissatisfaction” judgements about a certain thing (Kwon & Vogt, 2009). Individuals who have “positive effect reactions to an experience with a product are more likely to evaluate an attitude object as satisfactory and people are unlikely to see an object as being satisfactory if their experience was negative” (Kwon & Vogt, 2009). The affective component is also called the emotional component (Olufemi, 2012). Emotions are said to be conditions that include expressive behaviour, feelings and physical change (Galely, 2014). The emotional component is capable of arousing an effect centred around the object of the belief (Olufemi, 2012). Affective responses affect attitudes in numerous ways, one can be due to affective reactions that arise in a person after being exposed to an attitude (Haddock & Maio, 2008).

The third component of attitudes that can cause a response is the cognitive component (Galely, 2014). Cognition is one’s thoughts concerning the attributes of an object (Breckler, 1983). Thoughts can be developed through prior exposure to communications or educational materials (Breckler, 1983). It therefore refers to a property of the attitude object (Breckler, 1983). The cognitive component comprises conceptions or knowledge an individual has about a particular situation, thing or an individual (Galely, 2014). All kinds of information can be divided into two forms which are what is true and what is false (Galely, 2014). Conceptions on the other hand can develop by direct observations or by descriptive beliefs (individual experiences) of something or inferential beliefs (previously established ones) and they can also be developed by an impact of authorities (information opinions) (Galely, 2014).

The cognitive component of attitudes talks about the mental process beliefs, perceptions and conceptions pertaining to the attitudinal object (Garcia-Santillan et al., 2012). It is the views, beliefs and qualities we link with a certain object (Haddock & Maio, 2008). A person’s attitude might be primarily built on the thought of the positive and negative qualities about the attitude object (Haddock & Maio, 2008). Cognitive components are formed when people acquire data about the attitude object and thereby form beliefs (Kwon & Vogt, 2009). Data is acquired through direct experience (participation, involvement) and through indirect experience with objects (Kwon & Vogt, 2009). Literature will be reviewed with the intentions of finding out other scholars’

views pertaining to the attitudes that teachers may have when confronted with technology in class

2.4 Teacher's attitudes towards the use of technology in classrooms

Education institutions intend to prepare learners for their professional lives (Kalra, 2018). Technology is an instrument that can be both used by the educators and learners to gain more knowledge and share sense (Kalra, 2018). Given the significant changes that technology is bringing about in the business and education sectors, it is vital that learners be knowledgeable about it (Christensen, 2002). The epic growth of technology over the past decade has changed our world forever. Without electronic mails, internet and computers many of us would not be able to perform our everyday tasks and duties (Fraze et al., 2002). Technology has made the teaching and learning method more appropriate for the learner and linked to real life (Yadav, 2015). Hence, schools have now implemented the use of technology in classrooms.

Attitudes are a vital element in determining whether teachers accept using technology as an instrument in their lessons (Yadav, 2015). The employment of technology in education has forced a re-evaluation of the educator's role in learning (Lokken et al., 2003). Teachers are seen as essential individuals who are able to teach learners about technology (Yadav, 2015). They have remarkable potential to convey values and beliefs to pupils (Yadav, 2015). The success of using technology in the classroom largely rests on the attitudes and competencies of educators (Yadav, 2015). Though about two eras ago educators who used technology in the classroom were said to be "advanced and unconventional, they are now considered to be behind times today if they fail to use technology in the classroom" (Jalali et al., 2014). Readings highlight that newer teachers' familiarity with the incorporation of technology leads to increased technology integration (Haleem et al., 2022). A problem remains as to whether technology use is not connected to the number of years they have been teaching in schools. There are a lot of aspects that can influence teachers' use of technology in class which includes positive and negative attitudes (Kalra, 2018).

The educator's part in the incorporation of technology in class is a significant subject (Hung & Hsu, 2007). Schools are not keeping up to speed with the technologies that will be required for the learner's achievement in the 21st century (Raulston, 2009). This is due to the fact that teachers are unwilling to use technology in the classroom since they have negative attitudes towards it (Raulston, 2009). Although some teachers may

have the desire to embrace technology in the classroom they feel like they are not provided with proper tools (Raulston, 2009). Furthermore some argue that the inadequate number of technological tools and lack of facilities prevents them from using technology in the classroom hence they will have negative attitudes towards it (Kalra, 2018).

Technology has changed the way in which teachers approach teaching (Mundy et al., 2012). Educators' perspectives will differ when incorporating technology in their lessons according to how technology was introduced to them (Mundy et al., 2012). Many teachers trust that having electronic devices in classrooms is unnecessary while learners see it as an essential tool for learning (Francis, 2017). The achievement of using technology in classrooms relies mostly on the teacher's attitude (Al-Zaidiyeen et al., 2010). It is believed that the success of applying technology in the lesson rests on the attitudes of teachers and learners (Rana, 2016).

One of the aspects that teachers are battling with when it comes to the use of technology in the classroom is anxiety. Negative attitudes towards the use of technology in the classroom may also be accompanied by feelings of fear, worry and embarrassment, damaging the equipment or looking foolish (Lokken et al., 2003). Educators who see the use of technology as not attaining neither their nor the students' needs are less probable to incorporate technology in their classrooms and learning procedure (Awofala, 2019). Studies show that the greater positive perception of technology in the classroom among learners fosters high technology anxiety in teachers (Christensen, 2002). It is alluded that positive attitudes towards technology correlates with teachers extent experience (Christensen, 2002). With familiarity it is said that fears and anxiety tend to decrease while confidence increases (Christensen, 2002). Research found that at least 30 hours of technology practise and instruction is required to reduce anxiety concerning the use of technology in class (Christensen, 2002).

Positive attitudes of teachers in the use of technology in the classroom are seen as a necessity for effective use of technology in the classroom (Christensen, 2002). Having positive attitudes concerning technology in class is a growing concern in the present day (Yadav, 2015). It is the duty of the teacher to educate the youth and in order to release that accountability teachers must prepare themselves (Yadav, 2015). This

means that they have to constantly develop and update themselves with technology so as to bring about a positive attitude in the classroom (Yadav, 2015). Teachers whose attitudes are positive concerning the incorporation of technology tend to use it more often and comfortably (Jalali et al., 2014). It is also indicated that teachers' attitudes concerning technology do not only affect their own technology experience but they also have a great effect on the learners (Jalali et al., 2014). If a teacher uses technology in the classroom more often, learners will also be more participative and eager to learn (Jalali et al., 2014).

Some researchers allude that teachers with negative attitudes concerning the use of technology is because of their age (Francis, 2017). It is indicated that older teachers tend to have negative attitudes towards the use of technology in the classroom (Lokken et al., 2003). Younger people on the other hand tend to have a positive attitude and experience concerning the incorporation of technology (Hung & Hsu, 2007). Some argue that age is not a factor but the problem is that teachers are not receiving any support and training (Eristi et al., 2012). Teachers play a vital role in a learner's education, they can also use technology as a tool to instil a variety of skills in learners but there are still educators who are not comfortable with the incorporation of technology in class (Chow, 2015). Studies have also established that gender has a mediating effect on the attitudes of teachers when confronted with technology in class (Bakeer, 2018). Male teachers are said to have more positive attitudes as compared to female teachers (Yadav, 2015).

Studies show that teachers are interested in including technology in their classrooms but they do not have adequate knowledge as to how they can implement and maintain technology in classrooms (Chow, 2015). Teachers' attitudes in the classroom can act as a barrier to the execution of technology in classrooms (Pepe, 2016). Studies also show that teachers are unlikely to apply technology in classrooms if their attitudes towards it are negative (Pepe, 2016). Research shows that teachers with negative attitudes concerning the use of technology in classrooms lack computer skills hence they are unlikely to adapt to technology as equated to those whose attitudes are positive when confronted with technology in classrooms (Al-Zaidiyeen et al., 2010). Hence there are schools where teachers are still using traditional methods in their classrooms even though the school has technological devices (Francis, 2017).

Educators are the core gatekeepers permitting educational revolution to diffuse into the classroom (Christensen, 2002). It is critical that teachers possess attitudes that are positive when incorporating technology in the classroom for the process of teaching and learning to be successful (Christensen, 2002). Findings show that the field lacks studies on how educators can be encouraged to use technology in their lessons (Raulston, 2009). It is also alluded that educators are more likely to build on what they learn from professional development experiences when their present priorities and knowledge are recognised (Kmiec, 2010). Until teachers feel comfortable and have positive attitudes towards the use of technology integration in the classroom it is rare that they will use it in the classroom (Raulston, 2009). Schools and teachers must also recognise that what engaged the former generation of learners might not engage the present generation (Raulston, 2009). Hence, it is vital to be on par with the trends in technology and teachers should look for the best strategies of utilising technology in their lessons.

2.5 The use of technology in the classroom

In a world filled with technology a lot of questions arise in the field of education (Jackson, 2009). Should we use technology in education? If so, why should we use it and how should we use it? The answers to these questions are still under debate. This is because technology is forever changing and by the time research is finished the corresponding technological innovation is forever outdated (Jackson, 2009). Despite this it seems that technology is of great use in the faculty of education mainly in the classroom (Jackson, 2009). Technology is everywhere, but the question is: “Does it have a place in the classroom?” (Muir-Herzig, 2004). Schools should be seen as an environment where learners feel welcome to grow and develop (Krysko, 2014). Teachers need to do what they can to ensure the academic success of their learners (Krysko, 2014). Technology in the classroom is seen as “one” of the methods educators can use to ensure academic success in learners (Krysko, 2014).

Why should we use technology in the classroom? Back in the olden days schools, teachers and learners were able to operate without it (Jackson, 2009). But given the rapid rise and influence technology has on the world of today, it doesn’t make sense that we would prepare learners to enter the working environment without ever teaching with the use of technology (Jackson, 2009). The incorporation of technology in the classroom makes it possible to solve educational problems and prepares a child for

independence (De Silva, 2021). Incorporating technology in class can help educators and learners to create effective teaching and learning processes (Mustafina, 2016). The effective incorporation of technology in class requires educators to have positive attitudes towards technology (Mustafina, 2016). Teachers of the 21st period reason and behave differently as compared to the ones in the past times (Ertmer & Offenbreit-Leftwich, 2010). Some teachers allude that using technological tools such as computers in the classroom do not really assist learners (Jackson, 2009). But learners in this era are already familiar with technology and they are said to be called “Digital Natives” (Mustafina, 2016). These kind of learners are smart and globally connected hence it is significant to include technology in the classroom because they engage with technology at a young age (Mustafina, 2016).

Research has shown that using technology in classrooms fosters creativity, problem solving, innovation and good communication skills (Hollenbeck & Hollenbeck, 2009). Utilising technology in the classroom can help in facilitating the construction of knowledge (Muir-Herzig, 2004). According to Muir-Herzig (2004), having technological tools in the classroom can have a positive influence on the process of teaching and learning. The use of technology in classrooms has been one of the most overwhelming tasks for teachers and learners hence you will find many teachers having a negative attitude when it comes to incorporating it (Kilinc et al., 2016). The classroom is a place where learners can be creative (Keller, 2018). Research shows that technology can be used in all subjects, but teachers have to take into account the diverse learners in their classrooms (Muir-Herzig, 2004).

Often times we find that a teacher can stand in front of the learners and use a textbook to teach (Bruce et al., 1994). Yes, learners may listen to the teacher and understand what the teacher is saying but for some to understand it will require the teacher to be creative in using resources (Bruce et al., 1994). Studies show that the incorporation of technology can aid such learners especially in Science subjects (Bruce et al., 1994). Teachers cannot teach learners only from their textbooks (Mustafina, 2016). It is alluded that teachers who are only using the textbook may be perceived as old fashioned teachers (Mustafina, 2016). Hence it is important for educators to adapt to the situation and essentials of today’s pupils by incorporating technology in their lessons (Mustafina, 2016). However deciding to integrate technology in the classroom

comes with its own burden which is teachers' competencies and attitudes in using technology (Mustafina, 2016).

Technology in the classroom can provide communicative games and activities for learners that can lessen the anxiety and stress caused by learning (Mustafina, 2016). The use of technology can also help learners who have problems with focusing during a lesson to be interested in the lesson. For example, if a teacher uses videos as a resource in a lesson learners will be more intrigued and excited about the next lesson (Mustafina, 2016). Using technology in the classroom has a great impact on learners who work at their own pace because they are able to revisit the lesson at their own time (Jackson, 2009). Leaners do not have to compete with each other and the learner can move from one concept to another when they are ready to move (Jackson, 2009). Technology in the classroom allows learners to oversee their personal education. Studies allude that successful learning takes place when learners have active responsibility for their own learning (Jackson, 2009). When learners use interactive technology, their participation in class is active and their learning increases (Jackson, 2009). A vast number of teachers believe that their class would be boring if they do not use technology because learners would lose attention and technology just makes the class interesting and interactive (Bull et al., 2018). Investigations have shown that technological tools are not fully exploited by teachers in the classroom (Sheeran, 2003).

2.6 The influence of external factors in teacher's use of technology in classrooms

Technology in the classroom can take on a variety of roles (Abdul Karim, 2014). Some teachers may use it as a presentation tool, some may use it as a tool that fosters learner inquiry and some may use it for a learner information delivery tool (Abdul Karim, 2014). The incorporation of technology in the classroom is not about educating learners how to function digital devices but it is more about assisting teachers use technology as an instrument for teaching and learning (Kayalar, 2016). Teachers are in a century where many learners are using technology hence they have to come up with a way of including technology in the classroom (Bates, 2018). It is alluded that learners need teachers to re-envision the part technology plays in the classroom (Kayalar, 2016).

Educators are handy in effective technology execution because even though context and culture build standards of teaching, educators still decide on what works for them

and what does not work for them (Slusher, 2018). This independence offers educators with sets to adopt, reject or adapt instructional reform (Slusher, 2018). Technology integration enables educators to modify and redesign the available resources for improved learning results (Kayalar, 2016). A survey conducted in 2011 has revealed that despite the accessibility of technology in schools, only “8% of teachers fully integrate it in the classroom” (Slutsky, 2016). This can be due to a lot of factors that make teachers unwilling to incorporate technology in class (Slutsky, 2016).

The execution and success of technology in classrooms can be hindered by a lot of factors (Mahdi & Al-Dera, 2013). Some of these factors are allied with teachers since they play a significant part in making the use of technology in classrooms a success (Mahdi & Al-Dera, 2013). Research suggests that a vital aspect for a smooth incorporation of technology in the classroom is the teacher (Chen, 2008). Little attention is given to the aspects that might hinder teachers’ acceptance in using technology in the classroom (Chen, 2008).

Factors which can influence teachers’ incorporation of technology in class can be grouped into two, namely intrinsic and extrinsic barriers (Chen et al., 2009). Intrinsic barriers are said to interfere with internal alteration (Slutsky, 2016). Literature proposes that intrinsic barriers are common amongst teachers and they are more personal and deeply rooted (Slutsky, 2016). Intrinsic barriers are less tangible than extrinsic barriers (Slutsky, 2016).

