# The acceptance of electronic textbooks on tablets by teachers in secondary schools.

Full-dissertation by

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**(28345089)**

**Submitted in partial fulfilment of the requirements of the degree**
**MASTER IN INFORMATICS**

**in the**

**Faculty of Economic and Management Sciences**

**University of Pretoria**

**Pretoria**

**South Africa**

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**Date of submission: 31 October 2018**

# DECLARATION

I, the undersigned Sarah Mello, hereby declare that this study is my own work. The study has been compiled and submitted in fulfilment of the degree of Master in Informatics in the Department of Informatics, Faculty of Economic and Management Sciences.


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# AKNOWLEDGEMENTS

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# ABSTRACT

The rapid growth of technology in devices and applications has introduced several ways of doing things in organisations and in education. The introduction and growth of smaller devices provides an advantage in teaching nowadays. These smaller devices are, for example, smartphones and tablets, which promote mobile learning. Tablets together with e-textbooks are gaining momentum in the education systems and are used for teaching and learning. Even some publishers are seeing their growth and have started introducing more e-textbooks. Due to the introduction of these technologies in schools, it is believed that teachers are reluctant to accept and use these technologies in the classroom. Hence, this study to investigate the acceptance of e-textbooks on tablets by teachers in secondary schools in South Africa.

The literature review highlights some of the advantages and disadvantages of e-textbooks and tablets in educational settings. The acceptance model used to gather and analyse the data was the Unified Theory of Acceptance and Use of Technology (UTAUT) and the research approaches used were interpretative case study and qualitative research methodology. The study involved interviewing 14 secondary school teachers from one private school in Pretoria, South Africa. Of the 14 participants, there were 10 male teachers and 4 female teachers, with various levels of teaching and e-textbooks experience. Thematic content analysis was used, focusing more on deductive content analysis. From these approaches, themes were created to further analyse the interview content into more meaningful perceptions that teachers have regarding using e-textbooks and tablets.

One of the research sub-question was answered with findings from the literature only and the other research sub-questions were answered with both literature and interview findings. The main research question was answered with findings from interviews and themes created from interview responses and the findings are presented using the objectives of the research as well as the constructs of the UTAUT model. One of the important factors found was the challenge that teachers experience when learners are using e-textbook and that is they get distracted during class due to the social media applications that are installed on their tablets, which they use when they are supposed to be studying. The second important factor was the teachers' need to implement e-textbooks in the classroom as a teaching tool. The mandatory use of the e-textbooks had a positive influence on behaviour intention. However, at the time of the study, there was a limited choice of e-textbooks available on the platform and teachers complained about them being forced to use certain e-textbooks. The results found from this study can be helpful to schools and teachers who want to implement e-textbooks and tablets for teaching.

## Keywords

Mobile learning, e-textbook, e-textbooks, e-books, tablet PC, technology in school, digital textbook, UTAUT, technology acceptance

# CHAPTER 1

# OVERVIEW OF THE STUDY

## 1.1 Introduction

E-textbooks are defined as any published materials, such as books or journals, which can be read using a digital device, such as mobile phones or tablets, and are not in the form of a hardcopy (Embong, Noor, Hashim, Ali & Shaari, 2012). According to Embong et al. (2012), e-textbooks are a medium for teaching and this tool can enhance the processes of learning and can provide support to both teachers and learners. They add that e-textbooks on tablets can relieve learners from having to carry with them heavy books to school every day. Furthermore, for a successful adoption of e-textbooks on tablets; learners, teachers and even parents need to see the benefits (Embong et al., 2012). Before e-textbooks were introduced, the traditional textbook was the only format of textbook available and accessible by both the teachers and their learners.

E-textbooks are a recent intervention in South African schools and are being introduced in a number of schools in South Africa (ITWeb, 2012). Even though e-textbooks are a recent tool, providers in South Africa are also introducing and offering them in partnership with other publishers (ITWeb, 2012). In addition, many South African schools are now adding Tablets in their classrooms and this will affect learners as well as teachers (South Africa.Info, 2013).

Tablets, for example, can be used to deliver learning activities and e-textbooks (Bedi, 2014). Ifenthaler and Schweinbenz (2013: 525) state that a tablet can "easily be adopted in classroom instructions to facilitate learners' learning processes". Additionally, tablets can provide learners with additional learning materials, which they can acquire from more sources such as the World Wide Web. Moreover, teachers can search for e-textbooks that are in a digital format, which are in line with their curricula (Jones & Brown, 2011). However, tablets are not the only devices that can display e-textbooks; a personal computer can also be used for this purpose. Whatever the device used, according to Bedi (2014), it implies marked changes to the way teaching is currently executed.

It is assumed that the implementation of this technology disrupts traditional teaching practices and that teachers are often reluctant to accept this technology to aid their teaching methods (Teo, 2014). There could be many reasons why teachers' attitude towards this technology is not positive, resulting in them not accepting and promoting the use of the technology in the classroom. Teo (2014) says some of the reasons are the scepticism over

the advantages that technology brings into the classroom and teachers lacking confidence in using technology as part of their teaching. Yet as technology grows, its use grows in every sector of communities, such as in schools and in the work place. "Technology is an integral element in the world today" (Ahmad & Nisa, 2016: 163).

There is not much research on the acceptance of e-textbooks by teachers in the classroom. Most of the studies focus on the learners and the learners as users (Wang & Bai, 2016; Ifenthaler & Schweinbenz, 2016; Al-Mashaqbeh & Shurman, 2015). There are, however, a number of studies focusing on the acceptance of tablets by teachers in schools. One example of such is a study done by Ifenthaler and Schweinbenz (2013). They examined teachers' perceptions about accepting the use of tablets in classroom lectures. They state that the teachers assumed and believed that the technology would be easier to use, that there was infrastructure and support in place and therefore they intended to integrate technology into their teaching. Their findings were that the teachers' attitudes towards using technology in classrooms varied and that they wanted support and infrastructure to be functionally ready and available.

A study by Simsek and Doğru (2014) on a tablet PC Based Classroom, discusses the introduction of tablets in primary and secondary schools for educational tasks. Their study focused on how to use tablets more effectively in classrooms and how teachers can do more than teaching with tablets by also taking classroom attendance and giving their learners quizzes. In their study, they explain how teachers can also share their screens with the rest of the class. Montrieux, Vanderlinde, Courtois, Schellens and De Marez (2014) conducted a qualitative study that investigated the roles teachers play in the process of implementing tablets in a secondary school. They found that teachers who are willing to use technology in class should be promoted and that there should be more technology improvements in those schools.

In the literature on the acceptance and adoption of e-textbooks in classrooms, researchers propose different theories. Lin, Liu and Kinshuk (2015) constructed a Needs of Using E-Textbooks Perception Scale to determine the needs that must be fulfilled for a successful e-textbook implementation. Other examples are the Technology Acceptance Model (TAM) (Johnston, Berg, Pillon & Williams, 2015) to study the acceptance of technology by learners; Cultural Historical Activity Theory (Eicker-Nel & Matthee, 2014), which looks at the educational environment as a whole and the Punctuated Socio-Technical Information Systems Change model (Weilbach & Matthee, 2015), to understand the change associated with the e-textbook implementation. A study done by Weilbach and Matthee (2015) introduced some of the difficulties that teachers have when using e-textbooks. They based

their research on a change management theory. The focus was therefore not solely on teachers' perceptions. Their study point out the need for research on the teacher's views of accepting e-textbooks that comes with the integration of tablets. For such a study different technology acceptance models may be considered. The Unified Theory of Acceptance and Use of Technology (UTAUT) model of Venkatesh, Morris, Davis and Davis (2003) has not been used much in education studies, as was pointed out by Ifenthaler and Schweinbenz (2013). They addressed this gap by using the UTAUT model to study teachers' perceptions of the use of tablets in class. The UTAUT model can be particularly helpful in this study, since it focuses on the 'dynamic psychological processes' of teachers on which they base their decision to use e-textbooks in their teaching (Ifenthaler & Schweinbenz, 2013).

This study, similar to Ifenthaler and Scheweinbenz (2013), uses the UTAUT model in a qualitative study to investigate teachers' acceptance or use behaviour of e-textbooks on tablets. The problem statement below presents the aim of the study. It also highlights several issues that can be the cause of why teachers are not accepting e-textbooks on tablets.

## 1.2 Problem statement

The main problem identified in this section is that teachers are often reluctant to use e-textbooks in their classrooms as another method of presenting learning material to their learners. E-textbooks nowadays are available for use by learners and teachers in classrooms. However, it appears that teachers who know little about technology are not willing to use technology (in this case e-textbooks) in classrooms (Wang, Hung, Hsieh, Tsai & Lin, 2012). For example, a response from one of the teachers in the Weilbach and Matthee (2015) study was that it was clear that the decision to use e-textbooks was not theirs and that he or she was not comfortable using them.

Teachers could be unwilling to use e-textbooks as they are comfortable with using traditional textbooks. There can be many other reasons why teachers are reluctant to use e-textbooks. Some of these reasons may have to do with a lack of proper infrastructure such as hardware and software (Buabeng-Andoh, 2012). Other reasons are not having the required training on how to use e-textbooks, limited time to assess the e-textbooks and produce good learning material and the unavailability of funds from schools to buy e-textbooks (Johnson & Buck, 2014).

E-textbooks on tablets are being implemented in schools in South Africa (South Africa.Info, 2013) but teachers are reluctant to adapt their current teaching methods and do not necessarily want to embrace the technology (Weilbach & Matthee, 2015). When

technologies are introduced in schools, teachers should be ready and willing to accept and use the technologies. It is crucial to the successful implementation of technology that teachers embrace it. This study aimed, through a qualitative detailed investigation, to find out the perceptions that secondary school teachers have towards the use of tablet-based e-textbooks in classroom. This can be achieved with the main research question and research sub-questions that are mentioned in Section 1.3. The research questions provided guidelines in investigating the issues and providing answers as well as recommendations for teachers.

## 1.3 Research Outline

This section highlights the structure and important parts of the research paper that are used to meet the objectives of this research. The highlights include identifying the research objectives, the study's main research question and research sub-questions, the scope and the research methodology.

### 1.3.1 Research Objectives

The main objective of this study is to understand the acceptance of e-textbooks on tablets by teachers. We also want to provide recommendations to those teachers on ways of accepting these technologies in the classroom.

The objectives of this research are to: (a) to use the constructs of the UTAUT model to investigate teachers' perceptions of e-textbooks on tablets; (b) to use the UTAUT model to determine the factors influencing teachers' acceptance of tablet-based e-textbooks in secondary school; and (c) to determine the needs of teachers when using e-textbooks.

### 1.3.2 Research question

Technologies such as tablets are showing a promising method for delivering teaching in classrooms as another facet of the learning process (Ifenthaler & Schweinbenz, 2013). As more and more mobile technologies are developed with improved features, these mobile devices become mobile learning tools and they can be used to facilitate learning. An example of a learning process that technology provides is the use of a tablet which can display an e-textbook. However, not all teachers want to use e-textbooks; some of them still prefer to use the printed textbook (Dobler, 2015).

The main research question is: how can the UTAUT model help in reaching a better understating of teachers' use behaviour and acceptance of e-textbooks? The following are the research sub-questions:

SRQ 1: What is an e-textbook?

SRQ 2: What are the advantages and disadvantages of e-textbooks?

SRQ 3: What are the perceptions of teachers regarding technology in the classroom?

SRQ 4: What are the perceptions of teachers regarding e-textbooks in the classroom?

SRQ 5: What are the needs of teachers regarding the implementation of e-textbooks in the classroom?

### 1.3.3 Scope

For technology to be integrated, accepted and utilised in schools, there exist key role players who can ensure that the technology introduced is a success (Teo, 2014). Teo (2014) writes that the key role players are the teachers and said they can influence the type of technology they want to use and how often they want to use it. Ifenthaler and Schweinbenz (2013: 526) also write that if teachers were on board with the technology (tablets) introduced, their assistance can result in a "full integration of Tablet Personal Computers into the education system". However, despite the growth of technology, teachers are reluctant to use technology as part of their teaching toolkit (Teo, 2014). For these reasons, this study will focus on teachers only as key role players in the implementation of e-textbooks in classrooms.

Recently a private company launched a tablet based e-textbook platform at specific schools in South Africa. As stated on its website, the company is described as "an education company that focuses on combining the best educational practices with the latest technology to enable a teaching and learning environment in keeping up with the 21st century" (Curro, 2015). Its purpose is not to change the traditional learning process which it states is an environment in which the teacher is in control. It supports a blended learning process whereby traditional teaching is mixed with electronic learning. It provided tablets, e-textbooks, tablets applications and storage to learners and teachers. This study focused on the acceptance of this specific e-textbook platform on tablets in one particular private school in South Africa. Although this school provides teaching to primary and secondary school learners, only the secondary school teachers were involved in the study. The school would be referred to as School A from here onwards.

### 1.3.4 Research Methodology

The research approach that was used was qualitative research. According to Patton and Cochran (2002: 3) "qualitative research is characterised by its aims, which relate to understanding some aspect of social life, and its methods which generate words rather than numbers as data for analysis". There are different methods used to collect data in qualitative research, such as case study interviews (Woods, 2007). With case study interviews, the researcher selects a small number of people to interview (Woods, 2007). Woods (2007) further states that the researcher has to gain the interviewee's confidence and they need to gain the researcher's trust. The interview session can be a casual conversation with a group or a formal interview (Woods, 2007). With observations, the observer can be a researcher who is a student, a teacher, or other person who can just observe the behaviours from a distance, meaning a different room from the group being observed (Woods, 2007). For this research study, case study interviews were used to collect data.

The UTAUT model was used to understand the behaviour and acceptance of tablet based e-textbooks by teachers in secondary schools. The UTAUT model is an extension of the technology acceptance model (Marchewka, Liu & Kostiwa, 2007). The model has four constructs which can be used to identify a different understanding of each teacher's perceptions using e-textbooks in classroom in more detail. These constructs are explained in more detail in Chapter 2. Although this model is mainly used in quantitative studies, similar to Ifenthaler and Schweinbenz (2013), these constructs were used to guide interviews and the thematic analysis of the interview data.

### 1.4 Layout of the study

This study is structured in five fully detailed chapters. Chapter 1 comprises the background information of the study, problem statement, and research question as well as the scope of the study. The main research question identified was: how can the UTAUT model help in reaching a better understanding of teachers' use behaviour and acceptance of e-textbooks? In addition, there were three objectives that were found under the research outline. The scope of the study provided details of the school chosen for the research, the details of the organisation that provides e-textbooks and the platform they use for e-textbooks in the school. Lastly, the research methodology outlined the approaches and methods used, that is, a qualitative approach, interpretative case study, UTAUT model and interviews.

The second chapter details the overview of the literature in six sections, highlighting the studies that are related to this study: (1) mobile learning; (2) tablets; (3) e-textbook or e-books; (4) the acceptance of technology by teachers in education; (5) typical acceptance

theories used to investigate the acceptance of technology in schools; and (6) existing studies on the acceptance of tablets and e-textbooks in schools. The first section elaborates on mobile learning in terms of what mobile learning is and its advantages and disadvantages. The second section details what a tablet is and the benefits it provides in learning, for both teachers and learners. The e-textbook definition, the use of it and comparisons to printed textbooks are explained in the third section of the literature review. The fourth section elaborates on the acceptance of technology by teachers in education. The fifth section describes theories that are used for technology acceptance in schools and the last section presents the findings of other researchers, which are based on the acceptance and use of e-textbooks in educational settings.

The third chapter discusses and examines the research methodology. Included in the research methodology are the research paradigm, theories, research approaches, data collection and analysis methods, research setting, population and sampling and ethical considerations. The research paradigm followed was interpretivism; the theory used was the UTAUT model and the chosen approaches for the study were qualitative research and case study. Data was collected with the use of case-study interviews and analysed using the UTAUT model and themes generated from the interviewees' responses. A secondary school in Pretoria, Gauteng, was the research setting and teachers of that school were the chosen population. Lastly, the rights of the participants were elaborated on at the end of the chapter.

The fourth chapter presents the researcher's data analysis and interpretation of the results from the research interviews. Deductive thematic content analysis was used to create themes together with the constructs of the UTAUT model to clearly present what interviewees' results were under each construct of the model. Some of the themes found were *Benefits of using e-textbooks* which identified benefits that learners and teachers receive from using e-textbooks and tablets. Other themes were *Tablet*, *Tools* and *Support* which highlighted the functions that tablets provided to both learners and teachers, the tools they use to utilise e-textbooks and the kind of support they receive when encountering problems while using e-textbooks and tablets.