Intrinsic barriers may include teachers’ efficacy, teachers’ beliefs and attitudes, teachers’ age (Slutsky, 2016), while extrinsic barriers include teacher support and training, lack of resources, load shedding and connectivity (Chen et al., 2009).

2.6.1 Intrinsic barriers

a) Teacher self-efficacy

Teacher self-efficacy is recognised as the most significant issue in determining the achievement of new creatives (Slusher, 2018). Given the swift change in technology it is vital for teachers to be adaptive to change and new initiatives including technology initiatives (Slusher, 2018). Teacher self-efficacy plays a huge role in determining technology incorporation in the classroom (Slusher, 2018). Self-efficacy is described as the confidence in one’s competences to execute and organise the course of action compulsory to manage potential situations (Slutsky, 2016). Some researchers define

it as a belief in one's abilities to accomplish desired outcomes (Slusher, 2018). It is the behavioural causes of how people feel, act and think (Slutsky, 2016). It affects people's motivation, behaviour and their success (Slusher, 2018). In simple terms, self-efficacy is confidence (Slusher, 2018). Self-efficacy can be developed through social modelling, psychology responses, mastery experiences and social persuasion (Slutsky, 2016).

Self-efficacy is one theory that has been accepted in psychological theories of modern times (Slusher, 2018). The theory of self-efficacy states that individuals will try things they trust they can achieve and will not try things they trust will fail (Slusher, 2018). Individuals with "high self-efficacy set high aims and preserve dedication to them" (Slusher, 2018). Educators with high self-efficacy are most inclined to select the best options and change (Slutsky, 2016), while individuals with low self-efficacy doubt their aptitude and view difficult tasks as difficulties to success (Slusher, 2018). They give up easily and when they encounter an obstacle they lose confidence (Slusher, 2018). Performing a task successfully can strengthen one's self-efficacy and it is one of the most effective ways to develop self-efficacy (Slutsky, 2016).

Self-efficacy is a valuable indicator to forecast the effectiveness of technology initiatives (Slutsky, 2016). How much technology is being used in the classroom is dependent on the educator and with teacher self-efficacy seen as a significant issue in determining success it is also important for teachers to have a high self-efficacy (Slusher, 2018). Teachers' technology self-efficacy and their comfort in using technology in class directly influences their likelihood of incorporating technology in class (Agnew, 2009). An upsurge in self-efficacy can motivate teachers to adopt or complete a task in technology initiatives (Slusher, 2018). Teacher self-efficacy is a term which has been described as a teacher's confidence and comfort levels of using technology (Agnew, 2009). A teacher's self-efficacy in technology is primarily influenced by their experience (Agnew, 2009).

Studies have shown that teacher self-efficacy tends to drop at the beginning of new initiatives but gradually increases after a successful implementation of it (Slusher, 2018). Hence it is vital for school leaders to build teachers' confidence to ensure the success of the use of technology in the classroom (Slusher, 2018). Real bottom up change begins with the self-efficacy of teachers (Slusher, 2018).

b) Teachers' beliefs and attitudes

Teachers' views on learning and teaching are vital in determining their use of technology in the classroom (Izci, 2016). Educators' beliefs include their willingness to provide various centred views of learning and their support for student learning (Izci, 2016). In contrast, studies have also alluded that teachers who have positive attitudes towards the use of technology in the classroom are more probable to incorporate technological tools in the methods of teaching and learning (Izci, 2016). The attitudes of teachers regarding the effectiveness of the use of technology in the classroom have a bearing on the implementation of technology in the classroom (Agnew, 2009). Even if a teacher can have all the expertise and knowledge about using technology in the classroom, without the proper attitudes their skills are in vain (Izci, 2016). Understanding the benefits of technology and its relevance to the classroom is a driving force to changing teachers' attitudes (Agnew, 2009). There seems to be a strong affiliation between teachers' attitudes and the use of technology in the classroom (Izci, 2016). Educators' attitudes can have a great influence on their use of technology in the classroom.

The value and success of using technology in the classroom largely depends on the intention, readiness and technological abilities of teachers and how competently they use it (Kayalar, 2016). If teachers do not fundamentally trust that there is worth in technology then the use of technology will not be executed in their classrooms (Slusher, 2018). Slusher (2018) also shared the views that the decision for teachers to use technology in the classroom lies solely on the teacher and the beliefs they hold about technology. It can be alluded that for the application of technology to work in the classroom, educators need to change their beliefs and attitudes (Slusher, 2018).

c) Teacher's age

Studies show that younger teachers are probably more likely to have a positive attitude towards the use of technology in the classroom because they are more energetic, self-assured and eager than senior teachers (Mahdi & Al-Dera, 2013). It is indicated that teachers with less years of teaching practice stand more chances of using technology in the classroom as compared to teachers with more years of teaching knowledge (Agbo, 2015). This may be due to the fact that new teachers did their training in the 21st century world hence they have experience in using technology and respond positively to the use of technology in classrooms (Agbo, 2015). There are a lot of

reasons as to why young teachers have a more positive attitude towards the use of technology in classrooms more than old teachers (Bates, 2018). According to Basargekar & Singhavi (2017), teachers who have been teaching for ages are threatened using technology in the classroom as they feel like they are being replaced by technology hence they become less confident and have a negative attitude towards the use of technology in classrooms. Investigators suggest that there should be training programmes for teachers who have more years of teaching and newly appointed teachers; the training should be orientated into bringing about a positive attitude towards the use of technology in classrooms (Basargekar & Singhavi, 2017).

2.6.2 Extrinsic barriers

a) Training and support

Teachers already have a lot to deal with. For the success of the incorporation of technology in the classroom there needs to be some kind of support given to them. The support can come from key stakeholders such as co-teachers, learners, administrators, managers, parents and the community at large (Inan & Lowther, 2010). These stakeholders are seen as a critical component or rather a driving force in making the success of using technology in the classroom a success (Inan & Lowther, 2010). Given the times that we live in, it is inevitable to have technological devices in the classroom (Kayalar, 2016). School principals, parents and teachers can work together to improve the integration of technology in the classroom (Kayalar, 2016).

Studies allude that if teachers don't have support from their stakeholders they tend to be reluctant and have negative attitudes towards the use of technology in the classroom (Inan & Lowther, 2010). Studies also show that teachers do not receive proper support pertaining to the use of technology in classrooms (Johnson et al., 2016). It has been reported that only 7% of schools have teachers who are adequately skilled to use technology effectively and integrate it in the lessons (Jones et al., 2019). According to Jones et al. (2019), 29% of schools provide up to 1-14 hours of training per year and 36% do not provide any professional development of technology. This has made teachers be less comfortable in using technology in their classrooms.

Teachers also experience challenges regarding the use of technology in classrooms. If there is not adequate training offered to teachers, we will find a lot of teachers being demotivated to use technology in their classrooms (Habibu et al., 2012). The principals and administrators should encourage teachers to continue developing their

technological skills (Kayalar, 2016). If a teacher wishes to attend a course in information technology then principals and administrators should ensure that the teacher's wishes are granted (Kayalar, 2016). This will help in making the teacher move in the direction of the use of technology in the classroom and find it useful in no time (Kayalar, 2016). Educators are said to not make use of the availability of technology, demonstrating that technology availability is not a significant factor in their use of technology in the classroom (Abdul Karim, 2014). It was found that sufficient technology training was not made available hence teachers were not taking advantage of integrating technology in their classrooms (Abdul Karim, 2014).

b) Lack of resources

The most vital step in the implementation of the use of technology in the classroom is the availability of resources such as smartboards, computers and tablets. Lack of resources can make it hard for teachers to use technology in the classroom. Research alludes that there has been progress in making sure that schools are provided with technological resources to use in the classroom. Numerous works showed that lack of resources at school and at home discourages teachers to incorporate technology in the classroom (Bingimlas, 2009). It is also alluded that resources are aspects that can also influence the use of technology in the classroom; this means that if there are not enough resources teachers will be less likely to use technology in the classroom hence, they will have a negative attitude towards it (Hennessy et al., 2010).

c) Load shedding

Electricity is the most vital input in modern days, hence mining operations, manufacturing processes, the education sector is dependent on it (Goldberg, 2015). Load shedding is when the demand for electricity exceeds its supply and in turn brings about blackouts or power cuts (Lenoke, 2017). South Africa is currently facing an electricity crisis (Goldberg, 2015). Electricity is one factor that is mostly scarce in many schools, although its benefits are known as to what it can do in the classroom (Lenoke, 2017). The Department of Education seems to not show concern regarding the effect of electricity blackouts on the effective use of technology in the classroom (Mahlo, 2020)

With a growing demand for electricity ingestion, the supply of it appears to be partial hence Eskom as the sole benefactor of electricity in South Africa will be forced to cut off electricity in some areas for maintenance (Lenoke, 2017). The availability of

electricity enables the execution of technology in the classroom; it may also help in having early morning and late-night classes (Mahlo, 2020). It is unfortunate that some schools still lack electricity (Goldberg, 2015).

It is very frustrating for teachers when they try to include technology in the classroom only to find out that there is load shedding (Kunda et al., 2018). This automatically demotivates the teacher to use technology in the classroom hence they will have a negative attitude towards the use of technology in the classroom (Kunda et al., 2018).

d) Connectivity

Technology is forever changing, and teachers are now forced to rethink the way they teach. In a way it motivates both teachers and learners to come up with innovative and collaborative ways of learning (An, 2010). A vast number of schools have implemented technology in the classroom but the barrier to the successful implementation and usage is connectivity (Chambers, 2019). Technology in education is now solely dependent on connectivity (Holzhauer et al., 2013). It appears that many teachers are not using technology in the classroom to their full capacity because of connectivity (An, 2009). Connectivity is increasingly becoming a vital aspect in the incorporation of technology in class (Holzhauer et al., 2013).

2.7 Learner engagement towards the use of technology in classrooms

The role of technology in schooling is forever changing (Casey & Jones, 2011). Recently it has been focusing on motivating learners to excel and achieve what they have not been able to achieve before (Casey & Jones, 2011). Technology has been said to enhance learning opportunities, learner willingness, learner comfort and learner engagement (Carstens et al., 2021). As technology advances in education, it is important to understand its connection to learner engagement (Bergdahl et al., 2018).

It is now focusing on producing learners with skills to survive in the 21st century world (Casey & Jones, 2011). There has been and in many cases still is a gap between the teacher and the next generation learner (Hendryx, 2008). This gap is seen as the digital division in education between how the next generation is taught and how they learn (Hendryx, 2008). Being born into a period of technological changes has made learners become “digital natives” (Alshabeb & Almaqrn, 2018). Teachers are now faced with the most difficult task, namely learners in the current century that want to be involved, confronted and inspired through the learning procedure (Figueroa-Flores,

2016). This requires them to use technological tools such as gamification in order to engage learners in the learning procedure (Figueroa-Flores, 2016).

Studies reveal that incorporating technology in class can improve learner engagement (Falloon, 2012). The term engagement can be defined as the level of interest, attention, thought, bonding, commitment and attraction that is present between two or more entities (Rajabalee & Santally, 2021). It is evident that learners tend to show more excitement and interest when technology is used in their classroom (Casey & Jones, 2011). Technology is seen as the mind food for thought that helps the learner to be more engaged. Learners can learn at their own pace meaning that the learner can spend hours to analyse the content being taught (Rajabalee & Santally, 2021). The use of technology has also shown that it can improve learner participation and activity in class. A lot of learners tend to sleep when a teacher stands in front of them and delivers content, but they have shown more interest and been more active when the teacher uses a smartboard (Johnson-Smith, 2014). This is because they are more intrigued by what they see and they want to find out what is going to happen next (Johnson-Smith, 2014).

The technological integration has resulted in an increase in the use of mobile devices by a lot of individuals of all ages and they use them for informal and formal education (Alshabeb & Almaqrn, 2018). Learners are growing up in a century where they are immersed with technology every day. Many learners have smartphones and tablets (Rands & Gansemer-Topf, 2017). Learners can now navigate an iPod or iPad better than an adult hence they will demand more engaging learning strategies (Figueroa-Flores, 2016). You can imagine a classroom that comprises of learners who are familiar with technology as to how they will react when a teacher just stands in front of them as compared to when a teacher uses technology in class (Rands & Gansemer-Topf, 2017). Studies show that learners tend to make informed decisions when using different communication channels with teachers or peers (Verjans, 2013). It is also alluded that the incorporation of technology in class can act as an assistive tool that promotes self-regulation and independence in learners (King, 2015). Games are said to have a remarkable motivational power that can engage learners in the learning process (Figueroa-Flores, 2016). They are seen as mechanisms that encourage people to engage with them, even if there is no reward but the happiness of playing

and a probability to win, creating a highly participative full blown learning process (Figueroa-Flores, 2016).

The use of technology in classrooms does not only improve learner engagement, but using interactive tools such as smartboards improves learner academic achievement (Rands & Gansemer-Topf, 2017). Researchers allude that learners do not want to watch the teacher teach on a chalkboard but they want to be actively engaged as there are so many things that can be done when using technology in classrooms (Johnson-Smith, 2014). Learners can play Kahoot games in class as part of their class activity and such games have shown learners are able to be themselves and are able to participate actively (Rands & Gansemer-Topf, 2017). Learners are more likely to show interest in an activity where technology is included as they feel like those activities that use technology are more relevant to them as youngsters (Francis, 2017). Hence you will see a lot of learners being motivated to learn and participate in class (Francis, 2017).

2.8 The implementation of technology in classrooms with diverse learners

Nowadays learners come to school with a variety of educational needs. Due to inclusion, the number of learners with incapacities is on the rise thus exerting pressure on special and general teachers (Jones et al., 2019). Teachers must appreciate all aspects of variety in their learners in order to address and support their learning requirements (Kolimbetova, 2019). Having an understanding of the learner population has a great impact on the delivery and design of the lesson (Agonács & Matos, 2019). In order to respond to diversity, learners should be provided with a variety of options for engagement (Kolimbetova, 2019).

In any classroom there are economic, age, instructive background and ethnic or life experiences amongst learners (Hendryx, 2008). Nowadays teachers have a variety of pupils in their classrooms that they must cater to and traditional teaching methods are not applicable to address the varied necessities of learners (Kolimbetova, 2019). Traditional teaching methods are said to exclude learners with disabilities (Gordy et al., 2020). It is said that the diversity of learners will influence the pace and the extent of learning. Learner-centred learning calls for appropriate teaching approaches that can be utilised by educators to provide a variety of learning experiences (Aithal & Kumar, 2016). Hence it is imperative for teachers to appreciate the learning styles and

characteristics of learners to be able to accommodate all the learners in class when using technology (Hendryx, 2008).

As much as learners have different learning styles, teachers also have teaching methods. This can lead to a teacher using one teaching style that suits them while neglecting the different learning styles that learners have (Hendryx, 2008). Learners should not be limited but they should be exposed to different strategies that will suit them (Kolimbetova, 2019). The teacher should be vigilant of their own teaching styles and the learning techniques of learners (Hendryx, 2008). Studies show that the closer the teaching technique is to the learning technique the more fruitful and inclusive the class will be between the teacher and the learner (Hendryx, 2008).

Schools are progressively challenged to aid a diverse populace of learners, the worry is no longer on delivering “inclusive education but on how to execute inclusive education in methods that are effective and possible in ensuring that teaching and learning becomes a success” (Chonge et al., 2016). According to the “No Child Left Behind Act of 2001”, schools should develop plans that will enable all learners to meet stimulating state content and academic success standards (Jones et al., 2019). Since 2016, inclusion remains part of the school and educational reforms and other parts of the world (Chonge et al., 2016). Inclusion is an initiative that is set out to improve quality education of the disabled (Chonge et al., 2016). Learners have their own unique strengths, interests and learning differences (Kolimbetova, 2019). It can therefore be alluded that schools must involve all learners irrespective of their social, physical, linguistic, emotional, intelligence or further conditions (Chonge et al., 2016).

Inclusion is an important part in education, each and every learner has to be treated equally regardless of their backgrounds (Starcic, 2010). Demands for inclusive education have increased as teachers are now teaching diverse learners with different needs that have to be met (Starcic, 2010). Inclusive education can be explained as securing the right of all learners to access, involvement, success and presence in their schools (Kolimbetova, 2019). Inclusive education calls upon all schools to eliminate barriers that can hinder access, in order to provide excellent educational experiences for all learners (Kolimbetova, 2019).

Technology is a forefront for learners as a means to meet their individual needs (Jones et al., 2019). It can be alluded that technology allows learners to perform diverse tasks

that will suit their needs or learning styles, for example: it is suggested that text messages can help a learner who struggles with spelling and reading abilities (Ahmad, 2016). Technology has multifaceted features which can meet all the learning needs of learners (Ahmad, 2016). Learners can always go back to complex topics according to their preferred learning style outside the classroom; they also have an option to pause and rewind a pre-recorded video.

Studies show that incorporating technology in class allows teacher versatility in such a way that they can refine their teaching strategies and be inclusive of all learning styles of learners (Hollenbeck & Hollenbeck, 2009). When using technology in the classroom teachers should look closely at the learners' socio-cultural backgrounds they are working with, the type of learners, how they will build confidence and how to accommodate them regardless of their backgrounds (Casey & Jones, 2011).

Using technology in the classroom does not only accommodate all learning styles but it also makes learning effective (Aithal & Kumar, 2016). Assimilation of information differs according to individual preferences of learners (Dube & Ma, 2010). Some learners are visual, some are kinetic and some are auditory learners (Balanko, 2002). Visual learners prefer seeing pictures or videos, while kinetic learners learn best when they are physically engaged and auditory learners prefer listening to a teacher or a recording (Dube & Ma, 2010). Technology as a tool can be seen as useful in accommodating these types of learners. Furthermore, technology can also assist slow learners and shy learners because it allows them to study at their own pace and they can be accountable for their own learning and also have a variety of learning materials depending on their own learning styles (Balanko, 2002). Types of assessment have also proven to be useful strategies that will accommodate the diverse learners in class (Dube & Ma, 2010). A teacher can assess learners in a variety of ways, for example; the teacher can give learners an assessment that has pictures, recordings, videos or written words to accommodate everyone (Dube & Ma, 2010).

A classroom is a kaleidoscope of diverse learners and to accommodate all the learners' needs the teacher must ensure that they use teaching strategies that will accommodate each and every type of learner (Hollenbeck & Hollenbeck, 2009). According to Playsted (2019), the classroom comprises of a diverse group of learners who have different learning styles and the introduction of technology to them can be

overwhelming, hence it is the duty of the teacher to accommodate such learners. Although technology is seen as an integral part of inclusion in classrooms, some researchers argue that it is inadequate as it does not cater for all disabilities (Starcic, 2010). Studies also show that technology can be beneficial to learners who are from poor backgrounds (Unser, 2017). It is also the duty of the teacher to make sure that those kinds of learners are provided with the appropriate education (Unser, 2017).

The versatility of technology makes it possible to accommodate all the diverse learning needs of learners (Dube & Ma, 2010). Teachers should see to it that they meet all the needs of learners and technology is one of the tools they can utilise (Jones et al., 2019).

2.9 The advantages and disadvantages of using technology in classrooms.

Technology seems to be taking over classrooms, but without any doubt there will be "benefits and challenges" of using technology in classrooms (Klopfer et al., 2009). Technological apparatuses can offer notable rewards giving scholars flexibility in selecting where and when to study and increasing their access to technology (Nascimento et al., 2019). The technology that is available nowadays is very broad in a sense that it can accommodate each and every type of a learner in a classroom whether disabled or gifted (Radu et al., 2011). Not all learners learn the same way or at a similar pace; technology has made it easier to accommodate such learners because a teacher will prepare an instruction that will accommodate everyone (Keller, 2018). For example, the teacher can use a smartboard for visual learners or use an audio for learners who learn best when hearing (Keller, 2018). It is stated that technology does not discriminate, the information on the internet is available to everyone who has access to it (Radu et al., 2011) . Studies show that using technology in the classroom improves learner engagement and overall learner academic performance (Unser, 2017).

Technology is a very handy tool as it gives learners independence and control over their own learning (Dina & Ciornei, 2013). Introverts who are quiet during contact lessons are said to participate online (Fedynich, 2013). Learners who are slow in contact lessons can always go back to the notes at home at their own pace (Rivera, 2016). It promotes flexibility as learners can also watch videos at any time, replay them to grasp more information and understand better (Ramírez et al., 2014). Another interesting fact is that learners can watch a video prior to the lesson which gives them

more time to prepare questions (Ramírez et al., 2014). It is an interactive tool as it allows learners to generate their own materials and it also give learners access to a range of learning materials like newspapers, books, movie reviews and magazine articles (Lai & Kritsonis, 2006). Technology also benefits teachers in a way that they are able to finish the content timely since traditional methods are time consuming (Unser, 2017). It also motivates teachers to approach teaching with a positive attitude and more importantly a sense of play and makes the learning process fun for learners (Kumar, Rose & D'Silva, 2008). Using technology also eases the workload of teachers and ensures that the data and information about learners and lessons is kept safe (Kumar et al., 2008). It is alluded that technology encourages a greater relationship between teachers and learners and between learners and their equals (Lai & Kritsonis, 2006). The use of emails can also provide immediate feedback to questions that learners may have (Vu, 2005). The internet provides up to date information as compared to textbooks (Kumar et al., 2008). An additional advantage is that once teachers have recorded their teaching materials and activities, they can also refer back to them in future which saves them preparation time and also allows them to focus on individual needs of learners in class (Rivera, 2016). In cases when a learner is sick and cannot go to school they can easily go online and check what they did in class (Rivera, 2016).

Researchers allude that technology should be included in classrooms because it will help learners survive in the digital world (Johnson et al., 2016), although some researchers argue with that statement (Gisbert & Bullen, 2015). Is it better for learners to be computer literate while they lack interpersonal skills? Is it better for a learner to communicate with someone halfway around the world and not be able to communicate with his or her peers in class? (Radu et al., 2011). Having easy access to technology at any time can make learners lazy in a way that when they are confronted with a problem, they will not be able to solve it without consulting the internet. This will mean that they will not be problem solvers nor critical thinkers (Ogbomo, 2011). A disadvantage that is often overlooked is that individuals using computers or participating in online courses are literate (Fedynich, 2013). Although studies have shown that the use of technology in the classroom is an operational tool for teaching and learning, they also allude that participants lack proper skills to partake in it (Fedynich, 2013).

The use of technology in the classroom can bring about inequality amongst learners. When computers become a basic requirement for learners to purchase, some learners may not be able to afford buying a computer (Lai & Kritsonis, 2006). It is alluded that learners tend to focus more on technological features than what is taught, for instance if a teacher uses a video or images learners tend to focus more on how the images look (Jung, 2005). As result learners will not have a comprehensive input (Jung, 2005). Another disturbing problem is that learners often misuse it by spending more hours on Facebook, Twitter and games (Shatri, 2020). This is proof that learners lack concrete guidelines on how to use technology in such a way that will benefit them (Shatri, 2020). Using technological devices in the classroom also requires teachers to devote a lot of time preparing for classes, training with computers before class, on the other hand during class they have to distribute the technological devices and also collect them afterwards (Chartrand, 2016). The amount of time used to distribute devices and teach learners how to use the devices is the time that should be used for teaching and learning (Chartrand, 2016).

Searching for information on the internet can also be frustrating and time consuming, it requires one to be vigilant of false information and be able to cope with information overload (Vu, 2005). It is also alluded that the incorporation of technology in the classroom can make teachers focus more on creating visually attractive illustrations rather than focusing on the content that will be taught (Shatri, 2020).

2.10 Theoretical framework

The adoption and acceptance of technology has received considerable attention in the past decades (Ma & Liu, 2004). Although a variety of models have been recommended to clarify the use of new technologies, the “Technology Acceptance Model (TAM) has been the one that captures most attention of new technologies” (Chuttur, 2009). In 1985, Davis recommended the “Technology Acceptance Model (TAM) in his doctoral thesis at the MIT Sloan School of Management” to clarify the user’s behavioural intention to use new technology (King & He, 2006). He developed this model based on the “Theory of Reasoned Action (TRA), a psychological theory that seeks to clarify behaviour” (Liao et al., 2018). According to TRA a person’s attitude foresees his/her intention and intention moulds the real behaviour (Fathema et al., 2015). It can also be alluded that the TRA declares that opinions influence attitudes which in turn leads to intention therefore generates behaviour (Ma & Liu, 2004).

Researchers define technology acceptance as the favourable reception, approval and prolonged use of new technologies (Chen & Chan, 2011). Acceptance can also be defined as a vital factor in deciding the lose or win of new technologies (Samaradiwakara & Gunawardena, 2014). A variety of theoretical models have been proposed to explain an individual's acceptance behaviour but the TAM is widely used (Ma & Liu, 2004). The TAM is one model that is used for new technologies (Matikiti et al., 2018). It is there to trace how external factors influence intention, belief and attitude when using new technologies (Matikiti et al., 2018). The TAM has been widely used for explaining an individual's acceptance of new technology (Surendran, 2012). TAM is the most extensively used model in new technologies for its ease and understandability (King & He, 2006). Davis (1989) alludes that the performance gain is often held up by the user's unwillingness to use and accept available systems (Davis, 1989). The purpose of TAM is to predict and describe the acceptability of new technologies, exploring and analysing possible aspects that can impact the acceptability of those new technologies (Liao et al., 2018).

In this study, new technologies such as smartboards and tablets will be looked at, external aspects such as teacher's age, training and support will also be looked at as to how they may influence the use of new technologies in the classroom. Attitudes of FET teachers will be looked at individually with the aim of finding out reasons behind their attitudes.

In TAM the use of new technologies "relies on the user's attitude, the perceived ease of use, perceived usefulness of technology and the perceived benefits of technology" (Matikiti et al., 2018). "Perceived usefulness (PU) is the degree to which a person believes that utilising a certain system will be beneficial towards their work presentation" (Davis, 1989). It is stated that a system that is high in perceived usefulness will automatically foster a "positive use-performance relationship" (Davis, 1989). "Perceived ease of use (PEOU) is in turn explained as the extent to which an individual believes that using a certain system would be effortless" (Davis, 1989). TAM alludes that the perceived usefulness will be affected by the perceived ease of use such as when individuals find new technologies being "easy to use" they will then perceive technology as being "useful" (Fathema et al., 2015). As alluded by Davis (1989) that a system perceived easier to use is likely to be acknowledged by users (Davis, 1989). Both PU and PEOU impacts the user's attitude towards technology, it

alludes that if users find technology being easy to use and useful they will bring about a positive attitude towards new technologies (Fathema et al., 2015).

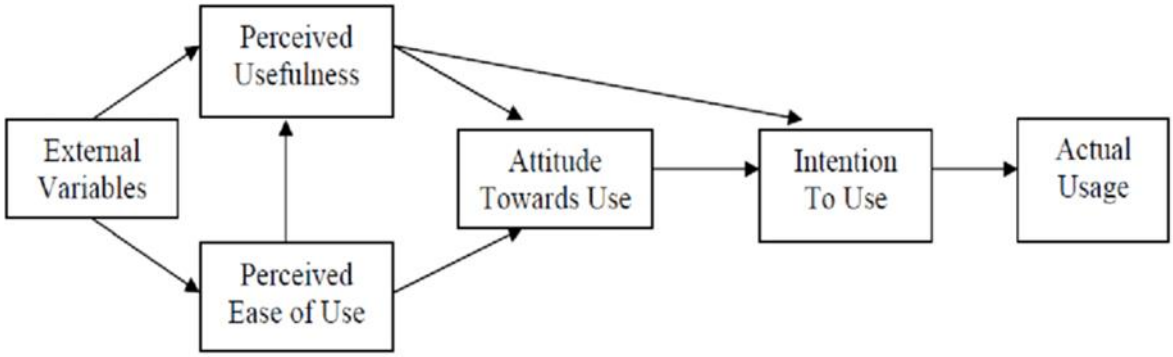

Figure 2.1: First modified version of Technology Acceptance Model (TAM) (Marangunić, 2015)

From the figure above, it can be alluded that if a person perceives the use of technology as useful and beneficial to their performance, they are more likely to use it more often. At the same time if the use of new technology is seen as easy to implement, no one will be reluctant to use it (Sandema-Sombe, 2019). It can also be said that if new technology is easy to use and it is useful regardless of external factors that may influence it, people's attitudes towards new technologies are more likely to be positive (Samuel, 2018).

In this study, FET teachers were confronted with new technologies such as smartboards and tablets. External factors that may influence their PU and PEOU of use will be looked at. This means that if teachers find it easy to use smartboards or tablets, they will consider them as being useful to use and in turn foster a positive attitude regardless of external factors. On the other hand, if they find smartboards and tablets not being user friendly due to certain external factors, they will likely be reluctant to use them and they will have negative attitudes towards the use of technology in the classroom. TAM is used in this study since previous investigations have revealed TAM as the most usually employed, powerful and highly analytical model of new technologies (Fathema et al., 2015).

2.11 Summary

Literature on a variety of sources has been reviewed, debates and gaps between different sources has also been reviewed pertaining to the attitudes of FET teachers concerning the incorporation of technology in class. Questions such as how and why were reviewed, for instance why some teachers have positive attitudes towards the use of technology in the classroom and why some were negative supported by literature. In the following chapter, research design and methodology of the study will be conversed.

Chapter 3: Research design and methodology

3.1 Introduction

In Chapter 2, writings on attitudes of FET teachers towards the use of technology was discussed. In Chapter 3, the main focus will be on the methodology underpinning the study.