Chapter five is the last chapter of the study and provides the research findings, summary and recommendations for further research. The findings are presented by first answering the research sub-questions, of which some are answered with just literature findings and others with both literature and interviews findings. The main research question is answered thereafter with findings from interviews only and is presented using the UTAUT model and the research objectives. Furthermore, limitations of the study are detailed. These are the limitations that the researcher experienced while conducting this research.

## 1.5 Conclusion

Chapter 1 discusses the introduction of the chapter, the problem statement that needed to be investigated as well as the research objectives and methodology. Other important topics that are featured in this chapter are the main research question and the scope. Moreover, how the rest of the study is planned per chapter is also detailed. Lastly, the conclusion of the chapter is provided at the end of the chapter.

The chapter's main focus is to introduce the problem statement to the reader and what the study hopes to achieve, that is, to identify the perceptions that teachers have towards accepting tablet-based e-textbooks in schools in South Africa. Another value detailed in this chapter is the research methodology, which explains how information was collected and which model was used to analyse and explain the acceptance of this technology by the teachers at these schools. In conclusion, this paper looks at the perceptions that teachers have in utilising tablet-based e-textbooks in the classroom to give lessons.

The next chapter discusses the literature review of this study. The literature review not only focuses on tablets and e-textbooks, but will also discuss the types of theory models that are used in the acceptance of technology in schools. Other subjects that are discussed in the literature review are the benefits and use of tablets in the classroom. It also provides a debate between electronic textbooks versus printed textbooks.

# CHAPTER 2

# OVERVIEW OF THE LITERATURE

## 2.1 Introduction

According to De Luna (2015), there is a transition in the publishing industry due to e-textbook technology's impact on education worldwide. Gu, Wu and Xu (2015) write that devices such as tablets, smartphones, e-book readers and iPads are rapidly dominating education systems worldwide. Book publishers have recognised the adoption of these devices and are now offering digital format textbooks called electronic books or e-textbooks (Rockinson-Szapkiw, Courduff, Carter & Bennett, 2013). Similarly to printed textbooks, e-textbooks contain materials that are used in the classroom. Furthermore, they have functionalities such as the integration of links to access certain materials online and highlighters for noting important information that is beneficial for educating in a classroom (Lin, Liu & Kinshuk, 2015).

This chapter focuses on existing research related to this study. Some of the topics that are discussed are e-textbooks, types of mobile learning and benefits, as well as the advantages and disadvantages of mobile learning and tablet-based textbooks versus printed textbooks and the use of e-textbooks.

The studies discussed in this chapter were searched with the use of keywords from Google Scholar, ScienceDirect database, Information Systems Education Journals and other published journal platforms. Keywords included *electronic learning, mobile learning, technology acceptance, e-textbooks acceptance* and *tablets*.

## 2.2 Mobile learning

### 2.2.1 Understanding mobile learning

"Mobile learning refers to any learning that occurs when the learner is not at a fixed, predetermined location, or learning that occurs when the learner takes the advantages of the opportunities offered by mobile technology" (Parajuli, 2016: 42). Sönmez, Göcmez, Uygun and Ataizi (2018) emphasise the freedom of time and place that mobile learning affords learners as another means of learning. In addition, mobile learning is a unique kind of learning as learners have access to learning materials, guidance and application related with

learning (Hidayat & Utomo, 2014) and it allows learners to learn on their own (Behera, 2013). Study materials are readily available and can be accessed in different locations such as moving buses, shopping malls, museums and hospitals (Behera, 2013). Mobile learning allows learners to access information and communication on the move (Sönmez et al., 2018). Fulantelli, Taibi and Arrigo (2014) point out that learners have to be flexible in the way that they can access learning materials using their mobile devices such as tablets, laptops and smartphones.

Mobile learning is increasingly becoming a focus area in the current digital teaching and learning environment (Parajuli, 2016). According to Fojtik (2014), this is made possible by the opportunities opened by such manageable, lightweight devices which are sometimes small enough to fit in a pocket or in the palm of the hand. Such devices include mobile phones, smartphones, tablets, and similar devices (Biloš, Turklj & Kelić, 2017). According to Sönmez et al. (2018), mobile learning technologies have mutual features such as portability, small size, interactivity and presence which make these devices more useful. Alhassan (2016) states that the term mobile learning normally refers to any sort of learning that can be done using mobile technologies. According to Shin and Kang (2015), the growth of innovative wireless technologies has enabled learning on the move, as people can access information irrespective of their location. Kee and Samsudin (2014) state that learning is interconnected in daily life and it can occur anytime and anywhere through mobile devices.

Sönmez et al. (2018) point out that mobile learning definitions have been provided by various researchers, but due to fast growth and development of mobile technologies, some definitions lost their relevancy in a short period. They further highlight that the most commonly applicable definition of mobile learning is the one provided by Lehner, Nosekabel and Lehmann (2003), as cited by Hidayat and Utomo (2014). They define mobile learning as a provision that delivers general information and educational content to the learner, which helps with the achievement of knowledge at any place and time. Mobile technologies offer new paradigms of teaching and learning (Chee, Yahaya, Ibrahim & Hasan, 2017). Moreover, mobile technologies provide new approaches to teaching and learning, since they can occur both inside and outside the classroom. Moreover, they enable collaboration and enhance interaction between learners and teachers and among learners (Hidayat & Utomo, 2014; Chee et al., 2014; Behera, 2013). Furthermore, content delivery, feedback, questions and information flow may happen in a dynamic way (Hidayat & Utomo, 2014).

Hamdani (2013) writes about two types of learning theories in his study: behaviourism and constructivism. Mobile learning with the use of mobile devices support both learning theories. Behaviourism as learning theory is defined as "repetition in the curriculum content"

(Hamdani, 2013: 666). Constructivism as learning theory is defined as learning that individuals construct themselves as oppose to the individual receiving knowledge from a secondary source such as a teacher (Hamdani, 2013). According to Hamdani (2013: 668), the teachers' new role can be developed by "constructivist-mobile learning". Furthermore, he emphasises that it means the teacher will be the facilitator and not outline what the learner should learn and how they should learn in any environment (whether in the classroom or out of the classroom). Mobile learning is nowadays a popular tool for communication and textbook reading (Fojtik, 2014).

## 2.2.2. Advantages and disadvantages of mobile learning

Mobile technologies, just like any other technology have their advantages and disadvantages that are related to the various learning environments (McQuiggan, McQuiggan, Kosturko & Sabourin, 2015). Biloš et al. (2017) indicate that the incorporation of mobile technologies is drastically changing the education system. Sönmez et al. (2018) point out that proper integration of mobile learning technologies into the current education system have a promising future as it provides another means of learning in a different environment where learners can engage in the educational processes. They further highlight that mobile learning is attractive, since information, communication and socialisation is available anytime and anywhere.

McQuiggan et al. (2015) emphasise that extensive implementation of mobile technologies at various levels is expected to become the most valuable and useful improvement to the classroom experience in engaging learners and teachers while empowering the education system. Furthermore, they concluded that mobile technologies offer great opportunities in changing education and learning if only embraced by knowledgeable, creative and open-minded educators, teachers and administrators. The use of mobile learning devices can enrich and develop the traditional learning process (Biloš et al., 2017).

Mobile learning, also referred to as m-learning offers several opportunities from both educational and technological viewpoints (Biloš et al., 2017). Mobile learning affords learners the ability to learn on the go (McQuiggan et al., 2015); it enables access to learning anywhere and at any time (Sönmez et al., 2018). According to Biloš et al. (2017), mobile learning supports personalised learning as it allows learners to study at their own pace while mobile devices allow them to learn within a realistic context. Learners are motivated by the personalised learning environment provided by m-learning, thus increasing the outcomes of distance education (Sönmez et al., 2018).

A study by Chee et al. (2017) confirmed that learners can learn on their own outside the classroom at their own convenience. Boticki, Baksa, Seow and Looi (2015) state that mobile learning empowers a shift from teacher-orientated learning to learner-orientated learning. The use of mobile devices encourages the achievement of collaborative learning. These devices allow easy interaction and communication with other learners and with teachers (Biloš et al., 2017). Teacher-leaner and learner-learner interaction outside the classroom is made possible by mobile technologies (Barreh & Abas, 2015).

McQuiggan et al. (2015) summarised the benefits of mobile learning: First, mobile learning facilitates learning on the go. Second, it improves the learners' high-order thinking skills. Third, mobile learning is a support structure in the learning environment. Fourth, it encourages personalised learning. Lastly, learners are motivated by using mobile learning devices. Even though mobile learning offers many benefits, there are challenges that come with mobile devices (McQuiggan et al., 2015). One of the disadvantages of mobile devices is that, since they are small, their screens and keys on the device are too small (Mehdipour & Zerehkafi, 2013; Behera, 2013). McQuiggan et al. (2015) point out that typing on a small screen is difficult and challenging as mobile devices such as smartphones do not come with a keyboard.

Moreover, not all mobile device models are capable of providing and supporting mobile learning (Behera, 2013) and some devices are not capable of supporting specific data formats (Mehdipour & Zerehkafi, 2013). Furthermore, other mobile devices become outdated very quickly. The mobile devices that support mobile learning are mobile phones (Behera, 2013), electronic books (Mehdipour & Zerehkafi, 2013), tablets (Gu, Wu & Xu, 2015) and wireless laptops (Yusri, Goodwin & Mooney, 2015).

Another challenge of mobile devices is that it can be a distraction to learners and it can also be used in an unethical way (McQuiggan et al., 2015). The authors further state that the use of mobile devices should be monitored both at school and at home since they can be used in an unethical manner or be a distraction to learners. Prejudice and attitudes towards technology are another hurdle (McQuiggan et al., 2015; Sönmez et.al., 2018). Despite the willingness to learn new information, people are still reluctant to accept technological changes as they do not know what to expect.

## 2.3 Tablet

### 2.3.1 What is a tablet

Technology is being adopted at a rapid rate in the general population and now the education environment is embracing it at approximately the same rate (Rekha & Muthuchamy, 2015). Technology continues to play a vital role in the teaching and learning environment due to an increase in the use of internet and electronic devices (Algoufi, 2016). Harris, Al-Bataineh and Al-Bataineh (2016) found that due to technology, students can participate and learn using various techniques that were never experienced before in a classroom setup. Moreover, technology in education has enabled the knowledge distribution to be spread immediately while enabling more effective and quicker communication.

The tablet is an interesting innovation in portable computing technology used in the education environment (Rekha & Muthuchamy, 2015). Rekha and Muthuchamy (2015) define the tablet as a lightweight, portable wireless computer with a special software application that uses a touch screen and has multiple functions such as browsing the internet. Kam, Wang, Iles, Tse, Chiu, Glaser and Canny (2005), as cited by Cummings and Hill (2015: 62), defines a tablet as "a pen-based computing with digital ink that enables instructors the flexibility to take notes, make comments, diagram models or create interactive presentations".

Tablets enable innovative teaching and learning abilities as well as opportunities (Rekha & Muthuchamy, 2015). Moreover, tablets can be used as a support for independent, differentiated and personalised learning by learners. Al-Mashaqbeh and Shurman (2015) establish that tablets could be a supportive structure for both teachers and learners. According to Algoufi (2016), tablets offer users an opportunity to study and access information anywhere and at any time. Fojtik (2014) indicates that learners can have better access to learning materials, use text and multimedia and study wherever and whenever. However, tablets can not only help to view teaching materials. Learners can interact, take notes, handle homework, and draw diagrams using tablets. Tablets allow teachers to spend less time in preparing lesson content since this is time consuming for both teachers and learners (Öztürk, 2018). Moreover, with the use of tablets, there is more interaction between teachers and learners in doing classroom tasks, thus allowing for a different classroom interaction.

Studies by Bedi (2014) and Knight (2015) confirm that, with the introduction of tablets in schools, the teacher's role is changing extensively. Before the use of tablets, teachers were known to be the most important source of information, but that is changing (Bedi, 2014). Instead, learners have information at their fingertips through the use of tablets. However, it

does not mean that all the information that the learners receive from tablets is correct and reliable for that particular course; therefore, the teachers will help the learners to use and extract the correct information (Bedi, 2014).

### 2.3.2 Tablet  use and benefits in learning

There are several activities that can be done using tablets in the classroom.  These activities include lecture preparation, giving presentations in class and grading (Simsek & Doğru, 2014). To add to these activities, the teacher can also take class attendance, provide quizzes and homework and share extra information with the rest of the class (Simsek & Doğru, 2014). The following information explains some of the activities mentioned and the way in which tablets can save the teacher's time in his or her daily duties:

- Simsek and Doğru (2014) point out that the teacher is the one who takes class attendance to know which learners did or did not attend the class at a particular time or date. This is a time consuming task. However, with the use of a tablet, the teacher can take the class register within minutes with the click of a button, using an application installed on the tablet, and the information will be stored in the database.
- Providing quizzes and homework can be easy and quick. The teacher can paste and make available the homework and quizzes to learners using the application developed for tablets and that application can have the ability to mark the quizzes and store the grades of each learner in the database accordingly (Simsek & Doğru, 2014).
- The school must have a portal that learners and teachers use to communicate with one another. Therefore, the teacher can use that portal to send the learners extra information that was not shared during class time (Simsek & Doğru, 2014).

According to Al-Mashaqbeh and Shurman (2015), tablet integration into the classroom enables another innovative means of learning and teaching. Moreover, the integration of tablets and e-books in the education environment improves teaching and motivates learners, resulting in better outcomes.

### 2.4 E-textbook or E-books

### 2.4.1 What is an e-textbook?

The rapid growth and development in Information Technology has increased the understanding of informatics technology (Ozdamli & Tavukcu, 2016; Hamedi & Ezaleila,

2015). Furthermore, technological skills and technological base knowledge are essential in every field. The children of today are very good in technology, thus the need to promote technology in all areas. The basic area for this should be education (Öztürk, 2018). Due to innovation and improvement in technology, e-books had a significant impact on both the Information Technology and education industries (Lai, 2016). Nowadays, people of different ages and cultures are starting to use electronic books (Patel & Morreale, 2014).

Embong et al. (2012) defines e-textbooks as any published materials such as books or journals which can be read using a digital device such as mobile phones or tablets and are not in the form of a hardcopy. E-textbooks enable learners to access printed textbooks in an interactive way (Al-Mashaqbeh, 2015). Moreover, learners have saved multimedia content on their tablets, such as pictures, and videos as well as interactive presentations and hyperlinks that can include tests, a discussion board, and a learner portfolio.

Patel and Morreale (2014) write that even though electronic books provide these features and opportunities, they might not be used due to the users not knowing how to navigate and utilise them. Another advantage of electronic books is that they are cheaper than the printed textbooks (Patel & Morreale, 2014). Some studies show that students and teachers still prefer printed textbooks rather than electronic books (Dobler, 2015). A study by Patel and Morreale (2014) found that electronic books are more effective than printed textbooks. This was demonstrated by the higher pass rate of students who used e-textbooks and a low pass rate by students who used printed textbooks.

The advantages of electronic books include easier delivery and cheaper purchase. Back-up and storage are simpler with e-books. They have the ability to adjust font and font size. E-books can be read on various devices, and text can be added to multimedia. A single device has the capability of storing a large number of e-books (Fojtik, 2014). Lai (2016) highlights that the carrying of full schoolbags will fade in the future, since learners need only carry e-book readers to school for their studies. Besides, e-book readers are convenient to carry and to make notes.


### 2.4.2 Comparing advantages and disadvantages of e-textbooks versus printed textbooks in schools

There are many advantages that e-textbooks can provide over printed textbooks (Doering et al., 2012). According to Lai (2016), e-books have several advantages as compared to printed textbooks. E-textbooks have the ability to motivate learners and encourage reading. They provide richer learning experiences as learning becomes alive and more interesting. E-

textbooks transform the textbook content into three dimensions through the incorporation of multimedia functions such as videos and animations.

Doering, et al. (2012); Harness (2015); Leonhardt (2017); Lai (2016) and Hawes (2018) summarise the advantages and disadvantages of electronic books versus printed textbooks as tabled in Table 2.1.