A discussion of the paradigm will be followed by the methodology which this study will use to find a solution to the problems discussed in the problem statement. The research design will attempt to understand the phenomenon (case study). A brief discussion of how participants were selected and the type of sampling that were used, will follow. After the identification of participants, the data collection methods; namely semi-structured interviews, field notes and Likert scales will be discussed. An explanation of how the data was triangulated, and how data will be analysed, will follow. Lastly, a debate of the methodological norms and ethical considerations will conclude the chapter.

3.2 Paradigm

A paradigm is a “set of beliefs or assumptions about an aspect of truth which gives rise to the world view” (Maree, 2007). It signifies what we reflect about the world but cannot attest to it (Maree, 2007). A paradigm discourses norms taken on faith such as opinions about realism (ontology) and the association amid the knower and the known (epistemology) (Kivunja & Kuyini, 2017). Ontology is more concerned about the nature of reality and whether social reality exists independently of social interpretations and conceptions (Maree, 2007).

Epistemology means learning and knowing about the social world; it is the basis of our understanding (Kivunja & Kuyini, 2017). It focuses on how truths, physical laws or facts really do exist or can be discovered (Maree, 2007). In this study the social world being a school will be looked at, and in this context, FET teachers’ attitudes when confronted with the use of technology in the classroom, will be under the magnifying glass.

The paradigm that will be used in this investigation is the interpretivism paradigm. The interpretivism paradigm focuses on the subjective understandings of people and their insights of the world as a way of understanding a social phenomenon (Kivunja & Kuyini, 2017). Interpretivists believe that truth is socially built and not objectively determined (Maree, 2007). This method is used by most investigators because it

allows making an effort to withdraw the constructions from the field by studying in depth the phenomenon of interest; it clarifies the subject's perspective and meaning of the context (Kolimbetova, 2019). The importance is on considering the participants' interpretation of the close world, hence reality is socially constructed (Kolimbetova, 2019). In this study FET teachers' attitudes will be studied in two schools and how they respond to the use of technology in the classroom.

3.3 Methodology

Methodology can be defined as the approaches, techniques or processes employed in the solution of a problem (Dube & Ma, 2010). This study will use a qualitative approach because it is naturalistic; it focuses on looking at the social life where interaction occurs (Pathak et al., 2013). The qualitative research approach usually emphasizes words rather than data that is expressed numerically (Hancock et al., 2001). It is alluded that it contributes to an understanding of the human condition in a variety of settings (Bengtsson, 2016).

Qualitative research examines individuals in a social setting to clearly understand the complex truth of the condition (Pathak et al., 2013). It tries to comprehend the research problem or the topic from the point of view of the local population which it is linked with (Kolimbetova, 2019). The qualitative approach is meant to discover how human beings interpret, comprehend, experience and yield to the public world (Hammersley, 2012). This shows that qualitative researchers learn things in their usual conditions with an effort to understand and make logic of the phenomenon (Aspers & Corte, 2019). Qualitative research emphasises how people can have diverse ways of looking at the social or psychological reality (Hancock et al., 2001).

This study will examine teachers in a school setting with the aim of making sense of how they experience and understand the use of technology in the classroom. It will observe what teachers' attitudes are when they use technology in the classroom. Teachers will have different ways of looking at the incorporation of technology in lessons hence this study will employ the qualitative research approach with the aim of hearing those different ways in which teachers look at the inclusion of technology. In this investigation, questions such as how people behave the way they do when confronted with technology will be answered and how the attitudes of educators are formed and how they are affected by the incorporation of technology in lessons will be solved.

3.4 Research design

A research design is a tactic that an investigator uses to incorporate a variety of components in a rational way and also seeing to it that the research problem is addressed (Maxwell, 2012). This study will use the case study research design. A case study is “an experiential inquiry that examines a phenomenon (a case) deeply and within its real world context when the limits between phenomenon and context may not be clearly apparent” (Yin, 2017). It is an investigation that aims to answer certain research questions with different evidence from a case study (Kolimbetova, 2019).

In a case study a certain case is learned in detail to get an understanding of a phenomenon (Mitchell & Jolley, 2010). A case study review manages with the technically distinctive state in which there will be additional aspects of interest than data points (Yin, 2017). In this study, an exploratory case study was used since the investigator wanted to understand the real-world case. An explorative case study answers the how and why; it determines how events occur and factors that may influence a particular outcome (Hill, 2017). In simple terms it can be alluded that it is there to determine a cause-and-effect relationship (Hill, 2017). This study was exploratory and inductive in nature as it explored the attitudes of FET teachers when confronted with technology and identified the cause and effect of teachers’ attitudes. In this study a single case was looked at which were two schools who are very similar in terms of learners’ backgrounds and the kinds of technology that were introduced in the schools.

3.5 Sampling

Sampling is a selection of individuals from a populace of interest whose findings can tell us more about the population in general (Maree, 2007). There are two forms of sampling in qualitative research which are purposive and convenience sampling (Whitehead & Whitehead, 2016). This study used purposive sampling which is used with a specific drive in mind (Taherdoost, 2016). Purposive sampling focuses on characteristics of the population which will in turn answer the research questions (Suri, 2011). In this investigation, the purpose was to find out whether FET teachers have a negative or a positive attitude when incorporating technology in their lessons. The populace of interest in this investigation was two schools based in township areas. The selection of participants focused on FET (10, 11 and 12) teachers only. Four teachers from each school were selected, “two younger teachers aged 23-30 with less

than 10 years' experience and two older teachers aged 45-60 with more than 10 years' experience were selected". This selection criteria was done with the aims of comparing how attitudes of teachers aged "23-30 with less than 10 years' experience" differ from teachers ages "45-60 with more than 10 years' experience" when confronted with technology.

3.6 Data collection

Data collection is a method of assembling information from a populace of attention for a researcher to answer research questions (Whitehead & Whitehead, 2016). There is a range of methods one can use to collect data, but in this investigation semi-structured interviews, field notes and Likert scales were used to gather information. Interviews are a two-way conversation where an interviewer asks an interviewee questions with intentions of gathering information about the population (Maree, 2007). An interview is a personal discourse amid the researcher and the participant (Kolimbetova, 2019). It is a method of collecting primary information where the interviewer pursues to get information from a person or a group and answers can be recorded (Kolimbetova, 2019).

In qualitative research there are unstructured, semi-structured and structured interviews (Chan et al., 2013). Semi-structured interviews are based on a track of inquiry established by the investigator before the interview; there are questions that will be asked followed by clarification and probing (Chan et al., 2013). Semi-structured interviews were chosen since they are flexible, the investigator was able to add probing questions and ask for clarification from the participants.

This study also used field notes. Field notes are made by the investigator to recall and note the behaviours, actions, events and other features of a setting being looked at (Phillippi & Lauderdale, 2018). Field notes allowed the researcher to jot down personal thoughts and ideas in an interview to capture the participant's body language (Phillippi & Lauderdale, 2018). They also aided in the construction of rich and profuse data of the investigation (Phillippi & Lauderdale, 2018).

Likert scales were used to collect information. Likert scales are a non-comparative scaling method and only measure a single characteristic in nature (Norman, 2010). In Likert scales respondents are requested to specify their "level of agreement from strongly agree to strongly disagree with a given statement" (Joshi et al., 2015). All

statements revealed a certain dimension of the attitude towards the subject (Joshi et al., 2015). Likert scales were chosen because they do not expect a simple yes/ no answer but rather allow for a degree of opinion or no opinion at all (Norman, 2010). In this study, FET teachers were interviewed and were asked to complete a Likert scale with the aim of finding out their attitudes when confronted with technology.

Validation of data in an investigation is very significant and to ensure that the term “triangulation” is often used to facilitate validity (Honorene, 2017). Triangulation in research is an influential technique that eases validation of data through cross confirmation from two or more bases (Honorene, 2017). Triangulation allows a researcher to view events from multiple perspectives (Korstjens & Moser, 2017). Triangulation is a mixture of two or more data bases, theories, approaches or researchers in one investigation of a particular phenomenon (Yeasmin & Rahman, 2012). Triangulation in social sciences is defined as mixing of methods or data so that a variety of standpoints or viewpoints can be extracted from a topic (Olsen et al., 2004). In social science study it is the procedure in which a researcher wants to validate findings by showing that independent measures of it agree, do not agree or contradict one another (Yeasmin & Rahman, 2012). Using a single method can only shed partial light on a phenomenon hence triangulation is utilised (Honorene, 2017). It also allows investigators to be more self-assured with their results (Yeasmin & Rahman, 2012).

Triangulation is aimed at widening and deepening one’s understanding (Yeasmin & Rahman, 2012), this can only be achieved by either a person or by a research group (Olsen et al., 2004). It “is the use of more than one method” to investigate a question (Heale & Forbes, 2013). Triangulation can help the researcher in obtaining a range of information on a similar issue (Honorene, 2017). It can also avoid potential biases, problems and weaknesses that can arise from a single technique, single study or a single spectator (Yeasmin & Rahman, 2012). Triangulation can be used to confirm recommended findings but it can also be used to determine broadness of data (Heale & Forbes, 2013). Other researchers describe triangulation as an effort to fully explain, plan out the complexity and richness of human behaviours by learning it from more than one perspective (Honorene, 2017).

Triangulation is a technique used by qualitative investigators to check authenticity in their studies (Guion et al., 2011). It is considered to encourage a more comprehensive

kind of a phenomenon in a study and to improve the rigour of the study (Heale & Forbes, 2013). This study, however used methodological triangulation which is defined as using more than one data collection technique or research method (Yeasmin & Rahman, 2012). Interviews, Likert scales and field notes were used as data collection approaches. This gave the study new viewpoints and if the conclusions are the same, then trustworthiness is established (Guion et al., 2011).

3.7 Data analysis

Data analysis are strategies that a researcher use to analyse data gathered during the research (Kawulich, 2004). It is an ongoing, iterative, emerging and non-linear process (Chan et al., 2013). There is a variety of strategies that can be used to analyse data but this study will use content analysis.

Content analysis is a data analysis strategy that is mostly used in social studies but it can also be applied in other studies (White & Marsh, 2006). It is a research method that is flexible in nature, hence it is applied in a lot of studies such as information studies (White & Marsh, 2006). Content analysis is a research method that is used to analyse and make inferences from texts, interviews, documents, videos, images, open-ended survey questions or focus groups (Fetters et al., 2013). Content analysis has a long history dating back from the 18th period (Hsieh & Shannon, 2005). Prasad (2018) alludes that it is a study of meanings, contexts and intentions contained in messages. The researcher sees images, expressions or texts as representations that should be interpreted, read, comprehended and analysed (Giannantonio, 2010).

Content analysis is a system used to process many words or texts into fewer content categories by following the rules of coding (Chan et al., 2013). The texts or words are broken down into manageable chunks or themes with the aim of examining them and answer the research questions (Harwood & Garry, 2003). It is also alluded that content analysis is a method for subjective interpretations of texts through the coding process by identifying patterns or themes important to social reality (Hsieh & Shannon, 2005).

In content analysis, conclusions can be drawn from the text, message, communicator, surroundings and background of the communicator (White & Marsh, 2006). It is the analysis of what is contained in the message and understanding the characteristics of messages (Prasad, 2018). The objective of content analysis is to have an understanding of the participants' perspectives on a certain topic (White & Marsh,

2006). In this study, data will be collected with the aims of getting an understanding of attitudes of FET teachers when using technology in their lessons.

The main aim in content analysis is to provide understanding and knowledge of a certain phenomenon (Hsieh & Shannon, 2005). In content analysis, the researcher is distant from the participants, the main focus is on the content (texts, images, documents or videos) obtained from the participants (Roller, 2019). This will not in any way jeopardise the integrity of the data coded as there is no relationship between the researcher and the participant (Roller, 2019). Hence it is regarded as the non-reactive and unobstructed method of social research (Prasad, 2018). It goes beyond merely understanding what is contained in the texts or words to understanding the social reality in a scientific and subjective manner (Harwood & Garry, 2003).

In this investigation, the data collected from the interviews, field notes and Likert scales were broken down into manageable chunks or themes with the aim of understanding attitudes of FET teachers when confronted with technology.

3.8 Methodological norms

Trustworthiness in research is the "degree of confidence in data, methods and interpretations used to certify the quality of an investigation" (Beck et al., 2014). Researchers should establish a procedure necessary for an investigation to be considered worthy by readers (Connelly, 2016). The criteria that should be included in the procedure to ensure trustworthiness is credibility, transferability, dependability and confirmability (Connelly, 2016).

Credibility is concerned with whether the reader will believe the findings of the investigation and how congruent the findings are to reality (Maree, 2007). Credibility determines whether the findings signify plausible information taken from participants' data and is accurate (Korstjens & Moser, 2017). In this investigation, credibility was confirmed through lengthy engagement in interviews between the investigator and participants (Nowell et al., 2017). Frequent debriefings were done between the supervisor and the researcher. The use of different data collection techniques was also used to ensure credibility.

Transferability invites readers of the research into the world of the study to be able to make connections amongst elements of the investigation and their experiences

(Maree, 2007). In this study only participants that are typical to the context were selected.

Dependability is recognised through a research design and its application, data gathering and data analysis (Mahoney, 2010). It is alluded that a research design may change as you conduct the study (Kobus, 2007). This can be insured by allowing peers to analyse the process or by providing a comprehensive explanation of the research methods.

Confirmability is the "degree to which the outcomes of the study are moulded by the participants and not with the investigator's interest, drive or bias" (Mahoney, 2010). An audit and peer review were done to trace the course of the research. This was done by taking the results back to the participants to confirm if they agree with them.

3.9 Ethical considerations

Ethical considerations were looked at in this study. Ethical considerations in research state that an investigator is not allowed to conduct research without the consent of the participants (Maree, 2007). Ethical clearance was required from the University of Pretoria Ethical Committee in order to continue with the study. Permission from the Gauteng Department of Education was obtained as well as consent from the principals of the respective schools in order to conduct the study. Consent letters were issued to teachers to determine if they wanted to participate in the study voluntarily. The names of schools and participants were kept anonymous as confidentiality is important (Connelly, 2014). The identity of participants and the identity of schools were secured from being discovered by others by using fictious names (pseudonyms) (Connelly, 2014).

3.10 Summary

In chapter 3, a brief discussion of a paradigm and methodology was given, namely a qualitative study. The research design to be used was also discussed which was a case study research design. An overview of how participants were selected was also discussed and how data will be collected using field notes, Likert scales and semi-structured interviews, followed by how data collected will be analysed looking at the methodological norms and ethical considerations. In chapter 5, the findings will be deliberated with reference to a variety of literature to support the findings.

Chapter 4: Data analysis and Findings

4.1 Introduction

Chapter 4 will present the results of the data collected at schools. Results will be analysed with the aims of solving the research questions by looking at the methodology and data collection methods. Interview responses will be presented in terms of themes and codes from each school. Data was collected from eight teachers, four from each school. The age range from both schools were two teachers aged "23-30 with less than ten years' experience and two teachers aged 40-60 with more than ten years' experience".

4.2 Research Questions

4.2.1 Main research question

- What are the attitudes of FET teachers towards the use of technology in the classroom?