**Table 2.1: Comparing e-textbooks to printed textbooks (Doering, et al., 2012)**

| Aspect | E-textbooks | Printed textbooks |
|---|---|---|
| Update | Quick, easy and convenient to update to a new edition. Faster way to search for new edition via the use of tablet and Internet connection. A user can get a pop up notification that there is a new edition available online and for download immediately. Electronic books are advantageous to modules and courses that continuously change yearly, per semester or after a certain amount of period. | In order to get a new edition, the user will have to buy a new textbook. The user will have to visit a bookshop or library to find out if there is a new edition of the book. Traditional textbooks are a disadvantage to modules and courses that continuously change yearly, per semester or after a certain amount of period. |
| Availability | New and old editions are easily accessed with the use of an Internet connection. Moreover, they are in most cases always available. | A user can visit a library or bookshop and be told that the edition is no longer available at the library or bookshop, or it has not yet arrived at the location that the reader is searching at. |
| Robustness | A tablet can freeze, crash or even be hacked, resulting in the e-textbook(s) being lost. A tablet will require software to protect it and enough space to store the information (electronic books). | A printed textbook can be damaged by water or fire if it is not properly looked after. Printed textbook are much safer and reliable than electronic books on a tablet. But both printed textbook and tablet based textbooks are at a risk of being stolen or damaged. |
| Price | E-textbooks may be cheaper to purchase than traditional textbooks, but the usage of tablets is much more expensive than the use of traditional textbooks. There are costs needed to implement the use of electronic books. These costs are for buying hardware and software, and the build of infrastructure to provide wi-fi connection. Hardware refers to the tablets and software refers to the e-books. Furthermore, teachers will need to be trained to use the technology. | Printed textbooks are expensive and new editions will be more costly. No infrastructure (software and hardware) needed to implement the use of e-textbooks. |

| Aspect | E-textbooks | Printed textbooks |
|--------|-------------|-------------------|
| Storage and Backup | E-textbooks do not take physical space to be stored. They are saved in a device and they are easy to backup. | With printed textbooks, one has to have a physical space where they are stored which takes up a lot of space in a room. |

### 2.4.3 Use of e-textbooks in the classroom

Embong et al. (2012) write that e-textbooks will not replace teachers in schools. The reasons are that the teachers provide encouragement, good feedback and direction to learners which are the qualities that every learner needs. The purpose of e-textbooks should be to make the work of the teachers easier and provide extra information to the learner and the teacher (Embong et al., 2012).

### 2.4.3.1. Suggested strategies to be applied by teachers when using e-textbooks.

The suggested strategies are put together from the advantages and limitations of using e-textbooks (Embong et al., 2012). The strategies are that the decision to use e-textbooks involves many stakeholders including the technology specialists, the administrator and the teachers. In order for schools to introduce, implement and use e-textbooks in their classrooms, they need to have technology infrastructure. These infrastructures include hardware and software. Even when there is infrastructure, the teachers should be equipped with sufficient knowledge to utilise these technologies to reap the benefits.

Furthermore, the school should find ways to accommodate all types of learners. Some learners may need special attention and more time to understand the technology and use it. The teacher will not be the only person who interacts with the learners when using the e-textbooks. The other people who will interact with learners are their parents and these parents also need to know and understand how to use e-textbooks to assist their children at home. As every technology can be broken or changed, it needs to be maintained to ensure learning is not interrupted. Therefore, the school has to make sure that there is a plan in place for maintenance.

Another e-textbook teaching strategy proposed by Wong, Liong, Lin, Loer and Lam (2011) includes three parameters for teaching using e-textbooks: Teacher-made, Demand and Integrated. The first parameter, Teacher-made, refers to when teachers customise e-textbooks that they require for their teaching. This gives them the advantage to make available to their students the books they will be utilising in their curriculum. Another

advantage is that e-textbooks can be divided into different chapters and, depending on the curriculum, the chapter that will be used at that time will be made available. E-textbooks can also be given to students for free. Formulating teacher-made e-textbooks requires a lot of effort by teachers.

The next parameter, demand, refers to the infrastructure necessary for e-textbooks to work. This infrastructure includes the hardware that they may require which can be expensive, and the challenge that the teachers and learners may face is when the hardware only accepts some software. There is available software such as Java-based e-textbook software, which is a cheaper software that can even be used on mobile phones. However, it has limited functions. The limited functionalities include displaying large images and providing the user the ability to make his or her own notes on the device being used to read the e-textbook. Another software program that can be used to read and display e-textbooks is ePUB. This software provides many features to the users. Some of the features it provides are that it allows the user to make notes and adjust the display size.

The last parameter, integrated, refers to the extent to which e-textbooks must "be integrated as an essential part of a course" (Wong, Liong, Lin, Loer and Lam, 2011: 1324). E-textbooks are seen as textbooks which learners should bring to school when they are required to. They are referred to as additional information providers, which give the learners the ability to access them at their own time, wherever they are. The integration of e-textbooks requires the right hardware and the right software to be used and installed.

### 2.4.3.2 Limitations of e-textbooks

Embong et al. (2012) point out that even though there are a number of devices that can be used to read e-textbooks, some provide limitations to the users. A few limitations suggested by Mehdipour and Zerehkafi (2013) are outlined below.

Some devices do not have sufficient storage space to store the number of e-textbooks that the user wants or requires. Certain classrooms do not have enough power outlets to allow learners to charge their devices so that they are not interrupted during a lecture by not having enough battery life. Training is vital to teachers before and when using e-textbooks in classrooms. Furthermore, even when training is provided to teachers, some may still need more training; meanwhile, they cannot use e-textbooks to teach in class.

To some extent, some learners may not have all the required e-textbooks on their devices and are unable to send a copy of the books to their peers. Therefore, they will not be able to share e-textbooks in the same way they can share a printed textbook. Some learners may

find it hard to read and learn using e-textbooks than using printed textbooks. Some learners may enjoy reading printed textbooks more than e-textbooks. With printed textbooks, some learners prefer to underline, highlight text or even circle text for better understanding, but some e-textbooks readers do not provide those functions.


## 2.5 The acceptance of technology by teachers in education

As technology is integrated in some schools, some teachers are reluctant to utilise those in classrooms as part of their teaching tools (Teo, 2014). Alfahad (2012) writes that most teachers are familiar with technology as they use it for emails and surfing the internet but only a small number of these teachers use it in the classroom to teach. There are factors that influence the acceptance and rejection of using technology in classrooms by teachers, and these factors include teachers' attitude, beliefs and feelings (Alfahad, 2012). Buabeng-Andoh (2012) and Koksal, Yaman and Saka (2016) identified factors that they think prevent teachers from integrating technology in their classrooms. These factors are the teachers' attitude towards technology, their gender and age, technical support factors, accessibility and computer competency.

According to Alfahad (2012), these factors are divided into two categories, which are internal factors and external factors. Alfahad (2012) and Aflalo (2014) write that some of the internal factors that influence technology's acceptance and use include the perceptions, fears and beliefs of teachers. In short, these factors are the way teachers judge themselves when it comes to introducing something new to their teaching processes and the confidence they have once they have finished the training courses (learning how to use the technology introduced in school for teaching) (Alfahad, 2012; Blackwell, Lauricella, Wartella & Robb, 2013). Hence, if the teacher feels that they have acquired enough knowledge about the technology and they feel confident to use it, then they will integrate it into their teaching toolkits (Alfahad, 2012). According to Ifenthaler and Schweinbenz (2013), the acceptance, full integration and utilisation of tablets in schools can be achieved if there is more research done on the acceptance of tablets by teachers. However, it is better to introduce change to educators in small chunks so that they feel confident enough or encouraged to study the technology and therefore learn the whole thing and implement it (Alfahad, 2012). To conclude the discussion of internal factors, Alfahad (2012) states that teachers need to be motivated.

The external factors that can influence the adoption of technology by teachers include the gender and age of the teacher; the support that the school can offer to teachers; the size of the class (Alfahad, 2012); and teaching experience (Bataineh & Anderson, 2015; Park,

Byun, Sim, Han & Baek, 2016). According to Alfahad (2012), the older teachers are not motivated to learn technology, due to a lack of knowledge compared to the younger teachers. It is believed that males are more knowledgeable about technology than females (Buabeng-Andoh, 2012; Alfahad, 2012). Alfahad (2012) imply that for females, the external factors that influence them are their learners and the equipment.

Furthermore, the lack of a teacher's computer knowledge and use influences his/her use of information technology in teaching (Buabeng-Andoh, 2012). Moreover, a lack of confidence plays a role in technology integration by teachers (Buabeng-Andoh, 2012). Technology is growing these days and younger people are the ones who are utilising it rather than older people. Therefore, older people are having more difficulty understanding technology than younger people, who are exposed to it from a young age. In any case, technology in education is an innovation and its success depends on the acceptance of it by teachers as well as their students (Ifenthaler & Schweinbenz, 2013).

According to Gaudioso, Hernandez-del-Olmo and Montero (2009), there is training which can help teachers to learn information technology and therefore make their own courses as they formerly did with traditional teaching and learning. In traditional learning, teachers are the ones who provide learners with feedback by physically being in the classroom and using chalk and board, but with the introduction of technology teachers can provide feedback wherever they are.  They will though also need face-to-face support from IT technicians whenever they are experiencing problems with the technologies they are using (Gaudioso et al., 2009). Since this study aims to investigate teachers' acceptance of e-textbooks, it is necessary to know how technology acceptance in schools by teachers has been studied.


**2.6 Typical acceptance theories used to investigate the acceptance of technology in schools**

According to Wong, Osman, Goh and Rahmat (2013), there exists many technology acceptance models which were developed to determine the intentions and the attitude of individuals towards adopting a certain technology. This technology may be introduced in the work place, such as companies and libraries, as well as in schools. The models that Wong et al. (2013) and El-Gayar, Moran and Hawkes (2011) mentioned are the Technology Acceptance Model (TAM) (Davis, 1989), Theory of Reasoned Action (TRA) (Ajzen & Fishbein, 1980, Fishbein & Ajzen, 1975), Theory of Planned Behaviour (TPB) (Ajzen, 1991) and Unified Theory of Acceptance and Use of Technology (UTAUT) (Venkatesh, Morris, Davis & Davis, 2003). Also, these models integrate significant factors concerning the user group as well as the technology targeted (El-Gayar et al., 2011).

### 2.6.1 Technology Acceptance Model

Holden and Karsh (2009) write that the development of TAM came about when there was a concern that was raised. The concern was that information technology developments that were available were not being utilised by its intended users (workers). The creators of this model believed that if technology is accepted by its users it will be fully utilised by its intended users (Holden & Karsh, 2009).
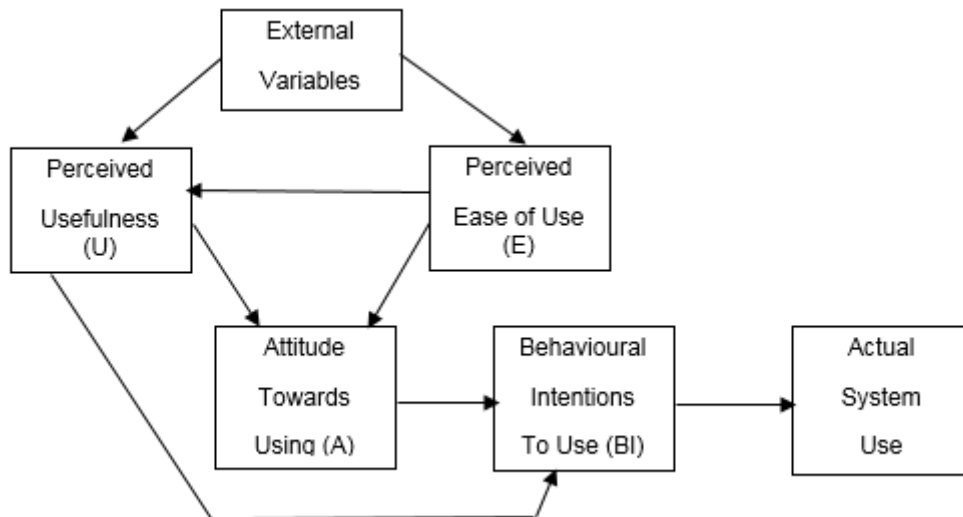


**Figure 2.1: TAM (Davis, 1989). Source: Davies et al. (1989).**

There are three variables that the model looks at, which are the user's attitude, beliefs and intentions to use the technology (Lo, Hong, Lin & Hsu, 2012). They state that the Theory of Reasoned Action model was modified to create the TAM. Lo et al. (2012) write that there are two important factors which can demonstrate the behaviour of an individual towards technology and they are Perceived Usefulness and Perceived Ease of Use.

For the prediction of the use of computers, there are "three primary factors" that were created (Lo et al., 2012: 546). The three are (a) Behavioural Intention to Use, which determines computers' usage; (b) Perceived Usefulness, which determines or portrays the intentions that the individual has to use the computer; and (c) Perceived Ease of Use which "is the second decisive factors of intension to use".

## 2.6.2 Theory of Planned Behaviour
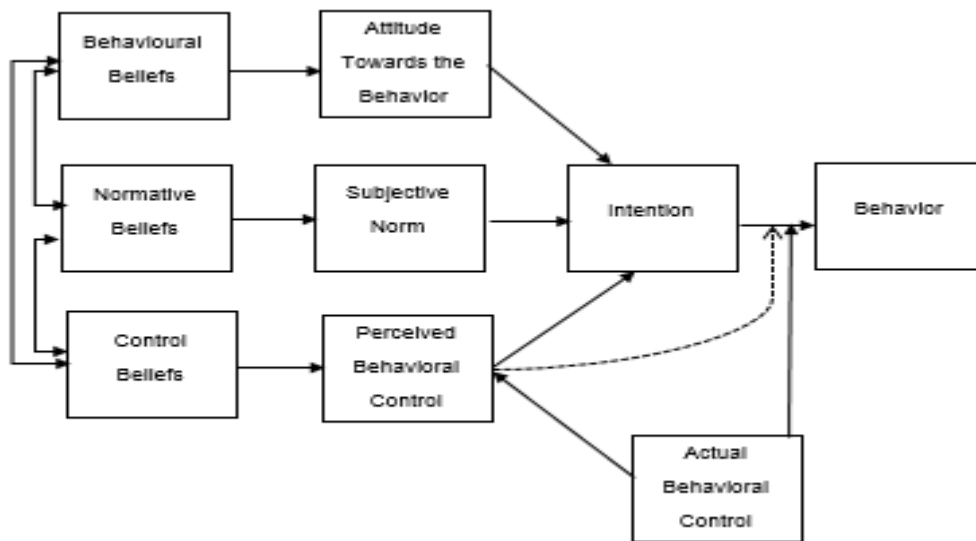


**Figure 2.2: TPB (Ajzen, 1991). Source: Ajzen (2015).**

Lee, Cerreto and Lee (2010) state that attitude towards the behaviour, perceived behavioural control and subjective norms can be used and measured to predict behavioural intention. Attitude towards the behaviour is explained as the extent to which an individual views a certain behaviour in a good way (Lee at el., 2010). They also explained subjective norm as the extent to which a person thinks that others desire them to behave in a particular way. In addition, they believe that they have to tell them they can perform the behaviour (Lee et al., 2010). These are the main determinants that portray the strength that shows their intention to do a certain behaviour (Lee et al., 2010).

## 2.6.3 Theory of Reasoned Action

Githinji, Mwaniki, Kirwa and Mutongwa (2014) write that the Theory of Reasoned Action was developed by Fishbein and Ajzen in 1975 which was derived from the Theory of Planned Behaviour. The two significant assumptions that are presented on the Theory of Reasoned Action are that the behaviour of a person is directed "by rational will" and a person's intention to perform an action will determine if that particular action will be performed (Hua, 2013: 2092). Githinji, et al. (2014) state that the main purpose of the development of this theory was to explain how the attitude, intentions, beliefs, behaviour and subjective norms of a person associate with each other.
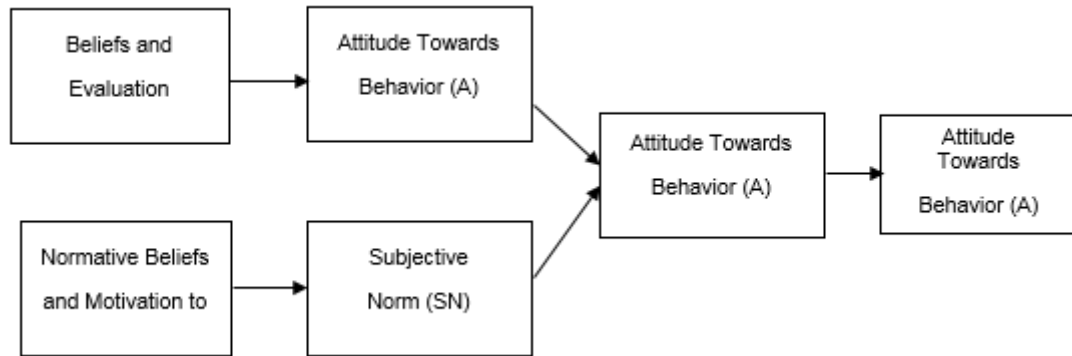
Behavioural intentions are triggered by an individual's behaviour to do something (Githinji et al., 2014). They also write that the intentions of an individual are provoked by the individual's attitude as well as that person's subjective norms towards the behaviour.