4.2.2 Sub-research questions

- What effect does the use of technology in the classroom have on FET teachers?
- How easy and useful do FET teachers perceive technology?
- What external factors (challenges or benefits) influence the attitudes of FET teachers towards the use of technology in the classroom?

4.3 Data analysis

4.3.1 Participants' information

School A and School B took part in the interview. Below is a biographical table showing teachers of both schools' gender, age, teaching grades and teaching experience.

Table 4.1: Attributes of participants

SCHOOL A					
Participants	**Gender**	**Subjects**	**Grade**	**Age**	**Teaching experience**
1	Female	Physical sciences	10-12	23-30	3 years
2	Female	Sepedi	10-12	23-30	8 years
3	Female	Business Studies	10-12	40-60	12 years
4	Female	IsiZulu	10-12	40-60	15 years
SCHOOL B					
5	Male	Geography	10-12	23-30	5 years
6	Male	Accounting	10-12	23-30	7 years
7	Female	Life Orientation	10-12	40-60	13 years
8	Female	English	10-12	40-60	20 years

4.3.2 Themes derived from Likert scales

A single trait which is the use of technology was measured using Likert scales. The rate of how teachers incorporate technology was measured. Themes such as frequently, occasionally and rarely were deduced. Participants either used technology in the classroom frequently, occasionally or rarely used it.

a) Frequently

A theme of “frequently” was deduced from the participants’ responses. Participants were questioned on how frequently they used technology in the classroom and Participant 6 alluded that he used it frequently (regularly). Participant 6 has been teaching for seven years and is aged between 23-30. Participant 6 had a positive attitude towards the use of technology in the classroom since he used it regularly.

b) Occasionally

A theme of “occasionally” was also deduced from the participants’ responses. From their responses on the question of how frequently they incorporated technology in their lessons, 75% said that they used it occasionally, meaning that they did not use it on a

regular basis. From the participants responses three of them were between the ages of 40-60 and the other three were between the ages of 20-30.

c) Rarely

Another theme that was deduced was “rarely”. When participants were questioned how frequently they incorporate technology in their lessons, Participant 7, who is aged between 40-60 alluded that she rarely “uses technology in the classroom and she has a negative attitude towards the use of technology in the classroom”.

Table 4.2: Frequency of teachers’ technology use

Participants	Frequently	Very frequently	Occasionally	Rarely	Never
1			X		
2			X		
3			X		
4			X		
5			X		
6	X				
7				X	
8			X		

4.3.3 Themes and codes derived from interviews

The identification of themes was constructed from the interview questions from participants, research questions and the theoretical framework. The data collected from the interviews will be discussed under the following themes:

Table 4.3: Themes derived from interview questions

Interview question	Themes	Research Questions
4 and 7	**Attitudes** i) Positive attitudes ii) Negative attitudes	Main-RQ1
1,2,3,4 and 10	**Benefits** i) Learner engagement ii) Classroom management iii) Learner performance iv) Facilitates learning v) Flexibility vi) Effectiveness of technology	Sub-RQ1 and 3
1,3,4,5,6 and 9	**Challenges** i) Lack of resources and theft ii) Disruptive and time consuming iii) Lack of discipline iv) Load shedding v) Lack of training and support vi) Lack of skills	Sub-RQ1 and 3
4	Perceived Ease of use/Usefulness	Sub-RQ2

a) Attitudes

Attitudes can be either positive or negative. A person's attitude can be influenced by certain factors. From the responses of participants, a theme of attitudes was evident in that some participants' attitudes were positive, and some were negative. A discussion of the responses will follow and the link between the TAM, interview questions and research questions will be discussed.

A theme of attitudes was deduced from the participants' responses for Question 4, which asked them to describe their attitudes when confronted with technology, as well

as Question 7, which questioned how participants' attitudes influenced their incorporation of technology in their lessons.

i) Positive attitudes

Findings indicated that four educators had a positive attitude towards the use of technology in the classroom because they saw it as an instrument that reduced their workload and helped with the participation of learners in the classroom. Participant 5 replied that: "*My attitude is positive, the kids love it, they respond well to it, they participate, and it keeps them engaged".* This was also supported by Participant 2: *"I have a positive attitude because it makes learners interested, and they participate in class. Less work and planning for me. Since my attitude is positive it influences me in a good way because I use technology in my class".* It is evident that Participants 2 and 5 had positive attitudes towards the use of technology in the classroom because it helped them with lesson preparation. This was also evident in Participant 6's response: "*My attitude is positive because I am familiar with it, and I am also technology literate.* He also said: "*It influences me in such a way that I use it more frequently".* Participant 1 said: "*I have a positive attitude; therefore, I use technology in the classroom every chance I get".*

ii) Negative attitudes

Three participants alluded that their attitudes are negative when it comes to the incorporation of technology in their lessons as they are technology illiterate; they do not have proper skills in place for them. Participant 3 said: "*I have a negative attitude towards technology because I do not have skills to use technology, I don't want learners to laugh at me".* Participant 4 also indicated that she has a negative attitude towards the use of technology in the classroom: "*My attitude is negative because I am not technology literate. I struggle to use technology in the classroom".* She also said: "*My attitude towards technology is negative because it is difficult to connect to the internet because nowadays, they use virtual meetings like Zoom so it becomes difficult for me to connect".* The last participant whose attitude was negative was Participant 7 who said: "*My attitude towards the use of technology is negative because I rarely use it. I am also not technology literate, obviously I am not going to use it more often and I won't have a positive attitude towards it".*

From the responses of eight participants, four participants (1, 2, 5 and 6) indicated that their attitudes are positive, and three participants (3, 4 and 7) alluded that they have a negative attitude when confronted with technology. Only one participant, which is Participant 8, was not clear as to whether her attitude is positive or negative. She said: *"My attitude towards the use of technology in class is neutral, I cannot say it is a positive one or a negative one because I am used to traditional methods but now, I am forced to use technology in the classroom because learners like it".*

iii) Link to TAM

With reference to the TAM, it can be alluded that teachers who had a positive attitude towards the use of technology in the classroom saw technology as being useful and they also saw it as being easy to use regardless of external aspects that may arise. This will in turn cause them to have a positive attitude in their intentions towards technology, and to their incorporating technology in their lessons. It can also be said that "teachers who have negative attitudes towards the use of technology in the classroom do not perceive technology as being useful or easy to use". A teacher whose attitude is negative when confronted with technology will be unwilling to use it and their actual use will be reduced in the classroom.

b) Benefits

The incorporation of technology in education can bring about benefits and challenges. In the following paragraphs, a discussion of how the inclusion of technology in lessons will benefit teachers. Benefits such as learner engagement, flexibility, classroom management, learner performance, effectiveness of technology and facilitating learning will be deliberated as participants saw them as being benefits of incorporating technology in lessons. Question 2, 3, 4 and 10 of the interview questions are where I studied more about the benefits of using technology in the classroom.

i) Learner engagement

Learner engagement can be explained as a person's enthusiasm and interest for school which will in turn have an impact on their behaviour and academic performance (Trowler, 2010). Learner engagement can also involve learner participation and learner involvement.

The following responses were deduced from interview question 2, which asked: "How did the introduction of technology in your school affect you personally and how did it

affect your classroom?" It can be presumed that teachers use technology in the classroom as it is evident that when they use it learners become more engaged in the lesson. A few teachers alluded that the introduction of technology at school was a positive one as it helped them with learner participation, it made learners to participate in the classroom and be excited to learn. This is evident from Participant 2's response: "*Learners were more engaged as compared to traditional teaching styles".* The response from Participants 5, 7 and 8 also supported Participant 2's response in a sense that the introduction of technology in their schools had a great impact on the learners as it made them happy.

Participant 5: "The kids love it, they respond well to it, they participate, and it keeps them engaged".

Participant 8: "The introduction of technology in my school had a positive effect on our learners. They were very excited to see technology being installed".

Participant 1 replied that: "*Having technology in the classroom makes it easier for me to plan and conduct lessons. Learners in class respond positively towards the use of technology, it captures their attention and makes teaching and learning run smoothly".* Participant 2 also said: "*Engagement of learners influences me to use technology in the classroom because learners become more interested in the lesson".*

On the other hand, Participant 2's response to question 4 of the interview questions which said: "Describe your attitudes towards the use of technology in the classroom" aligned with the theme of learner engagement. She indicated that: "*It makes learners interested, and they participate in class. Less work and planning for me".*

Participant 8 answered question 3 of the interview questions, which asked: "How often do you use technology in the classroom? Why?" She replied that: "*I don't usually use technology in the classroom, but I have come to a realisation that using technology in the classroom makes learners who are shy to participate more involved, so I can say that I am now forced to use it in order to produce good results."* Participant 3 said she uses technology in the classroom occasionally as it helps her with gaining the learners' attention.

From the responses of teachers, it can also be concluded that the inclusion of technology in lessons helps with learner performance, learner involvement and helps

learners to pay more attention as stated by Participant 1: "*It has an effect in classroom management; learners pay attention and the teaching and learning process runs smoothly"*. Participant 8 also said that using technology in the classroom helps with learner performance as she has seen improvements in slow learners: "*I have noticed a change in some of the learners, I have also noticed that their performance has improved. I have also noticed that they become more involved in the lesson when technology is utilised".* This was also supported by Participant 2's response: "*Attention from learners, they become keen to learn, their attitudes towards learning changes".*

ii) Classroom management

Classroom management plays a huge role in the procedure of teaching and learning. Teaching and learning cannot be effective if classroom management is overlooked. Question 10 of the interview questions is where I learnt about classroom management. The question asked: "What benefits do you experience in the use of technology in your classroom?" From the responses of participants, Participant 1 and 2 replied that incorporating technology in the lesson helped them with classroom management. Participant 1 said: "*It has an effect in classroom management, learners pay attention and the teaching and learning process runs smoothly"*. Participant 2 also highlighted that the inclusion of technology in the lesson helps with classroom management: "*Attention from learners, they become keen to learn, their attitudes towards learning changes. Another benefit is that it helps with classroom management".*

iii) Facilitates learning

Facilitating learning can be defined as a way in which the facilitator, which is the teacher, fosters a setting that is favourable for learning (Robinson et al., 2013) . It can be said that facilitating learning is where the facilitator provides an engaging learning experience for participants (Robinson et al., 2013).

From the responses, it can be deducted that the participants' understanding of technology and their usage lie in the fact that it helped them with fostering a vibrant learning environment where learners were interested to learn and made learning easier for them. Participant 1 commented: "*I can say that technology is a tool used to advance teaching and learning".* Participant 2's understanding of technology is that it is a tool that is used to make a classroom a welcoming environment where teaching and learning is interesting. An environment that is conducive for learning will make

learners involved in the lesson. Participant 2 highlighted this: "*Well, according to my understanding the use of technology in the classroom enhances teaching and makes teaching and learning interesting. It also helps learners to pay more attention".*

Participant 3: "Technology in the classroom makes teaching and learning easier, lessons can be well presented and less writing on the chalk board".

Participant 5: "Technology in the classroom is a tool that helps learners understand better. It keeps them entertained and makes learning fun and more familiar to them".

iv) Flexibility

Flexibility in the classroom means having a range of instructional and learning methods. The inclusion of technology means that a teacher can be versatile in his or her teaching and learning methods. For example, they can send learners notes and activities using WhatsApp, they can also accommodate a variety of learning styles for different learners.

From the responses of eight participants, four participants indicated that technology is flexible in such a way that they can send their learners work while they are at home, it also reduces paperwork, and they are able to do research. Participant 4 said: "*Less paperwork. It is easier for learners to do research work as they can even download previous question papers and memorandums to revise".* Participant 6 agreed: "*I can access the kids outside the classroom via WhatsApp and learners can also prepare in advance".*

v) Effectiveness of technology

As much as there is technology in the classroom, the most vital part is how effective and successful its implementation will be. Six teachers answered that they found the inclusion of technology in lessons effective in their phase and learning area. This was indicated by Participant 1: "*It is effective. I am teaching a practical subject. I get to show my learners pictures and videos of some of the content. It helps them remember and fully understand the topic".* Participant 4 agreed that the use of technology is effective in her phase and subject as she is an IsiZulu teacher: "*We are using it so effectively, and it is effective in our phase and subject because language books were easily accessed on the smartboard, and it was simpler and faster than using a chalk to write on the board".*

It can be concluded that FET teachers found the use of technology effective in their phase and subject because it accommodated a variety of learning styles such as visual learners. It was indicated that technology in the classroom is effective because it helped learners to understand better.

c) Challenges

The challenges of using technology in the classroom were deduced from interview questions 3, 4, 5, 6 and 9. Challenges like lack of resources and theft, technology being time consuming, lack of discipline and disruptive learners, load shedding, lack of training and support and lack of skills were mentioned.

i) Lack of resources and theft

Resources play a huge part in the incorporation of technology in education. The lack of resources may lead one to not use technology in the classroom. From the responses, it was deduced that two respondents incorporated technology in their lessons occasionally since there are not enough resources to use it as frequently as they wish they could. Participant 1 said: "*Our classrooms are not well equipped with technology".* Participant 5 also indicated that the reason they use technology occasionally, is because they do not have the required resources such as speakers which makes it difficult for him to utilise technology in the classroom, as the speakers are only reserved for Grade 12 learners. This is the response from Participant 5: "*There are not a lot of resources such as speakers and it is restricted to some learners. It is only reserved for Grade 12 learners."*

From question 9 of the interview questions, a challenge of lack of resources was also deduced. This question was posed to find out the challenges that teachers experience when using technology in the classroom. From the responses of teachers, it can be alluded that the most common challenge that teachers experienced when using technology in the classroom was a lack of resources. Although there are smartboards in the classroom, they do not function well. This was indicated by Participant 1: "*Smartboards not functioning properly at certain times".* Participant 5 also said: "*Lack of facilities*".

Participant 2 and 3 stated that their pupils do not have access to technological devices at home and this makes it difficult for them to include technology in their classroom. Participant 3 said: *"Learners do not have laptops, there's not enough time to practice*

at home, the rate of crime is too high in our community, not enough resources and our classes are not safe". Participant 2 agreed: "*Most learners do not have access to any kind of technological devices. Before Covid learners were able to share tablets, but now it is difficult".*

Another challenge that was common was the issue of theft whereby school technological resources are stolen by community members.

ii) Lack of time

Lack of time is also a challenge that was mentioned by the teachers. Participant 3 indicated that they incorporated technology only occasionally as it proved disruptive in the process of teaching and learning. She also highlighted that it was time consuming: "*It is time consuming and overcrowded classrooms delay the process of teaching and learning. It also affects the progress, goal and aim of a teacher".* Participant 7 said: "*It distracts the entire process of teaching and learning, and it is time consuming because most time is spent on learners teaching me how to use the technological device",* hence she rarely used technology in the classroom. It can then be concluded that Participants 3 and 7 do not incorporate technology as often as they would like since technology is time consuming.

iii) Lack of discipline and class disruption

Discipline plays a huge role when technology is used in the classroom. It can be very difficult to involve technology in the classroom if one cannot maintain discipline in the classroom. A lot of public schools are facing a huge challenge of discipline in general.