This theory assumes that any person is rational (Hua, 2013). Hua (2013) writes that, before a person decides to perform something, that person analyses the advantages and disadvantages of that particular action. Once the person has finished analysing, he or she makes a final decision (Hua, 2013).

### 2.6.4 Unified Theory of Acceptance and Use of Technology

The purpose of the UTAUT model is to define the intentions of the user to utilise technology and extend the behavioural usage of technology (Alshehri, Drew & AlGhamdi, 2012). UTAUT consists of four important constructs. They are: performance expectancy, effort expectancy, social influence and lastly facilitating conditions (Alshehri et al., 2012). According to Alshehri et al. (2012), these constructs are used to determine behaviour and usage intentions. The other four constructs are used to influence the impact of the first construct (Alshehri et al., 2012). These other constructs are gender, age, experience and voluntariness of use (Alshehri et al., 2012).
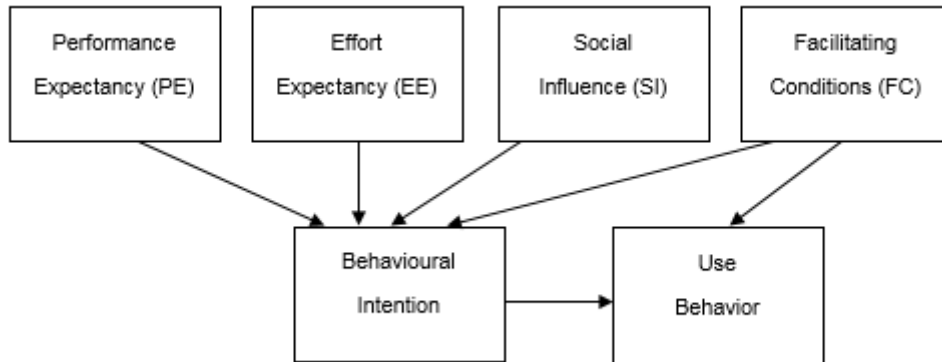
Figure 2.4. UTAUT (Venkatesh et al., 2003). Source: Niehaves and Plattfaut (2014).

The four main constructs are defined as follows (Alshehri et al., 2012:70-71; Gümüşoğlu and Akay (2017: 381):

- Performance expectancy, which "is the degree to which an individual believes that using the system will help him or her to attain gains in job performance".
- Effort expectancy, which "is the degree of ease associated with use of the system".
- Social influence, which "is the degree to which an individual perceives that important others believe he or she should use the new system".
- Facilitating conditions, which "is the degree to which an individual believes that an organisational and technical infrastructure exists to support use of the system".

## 2.7 Existing studies on the acceptance of tablets and e-textbooks in schools

De Oliveira, Camacho and Gisbert (2014: 87) were "Exploring the student and teacher perception of e-textbooks in a primary school". They used three methods to collect data for their case study and the methods were group interviews, video recording and class observations. Their sample consisted of one public primary school, with 14 learners aged 11 and 12 years old. The group was led by a 29-year old teacher who uses technology in classroom regularly to teach subjects such as mathematic and languages. Observations and video recordings were used to observe how the learners used the laptops provided by the school when they followed the teacher's instructions. The focus group interviews involved one teacher and the students and were semi-structured interviews.

They found four main themes, which are "classroom roles", "mutual support", "complementary literacy technologies" and "shared view, different perception". The first theme was based on a finding that when learners were given work in the classroom, finished

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it and the work was marked immediately, some learners were complaining about the marks they received and some were surprised at the feedback received. The second theme revealed that students asked for help from a peer when they were having difficulties answering a question and when their peers could not help they would ask their teacher for assistance. The third theme points out the complementary information that the teacher provided to the learners. The complementary material was a printed copy of the work that the students were given and the teacher explained that he provided it so that, when problems such as no or slow internet and learners getting lost arose, the learner could continue with his or her work. Additionally, the printed copy could be used for revision at home. The shared view from both the teacher and the students was that e-textbooks provided legitimate information but the different perception was on the function they used to highlight information which the teacher thought provided insufficient information for students. Other findings were that the students liked using e-textbooks and preferred it.

A South African study by Weilbach and Matthee (2015: 1-14) titled 'Using the PSIC model to understand change in an educational setting: the case of an e-textbook implementation' found that teachers perceived e-textbooks as not the correct tool for teaching and learning and that there was lack of support for them as well as their learners. The researchers used the Punctuated Socio-Technical Information Systems Change model, which consisted of "three aspects of IS change". The first aspect was "the work system" which is changed by an addition of a new IT module. The second aspect was "the building system" which they defined as a system that "incorporates the resources and routines to enact the planned and deliberate change". Lastly, the "organisational environment" which combines work system and building system and has two components, which are organisational context and the environmental context. Organisational contexts cover aspects such as resources and culture, while environmental context covers political and competitive environments, among others.

Alawami (2016: 1) investigated "Examining teachers' and college students' perspectives toward e-textbooks as an educational tool". The study's purpose was to find out the views of both teachers and learners regarding the use of e-textbooks for teaching and learning and how e-textbooks can be improved to satisfy their needs of a textbook. It was a qualitative case study and three teachers and some of their students took part in the study. Alawami (2016) found that it did not matter what the books' format was; what mattered was its content. Furthermore, the use of e-textbooks provided access to resources between teachers and students. Lastly the participants' perceptions were that e-textbooks were providing additional material.

Johnston, Berg, Pillon and Williams (2015) used the TAM model in a study in which they were investigating the experience of university students on the use of e-textbooks in a pilot project by two textbook publishers. They focused on perceived ease of use and perceived usefulness of the technology. Their sample consisted of 11 classes of the university. Results of their study were that a higher percentage of participants showed a positive perceived use of ease, as they found that it was easy to install the software, access the e-textbooks and navigate. However, the participants showed a lower interest in reading online. For ease of use, the two publishers were compared and they found that one is easier to access than the other. They state that even though their study did not focus on external factor such as cost, it is an issue that needs to be considered when implementing e-textbooks.

Eicker-Nel and Matthee (2014: 1) investigated "the adoption of tablet based e-textbooks in South African private school". The theoretical framework they used to analyse their findings is called Cultural Historical Activity Theory. The data collection method they used was interviews using an interpretive case study. Their sample consisted of learners and teachers from the same grade (Grade 10) and the same school in South Africa. Their sampling was influenced by the project that was running at the school, Information Technology School Innovation, whereby only the Grade 10 learners were given tablets for educational purposes.

They found that the learners found that the tablets and e-textbooks were advantageous. They were advantageous in that they were light in weight, easy to use compared to printed textbooks, and easy to access due to being stored in one place, unlike when they forgot a printed textbook at home. Even though there were some advantages that tablets and e-textbooks brought, there were problems experienced by both learners and teachers. These problems included too many files and applications in different locations in the tablets, making it difficult to access some at the same time, tablets charging problems, difficulties when moving from one page to the next and trouble reading from the tablets. In the conclusion to their study, they write that there were a few things required when e-textbooks are introduced, which can also influence the adoption of e-textbooks. These are infrastructure that can provide e-textbook platforms and teachers needing to acquire new teaching skills.

Grönlund, Wiklund and Böö (2017: 1359-1375) focused on the use of collaborative tools in a study titled "No name, no game: Challenges to use of collaborative digital textbooks". The collaborative tools are considered to be books that are in a portable document format and are used by teachers and learners to "communicate and discuss" among other things in schools. Some of the "collaborative tools" referred to are "teaching tools" which they state are used for sharing resources, "learning support tools" used for searching and finding words definitions and communication tools that are used for communication between a teacher and

students. They used "questionnaires, classroom observations and interviews" to gather data from 370 students and 30 teachers from several schools.

They found that the tools were not used as much as printed textbooks. In some instances, both teachers and learners were not aware of their existence. Their major finding and conclusion were that teachers saw and used digital textbooks as the same as printed textbooks and not as a teaching tool. Therefore, the teachers thinking about how they see digital textbooks has to change so that they gain its benefits and use it as a teaching tool.

Batoon, Morales and Fiqueroa (2018: 47-60) investigated "instructional design to measure the efficacy of interactive e-books in a high school setting". They used the Kemp Model of Instructional Design for their questionnaire. They followed a qualitative research approach with the use of a case study. Their sample consisted of 16 new students and 7 professors. They found that the e-books are used as a "technological education resource". There was an improvement in the students' learning skills such as "reading and writing," to name a few that the professors noticed. According to the students, their grades improved due to the functions that were provided, which were "audio and visual content".

Lin, Liu and Kinshuk (2015: 1-17) researched "teachers' needs when using e-textbooks in teaching". They constructed the "needs of using e-textbooks perception scale" that would assist teachers in implementing and using e-textbooks in schools. Their study involved 415 teachers from 22 schools responding to a questionnaire and they interviewed five teachers who were known to be experts in the field of using technology in school. Out of the 415, only 378 participants' responses were usable for the study. They used a quantitative research approach.

Their work established three "needs of using e-textbooks perception scale" which are "to support teaching activities, to support reading and presentation and to support learning activities". They explained the first need that teachers need to be provided with the functions such as pushing of resources, giving quizzes, and the ability to update content when using e-textbooks. The second need was described as the need to providing teachers with e-textbooks that have, to name a few, hyperlinks and the functionality to change fonts and its size. The last need was explained as the need to highlight information on the e-textbooks and "provide parent management interface". According to their study, these "needs of using e-textbooks perception scale" were not based on or affected by gender and age. Furthermore, in two of the "needs of using e-textbooks perception scale" components which are "support teaching activities and support reading and presentation" the level at which the teachers were teaching made a difference.

A study by Ifenthaler and Schweinbenz (2013: 525-534) considered teachers' perspectives regarding the acceptance of the tablet for teaching in the classroom. In their literature review, they focused on the benefits of the tablet, such as built-in microphone and camera features. In addition, they point out that teachers and students play a vital role in the success of tablet integration.

The research approach that they used was qualitative research. Reasons for selecting this method was that it allowed them to explore important variables of technology acceptance much more than did the UTAUT model. Another reason was the small number of teachers involved in the study. They used the UTAUT model, but they also touched on models that are used in technology acceptance such as TAM and TRA. They made use of all four constructs of the model which are performance expectancy, effort expectancy, social influence and facilitating conditions and added behaviour intention as well as use behaviour from the TAM.

The interview questions they asked the teachers were in-line with the UTAUT model and the teachers' attitude towards tablets. What they found on the performance expectancy construct was that a small number of teachers had believed that tablets might enhance "learning and instruction". Although they have seen tablets' potential, they did not have any idea how they could implement it as a teaching method. Age and gender played a role in their study (as part of the facilitating conditions construct). Hence, one of the participants who was a 37-year old female made a suggestion that she would like to be provided with a training course so that it does not take her too long to get used to using a tablet in the classroom.

Furthermore, with regards to facilitating conditions, a female teacher mentioned that infrastructure in terms of software and hardware support is a requirement for them to utilise tablets. According to her, if a problem arises she will not try to fix it but rather switch back to the traditional way of teaching. When questioned on the expectancy construct, the majority of teachers responded that as long as there was a strong support system the tablet would be easy to use. Lastly, they found that there was a positive attitude towards the intention to use technology. In conclusion to their study, performance expectancy and facilitating conditions were the major constructs that provided them with results on teachers' perceptions on using tablets.

**Summary of the findings**

The study produced different results in two ways, the first results were found from the literature review details in Chapter 2 and the second results were the study's results that are detailed in this Chapter. The table below provides a summary of the results from both findings. It was found that teachers at the school where the study was conducted have a positive attitude towards the implementation of e-textbooks unlike findings obtained from literature reviewed.

**Table 2.2 Summary of the findings from literature view and the study**

| Studies | Summary |
|---|---|
| **Study** | The first findings of this study were the needs pertaining to the learning environment as compared to the needs found from Lin, Lui and Kinshuk (2015) which focused on the functionalities needed from textbooks in the learning environment. The needs found in this study are 1) adequate and timely training, 2) having no learners in their classrooms without a tablet or mobile device, 3) the ability to choose the textbooks themselves, and 4) the need to communicate their requests regarding the software and functionalities with the service provider. |
| **De Oliveira, Camancho and Gisbert (2014)** | The shared view from both the teacher and the students was that e-textbooks provided legitimate information but the different perception was on the function they used to highlight information which the teacher thought provided insufficient information for students. Other findings were that the students liked using e-textbooks and preferred it. |
| **Weilbach and Matthee (2015)** | Found that teachers perceived e-textbooks as not the correct tool for teaching and learning and that there was lack of support for them as well as their learners. |
| **Alawami (2016)** | Found that it did not matter what the books' format was; what mattered was its content. Lastly the participants' perceptions were that e-textbooks were providing additional material. |
| **Johnston, Berg, Pillon and Williams (2015)** | Results of their study were that a higher percentage of participants showed a positive perceived use of ease, as they found that it was easy to install the software, access the e-textbooks and navigate. However, the participants showed a lower interest in reading online. For ease of use, the two publishers were compared and they found that one is easier to access than the other. They state that even though their study did not focus on external factor such as cost, it is an issue that needs to be considered when implementing e-textbooks. |

| Studies | Summary of the findings |
|---|---|
| **Eicker-Nel and Matthee (2014)** | They found that the learners found that the tablets and e-textbooks were advantageous. They were advantageous in that they were light in weight, easy to use compared to printed textbooks, and easy to access due to being stored in one place, unlike when they forgot a printed textbook at home. Even though there were some advantages that tablets and e-textbooks brought, there were problems experienced by both learners and teachers. These problems included too many files and applications in different locations in the tablets, making it difficult to access some at the same time, tablets charging problems, difficulties when moving from one page to the next and trouble reading from the tablets. In the conclusion to their study, they write that there were a few things required when e-textbooks are introduced, which can also influence the adoption of e-textbooks. These are infrastructure that can provide e-textbook platforms and teachers needing to acquire new teaching skills. |
| **Grönlund, Wiklund and Böö (2017)** | They found that the tools were not used as much as printed textbooks. In some instances, both teachers and learners were not aware of their existence. Their major finding and conclusion were that teachers saw and used digital textbooks as the same as printed textbooks and not as a teaching tool. |
| **Batoon, Morales and Fiqueroa (2018)** | They found that the e-books are used as a "technological education resource". There was an improvement in the students' learning skills such as "reading and writing," to name a few that the professors noticed. According to the students, their grades improved due to the functions that were provided, which were "audio and visual content". |
| **Grönlund, Wiklund and Böö (2017)** | They found that the tools were not used as much as printed textbooks. In some instances, both teachers and learners were not aware of their existence. Their major finding and conclusion were that teachers saw and used digital textbooks as the same as printed textbooks and not as a teaching tool. |
| **Lin, Liu and Kinshuk (2015)** | They established three "needs of using e-textbooks perception scale" which are "to support teaching activities, to support reading and presentation and to support learning activities". They explained the first need that teachers need to be provided with the functions such as pushing of resources, giving quizzes, and the ability to update content when using e-textbooks. The second need was described as the need to provide teachers e-textbooks that have, to name a few, hyperlinks and functionality to change fonts and size. The last need was explained as the need to highlight information on the e-textbooks and "provide parent management interface |
| **Ifenthaler and Schweinbenz (2013)** | There was a small number of teachers had believed that tablet PCs might enhance "learning and instruction". The need for training was highlighted and the need for infrastructure (hardware and software) support. The last finding was that teachers were willing to use the application as long as there was a strong support system. |

## 2.8 Conclusion

Usage and benefits of tablet in classroom, debate among e-textbooks and printed textbooks are the topics that are emphasised in this chapter. The discussions indicate that tablets are used in some schools and that they are beneficial and they enhance the learning process. It also indicated the problems that can arise from the tablet usage, such as disabilities and the costs that may be incurred if the tablets needs to be fixed.