From the responses of eight teachers, three teachers agreed that their most common challenge that they experienced when using technology in the classroom, was maintaining discipline. Learners tended to be over excited and forgot that they were in a class to learn. According to Participant 8: *"Our learners become more excited when using technology and they can become very disruptive in class".* Participant 7 also said: *"Often a challenge that I encounter when I attempt to use technology in class is to maintain discipline. Learners become out of order and another challenge is that I am illiterate".* Since learners were given tablets to use for learning purposes, some teachers complained that learners used those tablets to log in to social media platforms while they should be using them for learning purposes and that disrupted the process of teaching and learning. Participant 4 highlighted: "*Learners do not focus*

on learning, they use their tablets for WhatsApp, Facebook and watching movies and as a result distract from learning".

Participants were questioned on how often they incorporated technology in their lessons and why. From the responses of educators, it was deduced that three teachers indicated that they had a challenge of disruptive learners when using technology in the classroom as learners became very excited when technology was involved. This was indicated by Participant 4: "*Learners become very excited and lose focus hence I use it occasionally".* Participant 3 also *indicated* that they "use technology in the classroom occasionally as it is disruptive and delays the process of teaching and learning".

iv) Load shedding

Load shedding is already a pandemic on its own. When participants were asked which factors influence their attitudes when utilising technology in the classroom, load shedding was one factor that influenced their attitudes in a negative way. From the eight participants one participant alluded that it was difficult for them to plan for the next day as they did not know if there would be load shedding or not hence their negative attitudes. Participant 3 said: "*Load shedding makes it difficult for me to plan for the next day because I might not be informed if there will be load shedding, imagine preparing a whole lesson, then "boom" load shedding happens while you are in class".*

v) Lack of training and support

Lack of training and support is another challenge that hinders most instructors when deciding to incorporate technology in their lessons. This also causes them to have a negative attitude towards the use of technology in the classroom. When participants were asked how the introduction of technology in the classroom affected them and the classroom, two respondents indicated that the introduction of technology in education was difficult for them as they were not trained to use technology. Participant 3 said: "*It was difficult the first time due to lack of knowledge like being unable to connect and use it but through workshops it became easy to use it".* Participant 4 alluded that she struggled with the basics of switching on the smartboard, this is evidence enough that they needed training: "*I was a little bit nervous and, in the classroom, sometimes learners would help me to switch it on and off because they know technology more than us".*

When participants were asked which factors influenced their attitude when confronted with technology, three of the eight respondents mentioned that their attitudes were influenced by a challenge of proper training and support on how to incorporate technology in their lessons. This was mentioned by Participant 7: "*Being illiterate makes it difficult to use technology in the classroom, imagine the embarrassment I have when learners teach me a simple thing like switching on a smartboard or computer".* Participant 4 said: *"There is no proper training for us, there is no support and motivation to use technology in the classroom".* The third participant who also had a challenge of lack of training was Participant 8, she alluded that she preferred not to incorporate technology in her lessons as she did not know how to use it: "*I don't know how to use it or rather how to involve it in my lessons".*

vi) Lack of skills

Skills are needed to do something well. One cannot use technology in the classroom without technological expertise.

A challenging issue that makes teachers have a negative attitude when confronted with technology is "lack of skills". Participant 3 mentioned: "*I have a negative attitude towards technology because I do not have skills to use technology, I don't want learners to laugh at me".* Participant 4 agreed: "*I am not technology literate. I struggle to use technology in the classroom".* Two educators alluded that they did not find technology being effective because they had no idea how to utilise it in their subjects. This was said by Participant 8: "*I am an English teacher and I feel like it is not effective because in English more attention is paid to reading and writing, I do not know how I am going to involve technology in my English lessons".* Participant 2 stated: "*To a certain extent. My subject is Sepedi and we do not use much internet".*

vii) Link to TAM

With reference to TAM, it can be concluded that educators who see the benefits of incorporating technology in their lessons will have more positive attitudes towards it, and they are more likely to perceive it as being useful and easy to use. This also answers the third sub research question, which is: "What external factors (challenges or benefits) influence the attitudes of FET teachers towards the use of technology in the classroom?" From the responses of participants, benefits such as learner participation, learner engagement, learner involvement, facilitates learning and

flexibility were identified as factors that may enhance the attitudes of FET teachers to be positive.

It can also be alluded that lack of resources and theft, lack of discipline and disruption of classes, load shedding, lack of training and support, lack of skills and time are external factors that can have a negative effect on the teacher's use of technology in the classroom and in turn cause them to have a negative attitude towards it. TAM alludes that an individual who does not encounter any external factors when confronted with technology will be more inclined to incorporate it and see it as being useful, as compared to an individual who encounters challenges; they will be less likely to use it.

d) Perceived Ease of use/Usefulness (PEOU/PU)

As stated in the TAM, "perceived usefulness is the extent to which an individual trusts that using a certain system will be beneficial to them, whereas perceived ease of use is the extent to which a person trusts that using a certain system will be effortless" (Sudaryati & Agustia, 2017). In simple terms, if an individual perceives a new system as being easy to use, they will in turn see the usefulness of it (Bugembe, 2010). It is concluded that if an individual perceives the incorporation of technology as being easy to use, they will be more inclined to use it more often regardless of the external factors.

The theme of ease of use and usefulness was learnt from question 2 of the interview questions which asked: "How did the introduction of technology in your school affect you personally and how did it affect your classroom teaching?"

Participant 1 indicated that they perceived the use of technology as being useful and easy to use for them and learners in the classroom: "Personally*, I think technology made teaching and learning easy and I can say it had a positive impact in the classroom. Using technology in the classroom helps grasp the learner's attention since they use technology in their everyday lives".* This was also supported by Participants 3 and 7 who responded to question 1 of the interview questions which asked: "What is your understanding of the use of technology in the classroom?" Participant 3 said: *"Technology in the classroom makes teaching and learning easier, lessons can be well presented and less writing on the chalk board*". On the other hand, Participant 7 said: *"I can say that it is the use of technological devices like smartboards to make*

learning easier". It can then be concluded that Participants 1, 3 and 7 saw technology as being valuable and easy to use regardless of any outside factors.

Some participants saw the use of technology not being useful to them and their learners due to certain reasons. Participant 7 said: *"Both factors make me not use technology in the classroom because I do not see it as being useful, I try by all means to avoid using technology because I will be a laughing stock in front of the learners".* This response was learnt from question 6 of the interview questions which asked: "How does each factor influence your attitude towards technology use?"

The answers from the participants can be linked or used to answer the sub research question of: "What effect does the use of technology in the classroom have on FET teachers?" From the answers, it can be alluded that for some teachers (Participant 1, 3 and 7) technology had a positive effect on them as they mentioned that it made their lives easier and it helped them with learner engagement.

4.3.4 Themes derived from field notes

From the field notes taken by the investigator and observing the conduct of participants, two themes were picked up which were "motivated" and "demotivated". The two themes were grouped according to age and participants responses. It was evident that when participants aged 20-30 were asked questions associated with the incorporation of technology in their lessons, they seemed motivated to answer but when participants aged 40-60 were confronted with the same questions they seemed demotivated to answer.

Participants aged 20-30 provided reasons why they incorporated technology in their lessons. Their responses and behaviour alluded that their use of technology was influenced by the benefits they saw when using technology such as learner engagement. Their behaviour showed that they enjoyed using technology in the classroom and learner engagement is one component that motivated them.

Participants aged 40-60 also provided reasons why they do not use technology in the classroom or have negative attitudes towards it. In their responses they highlighted that they had negative attitudes towards the use of technology in the classroom because of factors like lack of skills and load shedding. In the behaviour while answering the questions, it showed that they were having negative attitudes towards

the use of technology because they were demotivated, not excited or eager to answer the questions.

4.4 Findings

The next section will discuss the results with reference to the TAM explained in Chapter 3 of the theoretical framework. Aspects in the TAM will be briefly discussed and be used as a point of reference to discuss the results. The aspects in the TAM will now be linked to the main research question and the sub-research questions with the aims of answering those questions using the obtained results.

Below is the TAM linked with the research questions:

4.4.1 TAM (Technology Acceptance Model)

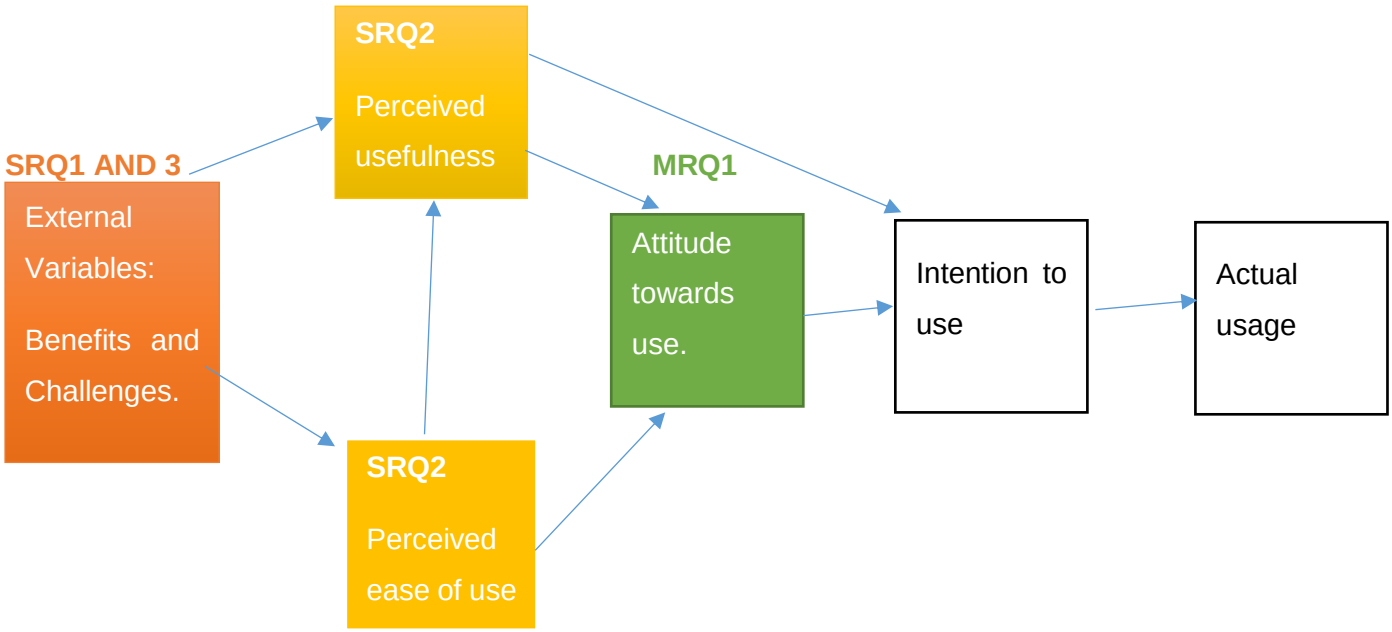

Figure 4.2: First modified version of Technology Acceptance Model (TAM) (Marangunić, 2015) linked to the study's research questions

4.4.2 External variables

The term variable can be something that can change or have more than one value (Kaur, 2013). It refers to something that varies which can be body temperature, weight, height and income or anxiety levels (Kaur, 2013). An external variable can be defined as a factor that can influence a behaviour or a view in a certain system (Hong & Yu, 2018). External variables can also affect the acceptance and the actual use of a system (Hong & Yu, 2018).

From the results obtained from the interviews, a variety of teacher's attitudes, behaviours and views pertaining to using technology were influenced by external variables. External variables will either have a positive or a negative effect on teachers. From the results obtained, benefits and challenges were themes that were identified as the external variables that influence the attitudes of FET teachers towards the use of technology in the classroom. This section and a discussion of benefits and challenges as external variables will answer sub research question 1, which asked: "What effect does the use of technology in the classroom have on FET teachers?" It will also answer sub research question 3, which asked: "What external factors (challenges or benefits) influence the attitudes of FET teachers towards the use of technology in the classroom?"

a) Benefits

It is believed that benefits promote, increase employee commitment and job satisfaction (Klonoski, 2016). Employees who see a system being beneficial will most likely utilise that system more often (Li, 2023). In the results obtained benefits such as learner engagement, classroom management, facilitated learning, flexibility and effectiveness of technology were identified as benefits that teachers saw when using technology in the classroom.

i) Learner engagement

Learner engagement can be defined as the ability of a learner to engage fully in the learning process with the aims of meeting the learning outcomes (Bender, 2017). It is a process whereby learners are given an opportunity to partake in the learning procedure by allowing them to ask questions (Willms, 2003). Teachers can also ask open-ended questions and allow learners to be part of group discussions during activities (Bender, 2017). Learner engagement is a degree of learner curiosity, attention, passion, interest and positivity shown by learners when they are learning or

instructed (Parsons et al., 2014). Studies show that involving pupils in the process of learning fosters learner focus, attention, and inspires them to engage in critical thinking (Bender, 2017). By looking at the results obtained, it is clear that educators saw the use of technology in the classroom as beneficial as it helped them with learner engagement. They alluded that using technology keeps pupils engaged and makes them participate in the lesson as compared to traditional teaching styles.

ii) Classroom management

Classroom management is a role played by a teacher to maintain a disciplined and orderly setting for teaching and learning which in turn fosters academic achievement (Scrivener, 2012). It is alluded that classroom management is not only about keeping order in the classroom or ensuring that learners remain seated, but it is about building strong relationships with the learners and encouraging them to take ownership of their own learning (Oliver, 2007). In classroom management, a teacher and learners can set classroom rules and acceptable behaviour (Chandra, 2015). Sticking to the set rules will foster academic excellence (Chandra, 2015). It is important to engage learners in classroom management in as many ways as possible and get their parents involved (Oliver & Reschly, 2007). From the results obtained, it is evident that teachers saw the use of technology in the classroom being beneficial to them in such a way that it assisted them with classroom management and made the method of teaching and learning run smoothly without any disruptions.

iii) Facilitates learning

Facilitating learning can be defined as a way in which the facilitator which is the teacher, fosters an environment that is conducive for learning (Robinson et al., 2013). It can be said that facilitating learning is where the facilitator provides an engaging learning experience for participants (Robinson et al., 2013). In this study, teachers alluded that technology facilitates learning by making learning interesting and helps learners pay more attention. Others mentioned that their teaching and learning advance when implementing technology in their lessons.

iv) Flexibility

The term flexibility is defined as the ability for something to change easily and be adaptable (Cardin, 2014). Flexibility in education means that learners can learn easily and adapt to new learning pathways that accommodate their learning styles, abilities

and interests (Kokoç, 2019). Concerning this study, technology is seen as a tool that makes teaching and learning flexible in such a way that it accommodates different learning styles. It also allows teachers to be flexible in their teaching methods to accommodate a variety of learners. In flexibility of technology, learners can adapt to new learning pathways (Estaji, 2017).

v) Effectiveness of technology

Technology transforms or changes the method of teaching and learning (Costley, 2014). It makes it more exciting as compared to the traditional ways of teaching (Ghavifekr & Rosdy, 2015). It also improves teaching and learning and makes learning informal and more effective for learners (Tahmina, 2022). Studies show that it also makes instruction for teachers easy and effective as it allows them to be technology versatile and make the content easy for learners (Ghavifekr & Rosdy, 2015). This was evident in the results obtained. Participant 1 said that “the use of technology in the classroom is effective for her as she is teaching a practical subject, which is Physical Sciences”. With the use of technology, she gets to use a range of resources like pictures and videos to help learners understand better.

b) Challenges

i) Lack of resources and theft

Lack of resources can be defined as a shortage or absence of something required to fulfil the required task (Bhika, 2017). It can also mean that there is not enough of the required resource, or it totally does not exist (Florian et al., 2021). In terms of this investigation, it was clear that teachers’ attitudes were also influenced by lack of resources such as shortage of smartboards and computers hence their attitudes were negative, and they became reluctant to include technology in their lessons.

Theft is defined as a crime or an action of stealing something that then results in disadvantaging the owner or the role it is supposed to play (Steel, 2008). This study showed that teachers do not utilise technology in the classroom due to theft in schools. They are being deprived the actual use of technological resources due to them being stolen.

ii) Lack of time

Lack of time is defined as taking a lot of time or spending too much time on something (Shove et al., 2020). In this investigation, it was evident that teachers who do not use

technology in the classroom complained that technology took up a lot of their time. They spent a huge amount of time on the use of technology other than schooling. They highlighted that it was more time consuming in an overcrowded classroom as most of the time was spent on trying to maintain discipline. Some teachers said that using technology in the classroom was time consuming because most of the time was spent on learners educating the teacher on how to use technology.

iii) Lack of discipline and disruption of classes

Lack of discipline is the way of not behaving in a controlled way, which involves not obeying the standards and rules set by a particular person or an organisation (Jinot, 2018). In this investigation, it was clear that teachers did not use technology in their classrooms or had negative attitudes towards the use of technology because learners lacked discipline when technology was used. When technology was used in the classroom, learners would become out of order and not focus on the process of learning and in turn distracted the entire process of teaching and learning.

The term “disruptive” means causing trouble and in turn stopping something from continuing as normal or usual (Khasinah, 2017). Learners can also be disruptive by making noise and not listening to the teachers (Stavnes, 2014). Disruptive behaviour prohibits teaching and learning to take place (Khasinah, 2017). In terms of this study, learners were making a noise and being disruptive in class, while the teacher was teaching using technology; this in turn caused the teacher to develop a negative attitude choosing not to utilise technology.

iv) Load shedding

Load shedding can be defined as an action of interrupting or switching off electricity with the aims of saving it or avoiding excessive costs (Nowakowska, 2015). It can also be defined as a deliberate shutdown of electricity (Lenoke, 2017). South Africa is currently facing load shedding (Nowakowska, 2015). In this study and the results obtained, it was evident that educators did not include technology in their lessons due to load shedding because you would plan your lesson well, and the type of technology to be used, only to find out that when it was time for your lesson to begin, there was no electricity. This then became a problem because it hindered instruction and learning, hence teachers chose not to use technology in the classroom and ended up having negative attitudes towards it.

v) Lack of training and support

Lack of training can be defined as a stage whereby employees or workers do not understand how to do their jobs (Nassazi, 2013). It is also said to be the absence of resources and proper instructional facilities (Habib et al., 2015). This in turn can lead to low morale, reduced productivity, unsatisfactory and unhappy employees (Nassazi, 2013). In this study it was evident in the results obtained that educators whose attitudes were negative when confronted with technology were partly because of lack of training. Teachers were not properly trained on how they should include technology in their lessons. They struggled to switch a smartboard on and off, and to connect and would ask learners to assist them.

Lack of support can be said to be the lack of motivation and encouragement to someone (Mupa & Chinoonelva, 2015). Support can also be defined as the supply of necessary things in order to achieve a certain goal (Business, 1997). Employees or people who do not receive support from their supervisors will not do their jobs successfully, in turn affecting the overall goal of the organisation (Mupa & Chinoonelva, 2015). In terms of this study, teachers complained that they did not have motivation and encouragement from their supervisors concerning technology, hence they did not utilise technology in their lessons and had negative attitudes towards it.

vi) Lack of skills

Lack of skills means not being able to do something well (Braňka, 2016). It is also defined as the inability to do something or perform well (Joynes et al., 2019). In this study, educators stressed that they did not include technology in their lesson since they lacked skills vital for the successful technology implementation. It was evident that educators who had negative attitudes towards the use of technology in the classroom was because they were not literate, they struggled to incorporate technology in their lessons and some stated that they did not want learners to laugh at them as they did not have proper technological skills.

4.5 Perceived usefulness and perceived ease of use

The term usefulness is something that can be used effectively (Waite, 2012). Perceived usefulness is said to be the belief of a user that using certain technologies can improve work performance (Jahangir & Begum, 2008). It “is the extent to which an individual trusts that using an information system would improve their job performance” (Samuel, 2018). It is expected that when technology is used it will

improve the user's performance (Hamid et al., 2016). It can also be said that when technology is used, it enhances productivity in an organisation or from the user (Samuel et al., 2018). According to Hamid et al. (2016), "perceived usefulness is the level at which an individual trusts that using a specific technology would be advantageous". As a person's perceived usefulness of a given technology increases, their intention to use it also increases (Hamid et al., 2016).

From the results obtained, it can be said that teachers who believed and saw the use and benefits of technology in the classroom, their intention to use technology in the classroom increased. It can also be said that from the results there were teachers who believed that incorporating technology in their lessons would enhance productivity and performance. Hence, they used it more often and their attitudes towards it was positive. It is believed that the inclusion of technology in education makes instruction and learning easy and has a positive impact. It also helps to grasp learners' attention in the classroom.

Perceived ease of use is the "extent to which a person trusts that using a certain system would be effortless" (Hamid et al., 2016). It can also be defined as something that is easy to use (Sandema-Sombe, 2019). As an individual's "perceived ease of use of using a given technology rises, their intention to use technology also rises" (Venkatesh, 2000). From the results obtained, it was clear that teachers who saw the use of technology in the classroom as being free of effort developed positive attitudes, and their intention to make use of technology increased. With the incorporation of technology in education, lessons can be well presented using smartboards, which then decreases writing on the chalkboard. It can be understood that the incorporation of technology in lessons makes instruction and learning easy.

In conclusion, it can be understood that when teachers see how useful and easy it is to use technology, it fosters a positive attitude in them and increases their intention for actual usage.

4.6 Attitude towards use

An attitude can be defined as the way of thinking and behaving (Waite, 2012). It is the way in which a person feels about something or when a person has an opinion about something (Altmann, 2008). It is also alluded that an opinion can either be positive or negative, the same applies to attitudes (Olufemi, 2012). In this study, teachers were

confronted with the use of technology in the classroom with the aim of finding out their attitudes towards it. From the results obtained, two attitudes were deduced which were negative and positive attitudes. Below is a discussion of those attitudes:

4.6.1 Positive attitude

A positive attitude is being optimistic about situations (Kabir, 2013). Often individuals with positive attitudes are optimistic and see the best even in tough situations (Guedes et al., 2013). It is also said to be a mind-set that helps one recognise opportunities (Kabir, 2013). Guedes et al. (2013) alludes that it is positive thinking. In the results obtained, four participants stated that they had “positive attitudes” towards the use of technology in the classroom, meaning that they were optimistic, and they recognised the opportunities technology brought to education. The participants stated that they incorporated technology in their lessons since the kids loved it and it made them participate and be involved in the entire lesson. They also said that it made lesson preparation easier and reduced workload.

4.6.2 Negative attitude

A negative attitude can be defined as a feeling that is not optimistic or cooperative (Stark et al., 2013). It can be said to be a pessimistic or a difficult outlook on the environment (Briñol et al., 2019). Studies show that individuals with negative attitudes often overlook the good and pay attention to the bad (Stark et al., 2013). From the results obtained, three teachers said they had “negative attitudes” towards the use of technology in their lessons because they were illiterate when it came to using technology in the classroom.

It can be concluded that external variables (benefits and challenges) determine whether one will perceive the use of technology in the classroom as being useful or easy to use. How a person perceives the inclusion of technology will then determine whether that person will have a positive or a negative attitude towards it and influence the intent to use and the actual usage of those technologies.

4.7 Conclusion

Findings from the semi-structured interviews revealed that there are participants whose attitudes are negative towards technology due to external factors such as load shedding. There are also participants who stated that they had positive attitudes towards the use of technology in the classroom as it fostered learner participation. It

can also be recognised that participants who said they had positive attitudes were between the ages 23-30 and had less than ten years' teaching experience, whilst participants who said they had negative attitudes were between the ages 40-60 with more than ten years' experience.

Likert scales were used to gather data with the intention of measuring a single trait which is "the use of technology in the classroom". Likert scales measured how frequently educators incorporated technology in their lessons and the results revealed that 75% of educators occasionally used technology in the classroom, 12.5% of teachers showed that they frequently used technology in the classroom and lastly, 12.5% of teachers indicated that they rarely incorporated technology in their lessons. From the Likert scale outcomes, it can be said that teachers aged 23-30 used technology in the classroom more frequently as compared to teachers aged 40-60.

As an investigator, I have noticed that when teachers aged 20-30 were asked questions relating to the incorporation of technology in their lessons, they seemed excited and happy to answer but when teachers aged 40-60 were asked the same questions they were not as excited; instead, they just wanted to answer the questions and get done with the interview. It seemed as if they were demotivated.

Chapter 5: Recommendations and Conclusions

5.1 Introduction

Chapter 5 presents the recommendations for future research. It is also a summary of the study, the limitations and contributions and concluding facts.

5.2 Summary

The goal of this investigation was to investigate the attitudes of FET teachers towards the use of technology in the classroom. To attain this goal, the following questions needed to be answered:

5.2.1 Main research question

- What are the attitudes of FET teachers towards the use of technology in the classroom?

5.2.2 Sub-research questions

- What effect does the use of technology in the classroom have on FET teachers?
- How easy and useful do FET teachers perceive technology?
- What external factors (challenges or benefits) influence the attitudes of FET teachers towards the use of technology in the classroom?

Chapter 2 extensively focused on what the term ‘attitudes’ means. Thereafter the study focused on the components of attitudes looking at a variety of sources. The main aspects that the literature focused on were the attitudes of teachers when confronted with technology, and the different aspects between positive and negative attitudes were briefly discussed. Furthermore, external aspects that may affect using technology in class were also discussed. Intrinsic and extrinsic barriers were looked at as aspects that may hinder technology use in classrooms.

As deliberated in Chapter 3, this investigation was a qualitative study, which used a case study to collect data from school A and school B using purposive sampling. Data was collected using semi-structured interviews, field notes and Likert scales. Data was analysed using content analysis.

Chapter 4 presented the data and its analyses. This was completed in accordance with what the study sought to achieve in terms of the main and sub research questions. The chapter began by presenting a biographical table with participants’ information

with attributes such as gender, subjects, grade, age and teaching experience. It then went on to discuss themes from Likert scales, interviews and how the Technology Acceptance Model linked with the entire study.

5.3 Recommendations

This study was important, as it provided suggestions regarding the attitudes of FET educators towards the use of technology in the classroom. The main goal of this investigation was to find out if teachers' attitudes would be positive or negative when using technology in the classroom and the reasons for this.

A recommendation to the Department of Education would be to come up with programmes that would address the challenges teachers' encounter when using technology in the classroom. For example, a challenge of lack of skills can be solved by designing workshops or seminars to educate teachers with proper technological skills that are needed in the FET classroom. From the educators who said that they have positive attitudes, the Department of Education could initiate workshops whereby these teachers could support and motivate their colleagues who have negative attitudes towards the use of technology in the classroom.

Future researchers could conduct the same study but look at a different phase; they could also compare how teachers from the rural areas respond to technology as compared to teachers in urban areas. A comparison of public and private schools could also be a recommendation to upcoming researchers to compare attitudes of public school educators and private school educators when confronted with technology.

This investigation could assist future researchers into conducting studies of how to change teachers' negative attitudes into positive attitudes. They could conduct studies of how to address the challenges FET educators deal with when using technology in their lessons.

5.4 Contribution of the study

Firstly, the Department of Education can benefit from this study. The Department of Education has introduced technology in schools, but the question remains as to whether the policymakers are aware of how those technologies are being used, and what the attitudes of the teachers are since the implementation of technology. Findings alluded that most teachers who have positive attitudes were teachers aged 23-30

while teachers who had negative attitudes were aged 40-60. The question remains as to how to change the attitudes of those teachers who feel negatively towards the use of technology in the classroom.

The benefits of this research are that it could bring about awareness regarding the attitudes of FET teachers towards the use of technology in the classroom, not only to the Department of Education, but to fellow educators, principals, the School Management Team (SMT) and the School Governing Body (SGB). This awareness would motivate schools to assess their FET teachers' attitudes towards the use of technology in the classroom and provide positive solutions.

The most important contribution of this investigation is the "teacher's voice". This investigation gave educators a platform to voice their issues when it comes to technology. The "teacher's voice" provides reasons to the Department of Education as to why educators' attitudes towards technology in the classroom are positive or negative.

5.5 Limitations

This study is limited because it only looked at FET phase teachers' use of technology in Grade 10-12 classrooms. Future researchers could investigate a different phase and compare the results. In this study, age was a limitation as teachers between the ages 23-30 and 40-60 were investigated; what about those aged between 31-39 and 61-65? The schools investigated were quintile 4, non-fee-paying schools. This can be a limitation as there is no comparison between fee-paying and non-fee-paying schools. Subsequent investigations could find that results vary greatly should fee-paying schools be investigated.

5.6 Conclusions

Looking at the results and the collected works, the subsequent assumptions can be drawn from the study. The results revealed that educators who said that they have a negative attitude towards the use of technology in the classroom are between the ages of 40-60. They mentioned that they do not have the proper skills needed for technological use, hence they do not use technology in the classroom. Those who had positive attitudes were between ages 23-30 and they said that their use of technology helped to keep learners engaged in the classroom. From the results, it can be said that teachers aged 40-60 are more comfortable with traditional methods of teaching

while teachers aged 23-30 are more comfortable with using technology in the classroom.

There are various factors that influence the incorporation of technology in education and cause educators to either have positive or negative attitudes when confronted with technology. Educators whose attitudes are negative when confronted with technology said that it was due to load shedding, lack of time, lack of skills etcetera. Those with positive attitudes said that they incorporate technology in their lessons as it helped them keep learners engaged in the lesson.