Nowadays technology provides devices that can be used to enhance the way learners are taught. However, these technologies change the role of teachers from being the main resource of providing information to learners as they formerly did. However, the teachers are still needed and are not replaced by these technologies. The technology that this study focuses on is the tablet and how it provides tablet-based textbooks. For this technology to function well, learners and teacher have to accept it. This study focuses on the acceptance of tablet based textbooks as part of the teaching instruction tool in schools in South Africa.

There are some important factors that the chapter discussed. These factors include the acceptance of technology in schools and the use of e-textbooks as well as the media that are used to display the e-textbooks. The model to be used to understand the perceptions that teachers have towards e-textbook in classrooms is called the UTAUT model. In conclusion, the chapter looked at the advantages that tablet based textbooks bring to teaching and learning and the views of teachers with regard to acceptance of technology as an instruction tool.

# CHAPTER 3

# RESEARCH METHODOLOGY

## 3.1. Introduction

This chapter covers the research methodology followed for gathering and analysing data, and the chosen population and sampling. The research strategy used is a case study and interviews were used to collect the data. The theoretical foundation of the study is also explained in this chapter: A research paper by Ifenthaler and Schweinbenz (2013) is discussed in which they used the UTAUT model to determine the perceptions of teachers towards the use of tablets for teaching purposes. This dissertation uses a similar approach by using the model (UTAUT) to determine the perceptions of teachers towards e-textbooks on tablets in one school. Ethical considerations discussing the rights of participants are also covered.

This dissertation is a qualitative research study. Zainal (2007) note that, if a researcher's aim is to do an in-depth study on a particular problem being experienced by a specific group, a qualitative research approach would be better suited as it helps a researcher to understand and analyse in detail the problem being studied. Furthermore, Zainal (2007) mentioned that a qualitative approach is a better approach when investigating problems within education among other sectors. Besides, a quantitative research approach has limitations and thus it can hide important aspects of the problems being investigated (Zainal, 2007). Another limitation that Zainal (2007: 4) mentioned is that quantitative research approach will not "help to explain complexities of real-life situation".

## 3.2 Research questions summary

The main research question was mentioned in Chapter 1. Below are the research sub-questions.

**Research sub-questions**:

SRQ 1: What is an e-textbook?

SRQ 2: What are the advantages and disadvantages of e-textbooks?

SRQ 3: What are the perceptions of teachers regarding technology in the classroom?

SRQ 4: What are the perceptions of teachers regarding e-textbooks in the classroom?

SRQ 5: What are the needs of teachers regarding the implementation of e-textbooks in the classroom?

## 3.3 Research Paradigm

*Research paradigm* refers to "human constructions, which deal with first principles or ultimately indicating where the researcher is coming from so as to construct meaning embedded in data" (Kivunja & Kuyini, 2017: 26). Myers (1997) noted that in qualitative information systems research there are three paradigms which are frequently used, namely, positivism, interpretivism and critical. Myers (1997) explained that positivism assumes a reality that occurs naturally that is not accidental and can objectively be measured by researchers and their instruments. Ritchie, Lewis, Nicholls and Ormson (2013) described positivism as follows:

- It produces knowledge based on careful observations to make sense of the findings,
- There is no doubt as to what reality is and is not,
- It allows and caters for natural sciences' methods to study the social world, and
- The research processes and facts are independent of the reality.

On the other hand, interpretivism is referred to as a philosophical approach whereby the researcher aims to understand the social context of information systems (IS) and its processes through the users of IS in a specific group (Myers, 1997). There are no variables (dependent or independent) that are measured, but a researcher can observe and derive understanding from a group currently experiencing changes in their situation (Myers, 1997). In other words, the perceptions of the subjects are not determined and measured statistically but they are understood, observed and measured in their context. Scotland (2010: 12) emphasise that "interpretivism aims to bring into consciousness hidden social forces and structures". He further explained that interpretive methodology focuses on understanding the perceptions, culture and history of a particular group experiencing a social change in their world. The third paradigm, critical research assumes that history plays an important role in the construction of reality and that history tends to repeat itself (Myers, 1997). Its focus is the uncovering of power structures in societies and the emancipation of the oppressed.

Among the three mentioned and explained paradigms, the one that the researcher chose as suitable for this research is the interpretive approach. It enabled the researcher to understand and provide results of a situation that a specific group (teachers) is experiencing, namely, changes and challenges due to new technologies (e-textbooks and tablet)

introduced at their school. Furthermore, it allowed the researcher to study the perceptions of the teachers in-depth and closely as the researcher did fieldwork which interpretivism supports.

### 3.3.1 Interpretivism

The focus of this study is to get an understanding of the factors influencing teachers' acceptance of e-textbooks in the classroom. The assumption is that each teacher creates his or her own meaning around this technology. By digging deeper into this subjective meaning of research participants, a clearer picture emerges about the acceptance and adoption of this new technologies in classrooms.

Thanh and Thanh (2015); INtgrty, 2016 and Goldkuhl (2012) describe some of the characteristics of interpretivism summarised below:

- It focuses on finding different perspectives and accepting them.
- It seeks interpretations, personal opinions, emotions and beliefs and does not need to be observable and measured.
- Ethnographies and case study methods are favoured by interpretivists.
- The qualitative research approach is usually linked to interpretivism.

Interpretivism seeks to understand and interpret human beings' everyday living and behaviours in their interaction with things such as the introduction of new technology for daily use. Thanh and Thanh (2015) noted that qualitative research and interpretivism work hand-in-hand as they look at the realities of the world and its changes through human beings and their daily living. Moreover, both qualitative and interpretivism support change in a social context. Thanh and Thanh (2015) add that case studies which are often used in qualitative research support interpretivism. Qualitative research seeks to understand the realities of the human being in a social context while quantitative research measures and observes facts.

### 3.4 Research approach

### 3.4.1 Qualitative research

Qualitative research allows the researcher to understand and analyse people's perceptions through the use of case studies (Yin, 2010) and "understand people and what they say and do" (Myers, 2013). Myers (2013) explained that qualitative research deals with finding data by talking to people. He further emphasises that statistical data would not result in a better understanding of people's social context. Yin (2010) adds that using statistical tools to

analyse data may not represent the feedback received from the participants. However, qualitative research studies provide the real live perceptions of participants which a researcher cannot modify to show different perceptions to what the participants are experiencing in their daily lives that are being studied (Yin, 2010).

As was already mentioned, a qualitative research methodology was chosen for this study. The reason for this was that it allows the researcher to conduct a case study with the use of interviews to help determine and understand in-depth the teacher's perceptions with regard to the use of e-textbooks in classrooms for teaching purposes. Other reasons, as emphasised by Jeff Sauro (2015), include:

- Exploration – it helps a researcher to explore something that is not well researched or known about a subject to gather information and understand about that subject. This could be a service and technology an organisation has introduced to its employees and the organisation wants to understand how their employees interact with the changes (technology) and the effects that the changes (technology) bring to its employees and production.
- Context – qualitative research gives more in-depth information on an environment and the context of what is being studied. It helps the research to be able to observe and gather information by being present at an event that is being researched.
- Explanation – it gives the researcher the opportunity to hear problems from the users, problems arising from the technology introduced.

There are several methods used in qualitative research and they are grounded theory, case study and action research (Myers, 2013). To determine and understand the perceptions that teachers have towards the adoption and acceptance of e-textbooks on tablets, a case study methodology was chosen to be suitable for this study.


### 3.4.2 Case Study

Myers (2009) writes that a researcher can choose between two methods of case studies, that is a teaching case or a research case. They each have different purposes; for a teaching case, the purpose is to "help students learn" (Myers, 2009). For this study the researcher focused on the research case as its purpose is to "contribute to a new theory or explore existing theory" (Myers, 2009); additionally, Leedy and Ormrod (2009) explained a case study as learning "more about something or a poorly understood situation".

According to Myers (2013), there are several ways to use a research case. He explained that it can be used to "discover, test, explain and compare" new or existing theories.

Furthermore, the objective of a case study is to "illustrate a principle or a particular point that the instructor wishes to make" (Myers, 2009). A research case requires the user to be more familiar and have a lot of information on the chosen research topic (Myers, 2009).

## 3.5 Data Collection

The approach used is an interpretivist case study where qualitative data is collected through interviews. The participants of the study were teachers from a private secondary school in Gauteng, South Africa. A researcher should familiarise himself or herself as well as cite the newest research articles that are available that are connected to the subject being studied (Myers, 2009). Hence the researcher mentioned some existing articles that were written on e-textbooks in school in her literature review.

**Table 3.1: Data collection method for the research questions**

| Research question | Data collection method |
|---|---|
| Main research question: How can the UTAUT model helps in reaching a better understating of teachers' use behaviour and acceptance of e-textbooks? | Interviews |
| Sub research question 1: What is an e-textbook? | Literature study |
| Sub research question 2: What are the advantages and disadvantages of e-textbooks? | Interviews and literature study |
| Sub research question 3: What are the perceptions of teachers regarding technology in the classroom? | Interviews and Literature study |
| Sub research question 4: What are the perceptions of teachers regarding e-textbooks in the classroom? | Interviews and Literature study |
| Sub research question 5: What are the needs of teachers regarding the implementation of e-textbooks in the classroom? | Interviews and literature study |

The researcher used interviews for data gathering. Interviews are a better technique to gather in-depth information as Myers (2013) writes that the understanding of social context of people in terms of their "roles and situations" can be obtained with the use of interviews. The researcher made use of the semi-structured interview method, the reasons being that it allows the researcher to go through pre-determined questions and add other questions as the interview proceeds (Myers, 2013). Yin (2010) calls the semi-structured interview a qualitative interview. He explains that it does not restrict the interviewer to stick to a set of questions laid out or interviewing one person at a time. It also allows the interviewee to pose questions to the interviewer, creating a conversation between the two and the questions

asked by the interviewer can be open-ended. Most of interview questions were based on the constructs of the UTAUT model, with some additional demographic questions. Twelve out of 14 interviews were recorded. Notes were taken during all the interviews.

### 3.5.1 Interview guide structure

The interview questions consist of two parts. The first part focuses on the demographics of participant and the second part concentrated on the constructs of the UTAUT model shown in Figure 2.4 above which has several constructs detailed fully in Chapter 2. Due to the description and understanding of the model's construct, the researcher found the model to be suitable to use for this study. The UTAUT constructs seeks to determine and understand the beliefs and perceptions of a group or of individuals and the expected performance of a technology that is being studied.

There are four main constructs in the UTAUT model. From these constructs there are two variables that are influenced by all four constructs and they are behavioural intentions and use behaviour as shown in Figure 3.1. In this study, behavioural intentions determine teachers' intentions to use e-textbooks in classroom and use behaviour determines if the teachers do use e-textbooks in classroom, how often they use them and what they use them for. In this research the model's constructs were used to investigate and gather data, as outlined below.

**Performance expectancy**, which is defined as "the degree to which an individual believes that using the system will help him or her to attain gains in job performance" (Alshehri, Drew & AlGhamdi, 2012: 70). The literature review established that teachers and learners can benefit from tablets and e-textbooks if introduced in schools. This construct helped the researcher to gather data and provide in-depth understanding to some of the teacher's perceptions of using e-textbooks. The perceptions that were measured were the benefits believed to come with e-textbooks, beliefs such as the improvement of the teachers' teaching methods when incorporating e-textbooks, and less effort in teaching and providing information to learners. The questions that were asked during the interviews with regards to this construct focused on the kind of benefits teachers believed the technology would give them in executing their jobs. The interview questions can be found in Appendix D.

**Effort expectancy** "is the degree of ease associated with use of the system" (Alshehri et al., 2012: 70). The researcher mentioned in the literature review that there were factors that affected the adoption and acceptance of tablets and e-textbooks. However, some of the existing studies on the acceptance of e-textbooks found that if teachers are provided with the

easiest technology and support and are confident with the technology they can adopt it more quickly with ease. Therefore, this construct measures the teachers' perceptions that the e-textbooks and tablets are easy to learn and use. Some of the interview questions that were asked were based on investigating the expectations that teachers had in terms of the technology introduced. The interview questions can be found in Appendix D.

**Social influence**: "is the degree to which an individual perceives that important others believe he or she should use the new system" (Alshehri et al., 2012: 71). This construct aims to find out the participants' interest and confidence in using technology and how they measure their colleagues' use of technology compared to them. The perception that other teachers can use e-textbooks better and efficiently than others were measured using this construct. The interview questions can be found in Appendix D.

**Facilitating conditions** "is the degree to which an individual believes that an organisational and technical infrastructure exists to support the use of the system" (Alshehri et al., 2012: 71). In the study by Ifenthaler and Schweinbenz (2013), a participant mentioned that they require infrastructure such as software and hardware support to be put in place. The reason being that, if there is a problem, she will not be required to fix it. Some of the research questions were based on finding out if there is infrastructure, software and hardware available to utilise e-textbooks in classroom. The interview questions can be found in Appendix D.

**Behavioural intention to use** is defined in Chapter 2 as the intention of an individual to adopt and use a certain technology. Furthermore, in Chapter 2 some parts of the literature review revealed that other teachers intend using the technology if there is training in place so that they do not struggle much when using the technology. The interview questions can be found in Appendix D.

### 3.5.2 Interview process

The process followed for the interviews was:

- Before the commencement of each interview, the researcher got permission to conduct the interviews from School A's head office and from the principal of School A. Each participant was given a consent form in which the researcher explained its contents and meaning, which participants signed and gave back to the researcher. Moreover, some participants read the form before signing. The researcher explained to the interviewees the purpose of the research study.

- For the duration of the interview, the researcher asked questions as they were and added a few questions, as the interviews were semi-structured and allowed the researcher to ask additional questions that were not listed in the questionnaires. The only personal data that the researcher asked participants were their gender, age, years of experience and subject they taught.

## 3.6 Research Setting

The study was conducted at one of the South African schools in Shoshanguve, Pretoria, Gauteng. The e-textbooks and tabletss are implemented from their primary level to their secondary level and in all their subjects. It is mandatory for both teachers and learners to use e-textbooks and not printed textbooks. However, the school has printed textbooks and they are used when necessary such as instances in which learners and teachers are having problems to access the e-textbooks or when teachers have to print certain material for the learners who do not have tablets.

When teachers use e-textbooks in the classroom, they open them on their laptops and project via the overhead projector to the whole class. They use the miEbooks application which is an e-textbook reader that is provided by EduX. The application provides a number of activities that both teachers and learners can use for learning. MiEbooks application functions for teachers and learners are:

1. The teachers can push homework, classwork, assessments, tests and notes to learners' resource library. Figure 3.2 below shows the pushed resources in the margins on the right-hand side.
2. Check learners' participation when using e-textbooks.
3. Download videos and push them to learners' resource library.
4. Mark assignment and tests.

5. Within an e-book, the user (teacher and learner) can highlight or underline information and make notes.
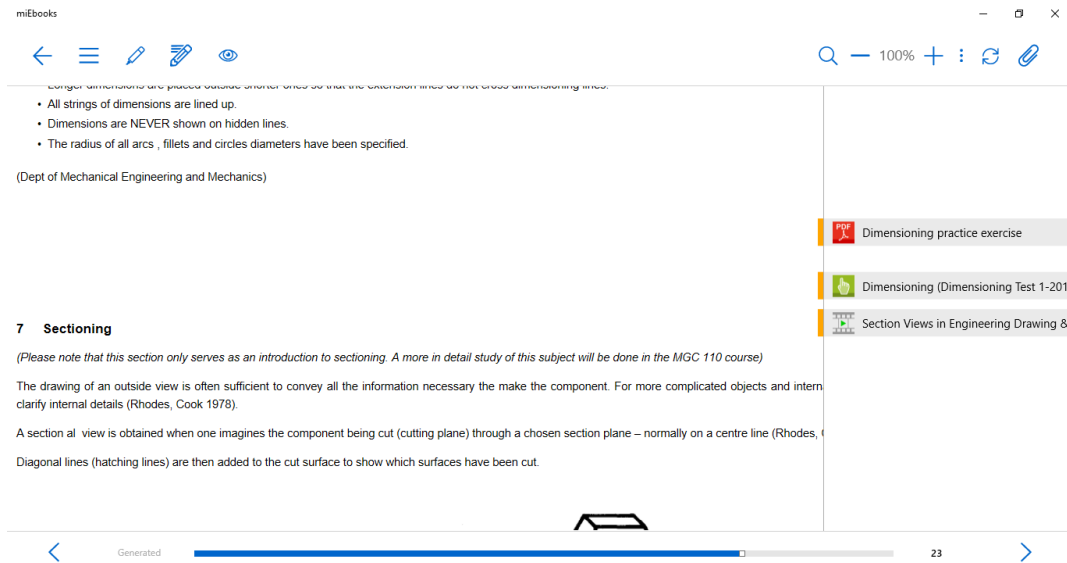


**Figure 3.2: A page of an e-book in the MiEbooks app.**

This study focused on secondary teachers only, since the researcher was investigating their behaviour and perceptions towards the use of e-textbooks on tablets as a teaching tool that they use for each subject for which they are responsible.