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Appendices

Appendices A: Research approval letter

GAUTENG PROVINCE
Department: Education
REPUBLIC OF SOUTH AFRICA

8/4/4/1/2

GDE RESEARCH APPROVAL LETTER

Date:	27 July 2021
Validity of Research Approval:	27 July 2021 - 30 September 2021 2021/200
Name of Researcher:	Maphosa M.P.
Address of Researcher:	37160 Milenyane Street
	Mamelodi East
	Lusaka Ext 22, 0122
Telephone Number:	071 4577 485
Email address:	u16096933@tuks.c0.za
Research Topic:	The attitudes of FET teachers towards the use of technology in the classroom.
Type of qualification	M.Ed Degree in Education
Number and type of schools:	02 Secondry Schools
District/s/HO	01 Districts

Re: Approval in Respect of Request to Conduct Research

This letter serves to indicate that approval is hereby granted to the above-mentioned researcher to proceed with research in respect of the study indicated above. The onus rests with the researcher to negotiate appropriate and relevant time schedules with the school/s and/or offices involved to conduct the research. A separate copy of this letter must be presented to both the School (both Principal and SGB) and the District/Head Office Senior Manager confirming that permission has been granted for the research to be conducted.

27/07/2021

The following conditions apply to GDE research. The researcher may proceed with the above study subject to the conditions listed below being met. Approval may be withdrawn should any of the conditions listed below be flouted:

1. *Letter that would indicate that the said researcher/s has/have been granted permission from the Gauteng Department of Education to conduct the research study.*

1

Making education a societal priority

Office of the Director: Education Research and Knowledge Management
7th Floor, 17 Simmonds Street, Johannesburg, 2001
Tel: (011) 355 0488
Email: Faith.Tshabalala@gauteng.gov.za
Website: www.education.gpg.gov.za

2. *The District/Head Office Senior Manager/s must be approached separately, and in writing, for permission to involve District/Head Office Officials in the project.*
3. ***Because of COVID 19 pandemic researchers can ONLY collect data online, telephonically or may make arrangements for Zoom with the school Principal. Requests for such arrangements should be submitted to the GDE Education Research and Knowledge Management directorate. The approval letter will then indicate the type of arrangements that have been made with the school.***
4. ***The Researchers are advised to make arrangements with the schools via Fax, email or telephonically with the Principal.***
5. *A copy of this letter must be forwarded to the school principal and the chairperson of the School Governing Body (SGB) that would indicate that the researcher/s have been granted permission from the Gauteng Department of Education to conduct the research study.*
6. *A letter / document that outline the purpose of the research and the anticipated outcomes of such research must be made available to the principals, SGBs and District/Head Office Senior Managers of the schools and districts/offices concerned, respectively.*
7. *The Researcher will make every effort obtain the goodwill and co-operation of all the GDE officials, principals, and chairpersons of the SGBs, teachers and learners involved. Persons who offer their co-operation will not receive additional remuneration from the Department while those that opt not to participate will not be penalised in any way.*
8. *Research may only be conducted after school hours so that the normal school programme is not interrupted. The Principal (if at a school) and/or Director (if at a district/head office) must be consulted about an appropriate time when the researcher/s may carry out their research at the sites that they manage.*
9. *Research may only commence from the second week of February and must be concluded before the beginning of the last quarter of the academic year. If incomplete, an amended Research Approval letter may be requested to conduct research in the following year.*
10. *Items 6 and 7 will not apply to any research effort being undertaken on behalf of the GDE. Such research will have been commissioned and be paid for by the Gauteng Department of Education.*
11. *It is the researcher's responsibility to obtain written parental consent of all learners that are expected to participate in the study.*
12. *The researcher is responsible for supplying and utilising his/her own research resources, such as stationery, photocopies, transport, faxes and telephones and should not depend on the goodwill of the institutions and/or the offices visited for supplying such resources.*
13. *The names of the GDE officials, schools, principals, parents, teachers and learners that participate in the study may not appear in the research report without the written consent of each of these individuals and/or organisations.*
14. *On completion of the study the researcher/s must supply the Director: Knowledge Management & Research with one Hard Cover bound and an electronic copy of the research.*
15. *The researcher may be expected to provide short presentations on the purpose, findings and recommendations of his/her research to both GDE officials and the schools concerned.*
16. *Should the researcher have been involved with research at a school and/or a district/head office level, the Director concerned must also be supplied with a brief summary of the purpose, findings and recommendations of the research study.*

The Gauteng Department of Education wishes you well in this important undertaking and looks forward to examining the findings of your research study.

Kind regards

.....

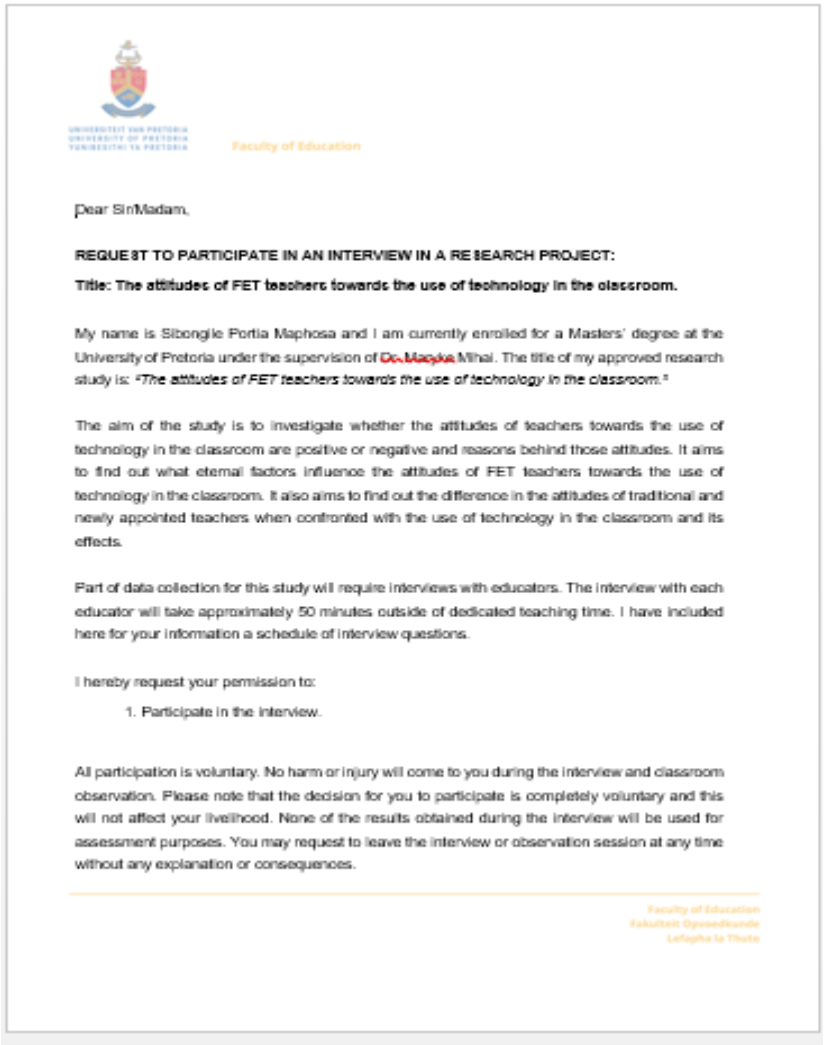
Mr Gumani Mukatuni
Acting CES: Education Research and Knowledge Management

DATE: 27/07/2021

Making education a societal priority

Office of the Director: Education Research and Knowledge Management
7th Floor, 17 Simmonds Street, Johannesburg, 2001
Tel: (011) 355 0488
Email: Faith.Tshabalala@gauteng.gov.za
Website: www.education.gpg.gov.za

Appendices B: Consent letter to the principal



Faculty of Education

Dear Sir/Madam,

REQUEST TO PARTICIPATE IN AN INTERVIEW IN A RESEARCH PROJECT:

Title: The attitudes of FET teachers towards the use of technology in the classroom.

My name is Sibongile Portia Maphosa and I am currently enrolled for a Masters' degree at the University of Pretoria under the supervision of Dr. Magda Mihai. The title of my approved research study is: *"The attitudes of FET teachers towards the use of technology in the classroom."*

The aim of the study is to investigate whether the attitudes of teachers towards the use of technology in the classroom are positive or negative and reasons behind those attitudes. It aims to find out what eternal factors influence the attitudes of FET teachers towards the use of technology in the classroom. It also aims to find out the difference in the attitudes of traditional and newly appointed teachers when confronted with the use of technology in the classroom and its effects.

Part of data collection for this study will require interviews with educators. The interview with each educator will take approximately 50 minutes outside of dedicated teaching time. I have included here for your information a schedule of interview questions.

I hereby request your permission to:

1. Participate in the interview.

All participation is voluntary. No harm or injury will come to you during the interview and classroom observation. Please note that the decision for you to participate is completely voluntary and this will not affect your livelihood. None of the results obtained during the interview will be used for assessment purposes. You may request to leave the interview or observation session at any time without any explanation or consequences.

Faculty of Education
Fakulteit Opvoedkunde
Lefapha la Thuto

As part of the data collection I will be using an audio recorder to capture the interviews for research purposes. The purpose of the audio recorder is to capture and transcribe the data accurately. All information obtained during the research study will be treated confidentially. My supervisor and I will have access to the data. The names of educators, principal or school will not be mentioned during any phase of the study. Furthermore, pseudonyms will be used to avoid identification of the educator and school.

At the end of the study, I will provide the school with a copy of the dissertation containing both the findings of the study and recommendations. In addition, I would like to request your permission to use all data, confidentially and anonymously, for further research purposes, as the data sets will become intellectual property of the University of Pretoria. Further research may include secondary data analysis and use of the data for teaching purposes. The confidentiality and privacy applicable to this study will be binding on future research studies.

All the information obtained during the research study will be treated confidentially, with not even the University of Pretoria or the Department of Education having access to the raw data obtained from the interviews. At no time will either you as an individual or the school be mentioned by name or be allowed to be identified by any manner or means whatsoever in the dissertation.

Thanking you in anticipation.

Ms S. P. Maphosa
Student Researcher
University of Pretoria
u18096933@tuks.co.za
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Dr. M. Mihai
Supervisor
University of Pretoria
marvise.mihai@up.ac.za
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LETTER of CONSENT

SCHOOL PARTICAPATION
VOLUNTARY PARTICIPATION IN THE RESEARCH PROJECT ENTITLED:

The attitudes of FET teachers towards the use of technology in the classroom

I, _____ (Full name) the principal of

_____

Please tick the appropriate block

Give consent ☐

Do not give consent ☐

to allow my school to participate in the above-mentioned study introduced and explained to me by Ms. Sibongile Portia Maphosa, currently a student enrolled for a Master's degree at the University of Pretoria.

I further declare that I understand, as explained to me by the researcher, the aim, scope, and purpose of collecting information proposed by the researcher, as well as how the researcher will attempt to ensure the confidentiality and integrity of the information she collects.

_____ _____

Full name Signature

_____

Date School stamp

Appendices C: Consent letter to teacher participants

Faculty of Education

Dear Sir/Madam,

REQUEST TO PARTICIPATE IN AN INTERVIEW IN A RESEARCH PROJECT:

Title: The attitudes of FET teachers towards the use of technology in the classroom.

My name is Sibongile Portia Maphosa and I am currently enrolled for a Masters' degree at the University of Pretoria under the supervision of Dr. Magda Mihai. The title of my approved research study is: *"The attitudes of FET teachers towards the use of technology in the classroom."*

The aim of the study is to investigate whether the attitudes of teachers towards the use of technology in the classroom are positive or negative and reasons behind those attitudes. It aims to find out what eternal factors influence the attitudes of FET teachers towards the use of technology in the classroom. It also aims to find out the difference in the attitudes of traditional and newly appointed teachers when confronted with the use of technology in the classroom and its effects.

Part of data collection for this study will require interviews with educators. The interview with each educator will take approximately 50 minutes outside of dedicated teaching time. I have included here for your information a schedule of interview questions.

I hereby request your permission to:

1. Participate in the interview.

All participation is voluntary. No harm or injury will come to you during the interview and classroom observation. Please note that the decision for you to participate is completely voluntary and this will not affect your livelihood. None of the results obtained during the interview will be used for assessment purposes. You may request to leave the interview or observation session at any time without any explanation or consequences.

Faculty of Education
Fakulteit Opvoedkunde
Lefapha la Thuto

As part of the data collection I will be using an audio recorder to capture the interviews for research purposes. The purpose of the audio recorder is to capture and transcribe the data accurately. All information obtained during the research study will be treated confidentially. My supervisor and I will have access to the data. The names of educators, principal or school will not be mentioned during any phase of the study. Furthermore, pseudonyms will be used to avoid identification of the educator and school.

At the end of the study, I will provide the school with a copy of the dissertation containing both the findings of the study and recommendations. In addition, I would like to request your permission to use all data, confidentially and anonymously, for further research purposes, as the data sets will become intellectual property of the University of Pretoria. Further research may include secondary data analysis and use of the data for teaching purposes. The confidentiality and privacy applicable to this study will be binding on future research studies.

All the information obtained during the research study will be treated confidentially, with not even the University of Pretoria or the Department of Education having access to the raw data obtained from the interviews. At no time will either you as an individual or the school be mentioned by name or be allowed to be identified by any manner or means whatsoever in the dissertation.

Thanking you in anticipation.

Ms S. P. Maphosa
Student Researcher
University of Pretoria
u16098833@tuks.co.za
071 457 7485

Dr. M. Mihai
Supervisor
University of Pretoria
marylse.mihai@up.ac.za
082 430 2928

LETTER of CONSENT

INDIVIDUAL CONSENT

VOLUNTARY PARTICIPATION IN THE RESEARCH PROJECT ENTITLED

The attitudes of FET teachers towards the use of technology in the classroom

I, _____. (Full name)

Please tick the appropriate block

Give consent ☐

Do not give consent ☐

To participate as an individual in the above-mentioned study introduced and explained to me by Ms. Sibongile Portia Maphosa, currently a student enrolled for a Master's degree at the University of Pretoria.

I further declare that I understand, as explained to me by the researcher, the aim, scope, and purpose of collecting information proposed by the researcher, as well as how the researcher will attempt to ensure the confidentiality and integrity of the information she collects.

_____ _____

Full name Signature

_____

Date School stamp

Appendices D: Interview questions for participants

INTERVIEW QUESTION 8

1. What is your understanding of the use of technology in the classroom?
2. How has the introduction of technology in your school affected you?
3. How often do you use technology in the classroom? Why?

Frequently	Very Frequently	Occasionally	Rarely	Never

4. Describe your attitudes towards the use of technology in the classroom.
5. What factors influence your attitude towards the use of technology in the classroom?
6. How does each factor influence your attitude towards technology use?
7. Do you find the use of technology effective in your phase and subject? Explain why or why not.
8. How much do you agree with these statements on the use of technology in the classroom?

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
It is easy to use technology in the classroom.					
Using technology in the classroom makes the process of teaching and learning easier.					
Being technology literate makes it easier to use technology in the classroom.					
Technology in the FET classroom is useful.					
Newly appointed teachers respond well to technology in the classroom as compared to traditional teachers.					
Traditional methods of teaching are much better than technological teaching methods.					