## 3.7 Sampling

Banerjee and Chaudhury (2010) defined population as a particular group of people or subject whereby there is a requirement to learn certain things about them. A sample is defined as "a subset of a population selected for measurement, observation or questioning, to provide statistical information about the population" (Boundless, n.d). As mentioned in Section 3.6, Research Settings, the population for this study consisted of only the teachers who are using the e-textbooks for teaching purposes in the classroom. The participants in this study were 14 secondary-level school teachers at a school in Gauteng. The school in this study will be referred to as school A.

### 3.7.1 Sampling Criteria

The main purpose for this method was so that the researcher can have a one-on-one conversation with each participant. This helped the researcher to understand and observe the participants' reactions and understanding of using tablet-based e-textbooks in

classrooms as a teaching method. The criteria used for selecting the participants were based on:

- The school had to have the required hardware and software as well as the e-textbooks available for utilisation by teachers.
- The participants had to be from a school at which the concept of e-textbooks on tablet had been introduced.

The sampling method used was a purposive sampling category. Under this sampling category, maximum variation sampling was applied. This method aims to include every participant from the selected population to be included based on "people, organisation, behaviours, experience, situations" among others. These are the type of participant a researcher is interested in finding the relevant information for what he or she is studying (Mujere, 2016). The maximum variation sampling included participants who:

- Were secondary level teachers at school A,
- Were using e-textbooks in-classroom for teaching purposes,
- Had access to internet, intranet, tablet and applications for e-books on their tablets,
- Volunteered to participate, and
- Were available to do the interview.

The following was not taken into account, although the information was recorded: the years of experience, their age, whether they used the e-textbook and tablets before, their gender, their attitude towards technology and which subjects they taught.

### 3.7.2 Demographics

The demographic information of each participant (teacher) is listed in Table 3.2 below. The subjects that the participants taught were Mathematics, Physical Science, Social Sciences, Economic Management Sciences, Economics, Business Studies, Life Science, Maths Literacy, Natural Science, Accounting, Information Technology, English, Life Orientation and Computer Application Technology. Demographic data were collected as well, including gender, different age groups, number of years of experience in teaching and different grades as well as the subjects each teacher was responsible for teaching. The first participant refused to give out his age.

**Table 3.2: Demographics of participants**

| Participant | Gender | Age | Experience | Subject |
|---|---|---|---|---|
| 1 | Male | Not specified | 5 years | Mathematics, Physical Science |
| 2 | Male | 37 | 8 years | Social Sciences |
| 3 | Male | 37 | 12 years | Economics, Economic Management Science, Accounting and Business Studies |
| 4 | Male | 47 | 19 years | Physical Science, Life Science, Mathematics, Maths Literacy and Natural Sciences |
| 5 | Female | 42 | 17 years | Mathematics |
| 6 | Male | 35 | 14 years | Business Studies |
| 7 | Male | 33 | 10 years | Accounting and Information Technology |
| 8 | Female | 34 | 13 years | English |
| 9 | Female | 32 | 5 years | Economics and Management Science, Business Studies and Life Orientation |
| 10 | Male | 25 | 1 year and five months | English Home Language and Life Orientation |
| 11 | Male | 27 | 8 months | Mathematics |
| 12 | Male | 37 | 9 years | Information Technology and Computer Application Technology |
| 13 | Female | 42 | 20 years | English Home Language |
| 14 | Male | 42 | 15 years | Mathematics and Physical science |

## 3.8 Data analysis

Data analysis is defined as the process of creating meaning and understanding from collected data through analysis. The process of analysing data involved identifying codes from participants' statements, creating themes from the codes identified and then mapping the participants' statements to the related themes under each relevant construct of the UTAUT. The interviews were semi-structured which allowed the researcher to add more questions as the interviews proceeded. This assisted the interviewer to gather relevant data for data analysis and research finding. The interviews were all face-to-face and responses received were text-based data transcribed from 12 recorded and two unrecorded interviews. The interviews were transcribed after each statement was scrutinised to decide whether it supported the existing constructs of the UTAUT model. The analysis involved putting the responses in a table format. The tables comprise four headings, that is theme, code, quote and participant number. Under the code, the researcher identified the codes from the responses, and then grouped them to form themes under each construct. Under the quotes there are participants' statements that are linked to the codes and themes. Lastly, the participant's numbers were added to match the statements of participants to indicate what

each participant said on different questions. There were statements that were removed, reasons being that the statements were not relevant to any questions asked, contained duplicates, were not related to the topic or did not make sense.

The qualitative data analysis technique that was used is thematic content analysis. Braun and Clark (2006) define thematic content analysis as "a method for identifying, analysing and reporting patterns within data". Thematic content analysis is often used in qualitative research (Braun & Clarke, 2006). Alhojailan (2012) writes that thematic content analysis can be used when there are situations that require data interpretation. He further explained that this is a situation in which the researcher has to produce facts that provide variables within a group being studied from the experiences of participants, for example, "their behaviour, actions and thought" (Alhojailan, 2012 :41).

Another situation that Alhojailan (2012) mentioned was that in which thematic content analysis represents analysed data in two approaches. Alhojailan (2012), Moldavska and Welo (2017) and Mayring (2014) state that there are two types of thematic content analysis, that is, deductive and inductive analyses. A deductive approach is a process of testing an existing theory that was used and tests if the theory can produce the appropriate resulting different situations (Alhojailan, 2012). He further defines the inductive approach as it does not follow any theory and that at the beginning of a research study observations have to be collected and there is no theory that is used to create questions for the study. This study focused on the deductive approach since the constructs of the UTAUT model were used to analyse the data.

## 3.9 Ethical Considerations

There are a couple of ethical issues that may occur when a researcher is performing a study. These issues can be mitigated by taking into consideration their effect on the participants in order to protect the participants in the study. The researcher obtained permission from the Department of Informatics and the school that is being studied. Therefore, ethics were observed as discussed below.

Informed consent is an agreement document that a participant sign indicating that he or she agrees to take part in a research study voluntarily. It is not a must that the participant should sign a form, but he or she is told upfront what the research is about and the risks associated with it.

Trust the degree to which the organisation and its employees trust that the researcher will not share or publish private information about them and that the researcher will not betray them while the research is still conducted or after its completed.

Anonymity and confidentiality identifiable information such as names, age, etc. of the participants should not be taken during and after the study. All the information gathered should not be identifiable in a way that it links to a specific participant and the organisation. In addition, the organisation's private information should be protected in the same manner as its employees (participants).

Before the researcher went to the school to conduct the interviews, the researcher received consent from the school and the university. At the beginning of each interview the researcher outlined the rights that the interviewee was entitled to before the interview proceeded. These rights are (Yin, 2010; Oates, 2006):

- To receive and sign consent forms to participate in the research.
- Each participant has the right to refuse to take part in the interviews.
- At any point, they can decide to withdraw from participating in the interviews.
- Confidentiality to be ensured to them that their identity will not be made available to anyone.
- Each participant was chosen equally and fairly included in the research.

After the participants were told about their rights, the researcher explained to them the purpose of the research. In addition, she also explained the research model that was used and how the questions were structured according to the model.

## 3.10 Conclusion

In conclusion, the information provided in this chapter includes a discussion on what qualitative research is and how sampling for this type of research should be selected. Furthermore, there were three types of research paradigms discussed, which are the interpretive, critical and positivism paradigms. For this study, the paradigm used was interpretivism and the theory used under this paradigm was Unified Theory of Acceptance and Use of Technology model. Lastly, there's a discussion on how data analysis in the next chapter was carried out. The next chapter is Chapter 4 and it discusses and analyses the findings of the interviews by creating themes and codes using thematic content analysis, using a deductive approach.

# CHAPTER 4

# Data analysis and interpretation

## 4.1 Introduction

The use of e-textbooks on tablets in the classroom has a number of benefits. Teachers are reluctant to use these technologies as a way of teaching, therefore delaying the growth, implementation and effective use of them. The Department of Education and schools' decision makers do not understand the problems that influence teachers' adoption and implementation of these technologies in the classroom, hence this study was done. The purpose of this study is to determine the perceptions that secondary teachers have towards the use of tablet-based e-textbooks in the classroom.

The previous chapter emphasised the tools, techniques and method to collect the data to be presented in this chapter. These include the research paradigm, which is interpretivism, the UTAUT model (Venkatesh et al., 2003) as the theoretical foundation, sampling criteria of the participants and ethical considerations explaining the rights of each participant.

This chapter presents the findings for this study in discussion format. The chapter concludes with a summary of the results of the research interviews.

## 4.2 Thematic content analysis

Thematic content analysis is mostly used in qualitative studies to transcribe and analyse different types of interviews, focus groups, and observations (Erlingsson & Brysiewics, 2017; Jugder, 2016) as was mentioned in Section 3.8. This is a qualitative study; therefore, the qualitative content analysis approach was followed. This analysis method was also guided by the UTAUT model and the research objective. It is important to note that the analyses was based on the constructs of the model as shown in Figure 4.1 below and gender and age were not considered for analysis. The discussion section of this chapter presents the descriptive interpretations of the data. Finally, the results are used to suggest a list of needs of participants associated with e-textbook implementation which are presented in Chapter 5. The research objectives as mentioned in Chapter 1 are:

1. to use the constructs of the UTAUT model to investigate teachers' perceptions of e-textbooks on tablets.

2. to use the UTAUT model to determine the factors influencing teachers' acceptance of tablet-based e-textbooks in secondary school.
3. to determine the needs of teachers when using e-textbooks.

## 4.3 Findings and analysis

The UTAUT model, as defined in Section 2.6.4 by Alshehri, Drew and AlGhamdi (2012: 70-71) and Gümüşoğlu and Akay (2017: 381), describes factors influencing the intentions of a user to utilise technology and extend it to the behavioural usage of technology. They further described the constructs of the model as follows:

- Performance expectancy "is the extent to which an individual believes that using the system will help him or her to attain gains in job performance".

- Effort expectancy "is the degree of ease associated with use of the system".

- Social influence "is the degree to which an individual perceives that important others believe he or she should use the new system".

- Facilitating conditions "is the degree to which an individual believes that an organisational and technical infrastructure exists to support use of the system".

### 4.3.1 Performance expectancy

With this construct, the researcher hoped to find out if the teachers believed that e-textbooks as a teaching tool can assist them in improving their teaching ways to be better than before. The themes identified in this construct are Convenience for learners, Methods of delivering lessons or information, Factors preventing the use of e-textbooks in classroom, Benefits of using e-textbooks, Disadvantages of printed textbooks, tablet functions and use, Disadvantages of using tablets, Learners' performance when using e-textbooks and Compulsory use of e-textbooks.

**Convenience for learners**

The first theme identified in the thematic content analysis was *Convenience for learners*. The e-textbooks are convenient for learners because they provide them with some benefits. Throughout the interviews, participants mentioned the benefits that e-textbooks and tablets gave to their learners. Participant 5 mentioned that for "disciplined learners there are benefits; it's a good thing". While other benefits mentioned by other participants are the

availability of e-textbooks and less heavy backpacks. The rest of the benefits are presented in Table 4.1.

This theme identified the importance of having and using e-textbooks and tablets at the school for the learners. The importance ranges from grades improvement as Participant 14 mentioned "improvement in grade averages", health, studying schedules and encouragement to study as they are excited about the technology.

**Table 4.1: The convenience that e-textbooks offer to the learners**

| Themes | Codes | Quotes | Participant # |
|---|---|---|---|
| Convenience for learners | Always available | "They are suitable and very convenient. Because at any moment in time you simply ask the learners to open their tablets and then they go to their e-book and find the information. It's not like a normal textbook whereby the learner will say I have forgotten it at home, it has been stolen; all those funny excuses", | 1 |
| | | "Because it allows them to practice regularly. They do the work anytime anywhere they want, whether they are in a taxi or whether they are sitting during lunch", | 11 |
| | | "They can read anywhere at any time with their tablet", | 12 |
| | | "With the serious ones, you find that when others are busy playing, the serious ones will take advantage of free wi-fi. They download information, they even tell me that they found this on this site. Maybe the site that I haven't visited and then they load to their resources". | 13 |
| | Lighter backpack | "It's compatible, the learners don't have to move around with lots of textbooks", | 7 |
| | | "The load they are carrying is reduced because the books are in the tablet despite the fact that they are not utilising", | 4 |
| | | "Healthy side, they don't have to walk with 12/13 books", | 8 |
| | | "Everything is loaded in their tablet. They don't have to carry books all around", | 10 |
| | | "It's less cumbersome for the learners to carry. Because sometimes you feel for them. The bags are full, so at least this comes in handy". | 13 |
| | Learners excited | "Is also ideal in the lower grades because they are so excited about the technology. And that excitement of using a tablet, even those learners who have got a negative perception as far as education is concerned you can see that they are excited about school". | 7 |

**Methods of delivering lessons and information**

This is the second theme identified under the performance expectancy construct. In this theme, the participants mentioned several teaching tools and techniques that they use and how they use them in the classroom and outside the classroom. These tools and techniques are generated by tablets and e-textbooks to provide learners with information. To a certain extent, some of these tools and techniques are also beneficial to the learners as they can receive resources even after school. Some of the mentioned tools and techniques are pushing videos, audios and projecting information. The rest of the teaching tools and techniques are mentioned in Table 4.2 below.

Furthermore, Participant 6 emphasised a teaching technique that is another option to use when e-textbooks and tablets are malfunctioning in classrooms, which is the use of a "chalk and board". However, this is the old way of teaching and it is still being used but not as much as before due to the introduction of e-textbook and tablets. Nonetheless, some of the participants considered pushing resources to their learners and projecting the information as the most effective uses of e-textbooks and tablets. Like Participant 1 who said, "The effective use is that you can project it with the overhead projector and you can further illustrate on the picture that has been projected on the white screen". Another positive thing that Participant 13 noticed was that:

> *"I found that those lessons that I deliver in that way, kids seem to enjoy better than the ones I just teach the traditional way. So, I have come to realise that kids enjoy these things, so it creates interest in them. So, when I compare myself to others, it means their lessons are more interesting than mine".*

This theme highlighted the many ways of teaching methods that are there and which other teachers can use if they are currently not using them.

**Table 4.2: Methods and tools used for lesson delivery in classroom**

| Themes | Codes | Quotes | Participant # |
|---|---|---|---|
| Methods of delivering lessons and information | Clear images | "The pictures and information, it's well detailed and defined because the pictures are coloured, so the information is portrayed clearly from the teacher to the learner", | 1 |
| | | "In IT, let's say we are dealing with how to study, kids nowadays they like visual, unlike the old model of reading your newspaper, so it's the things that they can relate to". | 7 |
| | Projecting | "History is all about reading and projecting on the board and telling stories as it is". | 2 |
| | | "I can easily project my e-textbook", | 3 |
| | | "Lesson presentation". | 14 |
| | Videos | "Sometimes I get videos just to add up to what I have and the e-textbooks". | 2 |
| | | "I can load videos and they can watch at home. They can prepare in advance so that they know tomorrow this is what we are going to do. The kids go through it and if they are not sure or they forget, it also serves as a revision; they can look at the video over and over again", | 9 |
| | | "I can attach a video there right next to the specific paragraph that we on. Let me say we are in a specific topic and paragraph number 3 and I want to play a video of an example of whatever information is being discussed there in that particular paragraph, I can simply take that video and paste it right next to the paragraph". | 10 |
| | Forward/ push resources | "The other aspect I was talking about is that you can push notes, activities, videos which wouldn't be in the case of hard copy", | 2 |
| | | "I can easily forward my resources to their book resources", | 3 |
| | | "I used it for pushing resources; they are a lot so no need to make copies; saves time and paper". | 5 |
| | Audio | "A part of the book we downloaded audio book so the learners are actually able to hear the pronunciation of the specific Shakespeare language and doing that, they get a much better understanding on Shakespeare and the time Romeo and Juliet was playing of", | 8 |
| | | "I push the book same time and every learner has it". | 10 |
| | Chalk and board | "Sometimes it is time consuming to use e-textbooks. Sometimes you just have to opt for the chalk and talk". | 6 |

**Factors preventing the use of e-textbooks in the classroom**

When analysing the interviews on printed textbooks compared to e-textbooks, the researcher found three themes. The first theme is *Factors preventing the use of e-textbooks in the classroom.* This theme highlighted the different challenges that teachers experience when using e-textbooks in the classroom. These challenges are preventing them to fully utilise the e-textbooks as their teaching tool. The first problem they experienced is that learners get distracted when they are using the e-textbooks and tablets. The distractions are caused by the lack of discipline from learners to focus on studying (e-textbooks). Other problems, as mentioned by Participant 3, were that "Some of the learners they don't have the tablets" and Participant 10 added that "Some of them (learners) don't have tablets, some tablet are lost, some of them the parents are still going to buy them tablets. Some of them probably the parents are still struggling; they can't afford to buy them the second time".

Furthermore, a few participants mentioned that the learner would be surfing the net or be on social media platforms such as WhatsApp and YouTube, instead of focusing on the work at hand. Participant 5 said, "Undisciplined learners are trouble, they Google and do WhatsApp". Other problems mentioned by participants were technical and application problems. While Participant 11 said, "They are using different operating systems on their tablets most of the times you find the ones that are using Windows, it cannot function properly".

In addition to things that are preventing teachers from using e-textbooks, the participants highlighted that situations or topics for a lesson influences the use of e-textbook, meaning that they may not use the e-textbook in each lesson. These findings are supported by some of the statements in Table 4.3. Two participants suggested a similar solution to deal with the accessing of social media platforms and surfing problems. The solution that Participant 3 suggested was, "If they can make the tablet not to accommodate other apps and only push books only, I think it will be very effective". Participant 4 suggested that "I would recommend that they use tablets without access to videos and so forth".

Due to these problems, few participants highlighted that they preferred to use the printed textbooks over e-textbooks, like Participant 9 and 11 who said "I honestly prefer traditional (printed textbook)". Their preference of this format is due to the challenges mentioned in Table 4.3 that they face in classrooms when the learners are interacting with tablets. A few participants expressed their preference being e-textbooks and others preferred both formats, such as Participant 4 who said, "I think they must work hand-in-hand; we must at least have them. Because now most of the learners, I can say 20 percent of the learners do not have tablets". Other statements that support the use of both textbook formats were made by Participant 5 who said it will depend on the type of learners, meaning, "Undisciplined

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learners, traditional textbook is suitable and disciplined learners e-textbooks is suitable".
Participant 7 added that, "Both (textbook formats), depending with the grade. Higher grades I
prefer textbooks, lower grades I prefer e-books". Nonetheless, the choice of preferred
textbook format resulted in mixed feelings about who should use e-textbooks in the
classroom. Three participants said only teachers are supposed to use e-textbook while other
participants said "both learners and teachers" should use the e-textbooks in classrooms.

**Table 4.3 Printed textbooks versus e-textbooks**

| Themes | Codes | Quotes | Participant # |
|---|---|---|---|
| Factors preventing the use of e-textbooks in the classroom | Distracted | "I prefer both [e-textbooks and printed textbooks] because normally learners use WhatsApp. Like you must specifically be on the book so when you say let's open the book someone will go to WhatsApp", | 3 |
| | | "If something is electronic, it means learners also have access to other unnecessary apps. So sometimes using e-textbooks a learner might act like they are opening their e-textbook up and they actually studying but they just playing games or they are on other social media networks", | 10 |
| | | "Most of the times they are not focused on what they are supposed to be doing instead they will be on other sites or surfing the internet. I honestly prefer traditional. When using a traditional textbook, you cannot get learners gets distracted, they cannot be surfing the net as they were supposed to be focusing on the actual work". | 11 |
| | Technical Problems | "Sometimes the wi-fi is down; you have to update the version". | 9 |
| | | "You are not going to experience any problems where a learner will tell you my e-textbook is not online today it doesn't want to open. So, using the traditional textbooks I think it will always be efficient", | 11 |
| | Situation or topic | "It depends on the topic. And sometimes use variety so there's no better method than the other, it all depends on the situation; it all depends on the topic", | 6 |
| | | "It depends on what I'm doing, with language the e-books are okay but with literature I prefer hard copy because they have to make notes and comments, etc. So for literature I feel no, I'd rather stick to the old system". | 13 |

**Benefits of using e-textbooks**

Benefits of using e-textbooks were identified as another theme under this construct. Although the benefits mentioned are to both teachers and learners, the most mentioned under this theme were for the teachers. The first benefit as stated by participants in Table 4.4 was safe keeping of the book. To elaborate further on safe keeping of the book, Participant 1 and 2 mentioned that a printed textbook can tear, therefore valuable information can be lost. Other benefits were that e-textbooks are environmentally friendly, easy to update and access, user-friendly, reliable and immediate availability, saves time and paper, fast teaching and for revision.

Another hidden benefit that was mentioned by participants was the performance of learners since the use of e-textbooks. Participant 1 said, "Mostly (learners) the improvement is there but is just that the attitude is there now". However, Participant 5 expressed that, "Some (learners) there is a decrease in their performance in the classroom due to not using e-textbooks during period".

To conclude this theme, it is important to note that the participants provided the benefits of e-textbooks. comparing it to printed textbooks. There were no benefits that were mentioned regarding printed textbooks. The table below represents the benefits and participants statements.

**Table 4.4 E-textbooks**

| Themes | Codes | Quotes | Participant # |
|---|---|---|---|
| Benefits of using e-textbooks | Safe keeping | "A traditional [printed textbook] can tear or one of the pages gets lost", | 1 |
| | | "The traditional textbook is okay but talk about how to keep it as it is, not tearing up". | 2 |
| | Environmentally friendly | "The e-textbooks are environmentally friendly because after using them you don't throw them away and make the environment dirty", | 1 |
| | | "We are trying to be eco- friendly, no more printing, we just push the resources". | 7 |
| | Easy to update | "It's easy to update e-textbooks than traditional, traditional you have to throw it away". | 1 |
| | Easy access | "Because learners they will be able access as long as they have wi-fi. They can easily access even homework when I'm absent". | 3 |
| | | "In my opinion, it is much more accessible for the learners". | 8 |
| | User-friendly | "In my e-textbooks I can just highlight whatever I want to highlight and write notes or extra information I want to put there. And if I want to erase it I can simply erase it, so its quicker and convenient". | 10 |
| | Reliability and immediately available | "Like reliability. The other advantage of e-textbooks, once you have purchased it online it is immediately available, unlike textbook". | 1 |
| | Saves time | "It reduces my use of white board and can easily push some activities into learner's tablets", | 4 |
| | | "When pushing resources, it saves time and no need to go do copies", | 5 |
| | | "It's not time consuming, you don't have to use notes on the board you just have to push", | 6 |
| | | "Time saving because we project it and it makes it easy for learners to follow the lesson". | 14 |
| | Saves paper | "Reducing a lot of paperwork". | 4 |
| | Fast teaching | "Probably the speed at which you work is much faster as compared to using an ordinary textbook", | 4 |
| | | "It makes my teaching very fast and convenient". | 12 |
| | Revision | "For me is the revision purpose, it works better when I'm revising". | 12 |

**Disadvantages of printed textbooks**

This theme identified three disadvantages of printed textbooks. These were generated from the comparison of the two textbook formats just as with the above theme. A few participants made mention of a few things they did not like about printed textbooks which resulted in disadvantages. The first disadvantage was that they are not user-friendly. Participant 10 explained that they have to be carried all the time and that you cannot find a quick explanation of a word without searching for it in a dictionary. This suggests that when using an e-textbook you can easily access the meaning of a word more quickly than when using a physical dictionary.

He added that printed textbooks are not easily available when ordering or purchasing, as with e-textbooks you can easily download and share among the learners. The last disadvantage was mentioned by Participant 12, who focused on the safe keeping of a textbook with regards to "natural disaster" damages. In conclusion, this theme highlighted factors that shows why printed textbooks as the main method of textbook format according to participants will not be considered. However, it does not put an end to having them as an alternative textbook as other participants mentioned that they still have and use them sometimes. Another factor mentioned by Participant 14 is that "They cannot each go back to traditional hard copy resources". Therefore, they might have a difficult time adjusting to printed textbooks as one participant mentioned that some learners have never used them before. They are used to e-textbooks as they started using them from lower grades. Table 4.5 shows the disadvantages and statements made by participants.

**Table 4.5 Disadvantages of printed textbook**

| Themes | Codes | Quotes | Participant # |
|---|---|---|---|
| Disadvantages of printed textbooks | Not user-friendly | "Well, traditional textbooks are fine but the process of having them around; having to carry them. If I don't understand something I have to go back, get a dictionary somewhere and then come back and write next to it. For example, if I want to take down notes, I cannot jot down all my notes on my traditional textbook because someone else in the following year might want to use it". | 10 |
| | Unavailability | "Instead of ordering and then maybe there is not enough textbooks for everyone. Now people have to go around sharing". | 10 |
| | Damage | "Simply because most of the time the textbooks we are using in terms of natural disaster it can damage the books". | 12 |

**Tablet**

*Tablet* became one of the themes identified due to being used as a display for e-textbooks and as a device to access other functions that the EduX system provided. The participants gave several uses of tablets. The functions are mentioned in Table 4.6 below. To name a few, the tablet provides a platform to enable teachers to use the EduX system to push resources, give homework and classwork to learners and monitor the learners' access to e-textbooks. Although the functions seem to provide positive use, there were some disadvantages that the participants mentioned. They mentioned that the disadvantages are safe keeping of the tablet and not having control as to what the learners can install on them.

**Table 4.6 Tablet**

| Themes | Codes | Quotes | Participant # |
|---|---|---|---|
| Tablet functions/use | Push resources | "I can push the corrections and sometimes when I'm absent I can push the work in my absence". | 13 |
| | Activities | "It's easy on their part. And the pushing of assignments and homework and videos, it helps them", | 2 |
| | | "Sending of class tests, homework to their book resources", | 3 |
| | | "For notes, exercise and reading case studies. Exercises are already prepared", | 6 |
| | | "Class activities, homework". | 7 |
| | Monitoring | "Now I can tell whether the learner is doing homework or not because I can monitor their activities even if they are at home", | 5 |
| | | "It's difficult to oversee whether learners are responding to what you are saying, are they on the same page with you or they are doing their own thing. So, monitoring is difficult especially if the class is too big", | 6 |
| | | "You can see what time did they sleep, when did they last open the book, the percentage of usage. You can easily monitor their activities. It just needs to be monitored because our kids are not that focused. So, you may think that the learner is in the e-textbook while the learner is just busy doing something else, so it needs discipline", | 7 |
| | | "I think it is efficient and it is helping me to see the progress of my learners". | 11 |
| Disadvantages of using tablets | Safe keeping | "But with the tablet if it falls in the water you cannot have access". | 12 |
| | Non-educational applications | "If something is electronic, it means learners also have access to other unnecessary apps. So sometimes using e-textbooks a learner might act like they are opening their e-textbook up and they actually studying but they just playing games or they are on other social media networks", | 10 |
| | | "Most of the times they are not focused on what they are supposed to be doing instead they will be on other sites or surfing the internet". | 11 |

### 4.3.2 Effort expectancy

With this construct, the researcher aimed to find out from the participants how easy or difficult it was for the learners and participants to use and adapt to these technologies. The theme identified in this construct was *Adapt to e-textbooks*. To encourage the use of

technology, its users have to find it easy to use. When the technology is user-friendly, it can be adopted positively. Therefore, the adaptation of e-textbook by both teachers and learners is important as it can persuade the adoption of the technology in school. A few participants mentioned that learners are struggling to adapt while the majority of the participants said learners are adapting well. Participant 10 mentioned that, "Since we are in a generation of technology they don't have any problem with using the e-textbooks or operating them" and Participant 11 added that, "The students are used to it; they've been using it I think since grade 7 or so. So they are used to the e-books". Table 4.7 provides supporting statements from the participants.

The last code identified was "Teachers go through learning curve". This is based on the participants' first time use of e-textbooks. The majority of the participants said that it was easy for them to use the first time and a few participants mentioned that it was challenging. It is clear that most participants had to go through a learning curve to start getting used to the functions. Some found it easy from the start. It can be assumed that the majority of the participants found it easy to use these technologies due to the training they may have received, having used the technologies before implementation and having acquired skills as technology teachers. Table 4.7 shows participants' statements that support the findings.

**Table 4.7 Participants' views on learners' adaptation of e-textbooks**

| Themes | Codes | Quotes | Participant # |
|---|---|---|---|
| Adapt to e-textbooks | Learners struggling to adapt | "They [learners] are still struggling but they are getting there. Because even us teachers, we struggle a bit in terms of going to the exact page", | 1 |
| | | "They [learners] are failing to adapt because they don't utilise facilities well". | 4 |
| | Learners like technology | "They [learners] love technology", | 2 |
| | | "These are young generation they like technology", | 3 |
| | | "They [learners] like technology". | 9 |
| | Teachers go through learning curve | "At first I didn't find it easy but gradually I'm now comfortable with it", | 1 |
| | | "It's quite easy", | 4 |
| | | "For me it was easy, we had training. But for the old people it was drama. So, age will determine whether it's easy or difficult", | 9 |
| | | "At first no, because I wasn't used to the process, I was just taking down notes. After I got used to it, it was pretty much easy. There was nothing actually hard about it", | 10 |
| | | "It is very user-friendly. It is easy", | 12 |
| | | "Not at all so born before technology", | 13 |
| | | "Very easy". | 14 |

### 4.3.3 Social Influence

The first theme found under the social influence construct was *Learn from others*. This theme identified the influence that other participants had on their counter parts. The influence is directed at the use of e-textbooks and tablets in the classroom. Other teachers are influenced to use these technologies because of the fact that their colleagues use it and also the way they use it. The majority of participants expressed that they were influenced by how other teachers were using the technologies. Table 4.8 summarises teachers' comments. Some participants mentioned that the way in which others present their PowerPoints influences them. However, Participant 9 said she is not influenced by others because "I don't know what other teachers are doing" and Participant 14 said, "I don't know how others are using them because I am always in my class".

**Table 4.8 Participants' influence on each other to use e-textbooks**

| Themes | Codes | Quotes | Participant # |
|---|---|---|---|
| Learn from others | Copy good practice | "I copy good practice", | 1 |
| | | "Copy from others who do it better than you". | 6 |
| | Influence | "The way they do their presentation of the slides", | 3 |
| | | "It influences me a lot because at times we go to SharePoint; we share information and so forth", | 4 |
| | | "The way they provide extra information, extra notes are influential because they try and get as much usage from other platforms of information than just relying on what's in the e-textbook", | 10 |
| | | "You find some people they do like PowerPoint presentations from those things in the e-books. I can't, someone has to set it up for me". | 13 |

**Advanced users of e-textbooks**

The last theme identified under this construct through thematic content analysis was the participants identifying the teachers who are *Advanced users of e-textbooks*. The advanced users were, according to other participants, the Computer Application Technology (CAT) teachers. This implies that they are advanced due to the subject they teach, which is in line with the technology. Table 4.9 below provided the statements from participants that support this theme.

**Table 4.9 Advanced users of e-textbooks**

| Themes | Codes | Quotes | Participant # |
|---|---|---|---|
| Advanced users of e-textbooks | IT teachers | "Those guys who are teaching IT", | 3 |
| | | "There is this other teacher who is teaching CAT, so with this IT stuff he's way knowledgeable", | 11 |
| | | "With my knowledge and experience in IT, some of them it's easy for me to use it", | 12 |
| | | "The IT guys those that are teaching CAT", | 13 |
| | | "There are teachers for CAT". | 14 |

### 4.3.4 Facilitating conditions

There were three themes that were identified in this construct. They are Tools, Training and Support (from colleagues and from technicians).

**Tools**

To use e-textbooks in the classroom there should be available proper tools. These tools should be in the form of hardware and software. According to participants, the tools that are available and some of the tools they are using are e-textbooks, tablets, and projectors installed in every classroom. The rest of the tools are listed in Table 4.10, as stated by participants. This is an important theme because without the tools that were mentioned, the use of e-textbooks would have not been possible. This is one of the factors that influence the use of e-textbooks.

There was a complaint about e-textbooks from Participant 4 who said "We are not given option to choose the books we feel are more user-friendly". This implies that they are forced to use the e-textbooks that EduX provides them with and are not given an opportunity to suggest the e-textbooks that they feel they want to use and that are user-friendly. Another complaint was expressed by Participant 12 who implied that the software they are using needs an improvement. He mentioned that, "When someone develops software you need authorisation from the software developer before you can be able to modify or before you can be able to add". This suggests that the current software programs that are used are not up to the satisfaction of some of the teachers.

**Table 4.10 Tools used to deliver lessons in classrooms**

| Themes | Codes | Quotes | Participant # |
|---|---|---|---|
| Tools | Hardware and software | "We have the tablet, laptop, all the tablets are loaded with e-textbooks, and we have a projector and wi-fi", | 2 |
| | | "They give us laptops or tablets. We have wi-fi internet access", | 8 |
| | | "Laptop, the tablets. We got projectors. wi-fi", | 9 |
| | | "We have tablets, laptops, Siyavula application and the EduX software", | 11 |
| | | "We have the projector", | 13 |
| | | "E-books, tablets and projectors". | 14 |

**Training**

Another theme identified under facilitating condition construct was *Training*. In order for new systems to be used there should be training provided to its users. The training can be provided before the implementation and during implementation of new systems. This can encourage and influence the use of new technologies. From the responses of participants, some mentioned that they never received the training before using the technologies and they learned from other teachers.

Others, like Participant 6, who joined the school while the technologies were already implemented, mentioned that, "I jumped on a moving train so I suppose it was done. However, the time I joined it was already moving". This suggests that when new teachers join the school they are not given training before entering a classroom and using e-textbooks and tablets. However, it does not mean that there will never be any other training, since Participant 13 mentioned that, "They continue to do training". Therefore, this statement from Participant 13 means that training is provided at a particular time and that those teachers who did not get a chance to learn the technologies before using them have a chance to learn them from the EduX personnel.

Another way of training mentioned by Participant 6 was that, "We hold meetings for training if there are any new aspects to be exposed to". In this way, they do not have to wait for EduX personnel as Participant 10 stated that, "Every term, the people from the EduX department come and educate us". The teachers themselves can help educate one another by providing and conducting training sessions. To support the statement that teachers can educate each other, Participant 2 was impressed with another teacher's knowledge of these technologies when he said:

> *"There was a day that we went for a training, and one of the teachers showed how she been using the software to do multiple choice questions. Even though it was training on that but she had been using it before that day of training."*

Table 4.11 provides additional statements that support this theme.

**Table 4.11 EduX training provided to participants**

| Themes | Codes | Quotes | Participant # |
|--------|-------|--------|---------------|
| Training | Provided training | "Not with me, the other teachers showed me. And then from there it's an application, you learn it; you do and you see the results", | 1 |
| | | "I think it was done two or three months before we even started using it", | 2 |
| | | "We hold meetings for training if there are any new aspects to be exposed to", | 6 |
| | | "Every term, the people from the EduX department come and educate us. They give us extra classes, training classes", | 10 |
| | | "I haven't received training", | 11 |
| | | "They [EduX] train us, we learn from the training". | 14 |

**Support**

When considering the use of these technologies, *Support* was found to be another important theme. This theme can be divided into two parts, which is support from colleagues (teachers) and support from the deployed IT technicians that are always available at school. Many participants mentioned that whenever they have a problem they would go to the colleague they prefer to get help from. Furthermore, they mentioned that, if a learner is experiencing a problem, if they cannot assist the learner they would refer the learner to the technician or an IT teacher to assist.

According to the participants, IT technicians provide support to both learners and teachers with problems they may be facing on a daily basis with their tablets and e-textbooks. Just as Participant 11 said, "We do have IT personnel. If you are having challenges, in most cases we refer our problems to them". Participant 7 added that, "The EduX guys makes a turn once every week" to provide further assistance. This is supported by additional quotes from other participants in Table 4.12.

**Table 4.12 Provided supports**

| Themes | Codes | Quotes | Participant # |
|---|---|---|---|
| Support from colleagues | Ask for help | "If I'm having a problem, I can go and consult another teacher to help me with that particular problem", | 1 |
| | | "Normally you just learn normally when you have a problem then you go and ask for assistance", | 3 |
| | | "There are teachers who are advanced, I ask for help from teachers who know how to do that specific activity", | 5 |
| | | "The other guys they just go to those who are well clued up and learn how to do it, how to download, how to push, how to convert, things like that", | 7 |
| | | "Everyone will go to their relevant people, but when the older people come I help where I can and the young teachers are always willing to help", | 9 |
| | | "I have got a senior teacher, most of the times we sit and plan together what to send out and how to best use the EduX platform". | 11 |
| Support | Technical support | "There in an IT technician", | 1 |
| | | "There are some things that are technical like things that have to be configured by the IT guys", | 2 |
| | | "We just refer them [learners] to the IT guy because of the issue of time", | 3 |
| | | "There are technicians; we are not given that access to assist them. But when we send for that help it takes a long time. They delay on fixing those problems", | 4 |
| | | "Sometimes we refer them to the technician especially problems beyond my control", | 6 |
| | | "There are some things that are technical, I can't help them [learners]", | 9 |
| | | "We have got people that are there to assist students like technicians We got a professional who comes every week to help us with anything we need for the EduX platform", | 10 |
| | | "Guys who deals with software and hardware. If they can't, they send it to specialist in head office". | 11 |

### 4.3.5 Behavioural intention to use

In the UTAUT model, behavioural intention is influenced by three constructs. The constructs are Performance Expectancy, Effort Expectancy and Social Influence. From the findings from the three constructs, the researcher aimed to find out if the teachers had a positive or a negative attitude towards the use of these technologies in classrooms. Users' attitude can influence the behavioural intention to use these technologies.

The technologies referred to are e-textbooks, tablets and the EduX platform. With regards to attitude towards e-textbooks and tablets, most participants expressed a positive attitude, such as Participant 2 who said, "I love it (e-textbook), it's portable". Other positive attitudes were from (a) Participant 7, "It (e-textbook) is ideal" and (b) Participant 8, "I'm excited regarding the e-textbooks in class".

Participant 9 had a negative attitude due to the behaviour of the learners and the tools they used when she said, "Personally I don't vote for them because kids play on their tablets. Sometimes the wi-fi is down; you have to update the version. I prefer hard copy".

When it comes to participant's attitude towards the EduX platform functions, among others are e-textbook display, pushing of resources, playing audio and video and monitoring learners. Participant 13 said, "I think it's good, just that I don't know how to use these other functionalities". While Participant 7 mentioned that:

> *"I have challenges with the EduX. One, the resources that we have been pushing since 2015 are still there they need to be taken out because it's taking space for the learners. Secondly on videos, you can only upload videos that are like 15 minutes long, not more."*

Furthermore, another aspect that can influence participant's behaviour to use these technologies was training. There was a positive response from participants who said they would like to get training so that they can utilise the platform to its full extend. The only negative response was from Participant 9 who said, "The little training that they give us, half the time we are lost. There are too many things on EduX".

It can be concluded that the participants have a positive attitude to use the technologies. This is influenced by the finding in the three constructs that provided a good deal of positive outcome, such as the benefits the learners and teachers received from these technologies. As well as their willingness to get more training to fully use the technologies and the EduX platform.


### 4.3.6 Use behaviour

Use behaviour is influenced by the results from behaviour intention and facilitating condition constructs as shown in the UTAUT model in Figure 4.1. In this study, it was assumed that frequency of use will give an indication of use behaviour. The findings showed that these technologies are used frequently as participants mentioned that they use the e-textbooks and tablets "everyday" and "every lesson". Despite the fact that they are mandated to use them every day, they showed positive results and are influenced to use them. A further

theme was found, namely, *Voluntariness of use of e-textbooks*. The statements in Table 4.13 supports the mandatory use of e-textbooks in the classroom.

**Table 4.13 Mandatory use of e-textbooks**

| Themes | Codes | Quotes | Participant # |
|---|---|---|---|
| Voluntariness of use | Mandatory | "Its mandatory, I have to use it in every lesson", | 4 |
| | | "No decision, therefore we always use it. But when they are writing tests, they don't use e-textbooks", | 5 |
| | | "We use it every day, it's not an aide to teaching it's the main thing. Like in grade 12, they do have tablets and they do have hard copies so the main thing is e-book and then we support them with printed material. It's not the other way around", | 7 |
| | | "They have to have their tablets every day and their e-books are in their tablets. So, it's not a decision to say today we are using e-textbooks. Every day we are supposed to use e-books", | 10 |
| | | "I do not decide to use the e-book, it's a norm it's what we use. It's in the school's policy, we use the e-books. So, it is a must for me to use the e-book because we don't have any other material except the e-books", | 11 |
| | | "People are saying they were born before technology but as long as we are in the 21$^{st}$ century whether you were born before or not, you have to use it because that is what we are using", | 12 |
| | | "At this school it is mandatory since we have to use e-textbooks, but there are hard copies". | 14 |

## 4.4 Conclusion

This chapter detailed the study's results produced from interviews. Only the teachers were interviewed and the learners were excluded from the interviews. A deductive approach was used, as it tests the theory from the literature. The theoretical model that was used was the UTAUT. Themes were created to provide a better analysis and understanding of the interview responses.

From all the themes found from the analysis of the interviews, there were several themes that clearly highlighted factors and the perceptions of participants with regards to accepting the use of e-textbooks in the classroom. The themes are *Methods of delivering lessons and information*, Factors *preventing the use of e-textbooks in the classroom*, *Benefits of using e-textbooks*, *E-textbooks*, *Training*, *Tools* and *Support*. These themes identified and

highlighted the challenges participants face daily. However, they also highlighted the benefits they are getting from using e-textbooks and tablets. Other factors that the researcher learned were the kind of support that participants received from their colleagues and EduX personnel and the tools that they are using and what they are using them for. An interesting finding was that despite the fact that the use of the technology was mandatory, the behavioural intention towards use was positive. This is in line with the research of Venkatesh et al. (2003). They added voluntariness of use as a control factor of the relationship between social influence and behavioural intention and predicted that social influence will have a stronger effect on behaviour intention in mandatory environments.

The last chapter provides the conclusions of this research study and provides recommendations on how to introduce, encourage and motivate teachers to use e-textbooks in classrooms as a teaching tool.

# CHAPTER 5

# Findings, recommendations and conclusion

## 5.1 Introduction

This chapter presents the study's findings, conclusion and recommendations. The findings of the study answer the research questions and provide results on why teachers are reluctant to use e-textbooks on tablets in the classroom. Furthermore, the recommendations for further research and Chapter 5's conclusion will be presented at the end of this chapter.

## 5.2 Findings of the Study

The findings of this study are presented by responding to some research sub-questions with the literature findings only and other research sub-questions are responded to with both literature findings and interview findings, as indicated by Table 3.1. Furthermore, where there were responses from interviews that are in line with the literature findings, they are highlighted within the findings. The findings for the main research question are from only the analysis of interviews and are discussed in Section 5.2.6 after the findings from the sub-research questions. Other findings are discussed and presented under each sub-research question of the study.

### 5.2.1   SRQ 1: What is an e-textbook?

E-textbook was defined in the literature review as a textbook which is in an electronic format and displayed in an electronic device such as tablet or smartphone (Al-Mashaqbeh & Al Shurman, 2015). Hamedi and Ezaleila (2015) emphasise that an e-textbook is the same as a digital textbook. Another definition of e-textbook by Lin, Liu and Kinshuk (2015) is that it comprises electronic materials that are suitable for education in the classroom. They add that e-textbooks are a means for conducting lessons in the classroom and they can also be used to deliver lessons online. According to participants' responses, an e-textbook is an application that they use to deliver lessons to their learners.

Furthermore, Lin et al. (2015) state that there are several ways that learners can acquire knowledge when using e-textbooks. Learners can use hypertext, which they explain as an environment that produces many ways of utilising information (Hamedi & Ezaleila, 2015).

They also add that another way of getting more information is with the use of multimedia channels. Some of these channels are video, animation, and audio, which are embedded in some e-textbooks and the devices that are used to display the e-textbook. Another good thing about e-textbooks is that it can provide teachers the platform to give their learners assessments via digital platforms and they can provide feedback more quickly (Hamedi & Ezaleila, 2015). It was found in the interviews that some of the above-mentioned multimedia channels are being used by both teachers and learners daily. An example is the use of audio, regarding which an English teacher among the interviewees mentioned that she uses audio so that her students can be "able to hear the pronunciation of the specific Shakespeare language".

In conclusion, an e-textbook is a tool used in education as a teaching tool in the classroom. It is applicable to be used by both learners and teachers. At the school where this study was conducted, both learners and teachers are using it as their main textbook format and is it a rule written in their policy, as one participant mentioned. There are benefits that are afforded by e-textbooks to both users. These benefits are detailed in the answer to the second research sub-question below.

### 5.2.2 SRQ 2: What are the advantages and disadvantages of e-textbooks?

Technology brings change to the way things are implemented especially in education settings. These changes can be beneficial and yet they can bring challenges that the users have to face daily when using technology in schools. The literature review as well as the interviews identified several advantages and disadvantages of e-textbooks. The key findings of this research sub-question are the advantages and disadvantages of e-textbook that were found from participants whereby they were comparing e-textbooks to printed textbooks and the literature review. There were several advantages and disadvantages of e-textbooks that participants mentioned and some of them are linked to the tablets that are being used to display e-textbooks. The advantages from the literature review as mentioned by Doering et al. (2012); Harness (2015); Leonhardt (2017); Lai (2016); Hawes (2018), as well as those mentioned by participants are presented in Table 5.1.

**Table 5.1 Advantages of e-textbooks**

| Advantages from Literature review | Advantages identified from Interviews |
|---|---|
| Environmentally friendly – due to e-textbooks being made electronically, there are no trees that are cut down to make papers for the printed textbooks. | Environmentally friendly – due to the e-textbook format being electronic and not tangible, a person cannot throw it away to pollute the environment. |
| User friendly—font size adjustable—the user can reduce or increase the font size to the specific size they want for better reading. | User-friendly – it makes it easy to highlight and add or delete extra information. |
| Easy to search online – a user can search on the internet and download an e-textbooks they want. | |
| Readable in the dark – e-textbooks are displayed on portable small devices and devices have lighting therefore giving the user the ability to use them even when they are in a dark place. | |
| Imbedded links – there are links within e-textbooks material giving the reader to click on them and find more information like a definition of a word. | Imbedded links – the teachers and learners do not have to look for a definition in a dictionary, they can access the meaning quickly using links within the e-textbooks. |
| Portability – a user can travel with more than one e-textbook in one device and their back packs will be less heavy than carrying printed textbooks. | Lighter backpack – the learners carry less heavy backpacks because all their textbooks are electronic and they are all in a tablet. |
| Affordable – e-textbooks are less expensive than printed textbook. | |
| | Easy access – it is easily accessible to learners as long as they bring their tablets with to school and there is internet connection and there are no problems that arise like internet connection not being available or the tablet freezing. |
| | Saves paper – no need to print any material as the learners have soft copies of the textbook. |
| | Fast teaching – lessons are delivered faster than when using a printed textbook. |
| | Revision – it gives the teachers and learners better revision content as they already have the content and can quickly and easily access it anytime and anywhere. |
| | Safe keeping of a textbook – few participants mentioned that an e-textbook is safe from tearing and losing some pages. |

| Advantages from Literature review | Advantages identified from Interviews |
|---|---|
| | Reliable and immediately available – the amount of time it takes for e-textbook to be available for use and in the hands of the owner is quicker than when ordering printed textbook, as it can take a day or more to get to the owner. |
| | Easy to update – an electronic copy of a textbook is easier to update than a printed copy. These means that to update a printed textbook, the user must get a new edition and then get rid of the old edition. |
| | Saves time – e-textbooks and tablets save time for teachers since they do not have to write anything on the board; they can show the learners what they want to show them with the use a projector. |

The disadvantages that were stated by Doering et al. (2012); Harness (2015); Leonhardt (2017); Lai (2016) and Hawes (2018) and participants are presented in Table 5.2.

**Table 5.2 Disadvantages of e-textbooks**

| Disadvantages from literature review | Disadvantages identified from interviews |
|---|---|
| Batteries for the device – a user must have enough battery life in order to read an e-textbook or the device will be off; therefore, the e-textbook will be unavailable. | |
| Device dependent – e-textbooks rely on a reading device to work and applicable software. | |
| Health – when using e-textbooks, a user stares at the screen for some time; therefore, damaging their eyes. | |
| | Application problem – different operating systems performing differently; one performs much better than the other. |
| | Tablets availability – some learners' tablet get lost or damaged and parent are not able to replace them sooner. |
| | Learners are distracted – when learners are using e-textbooks, they tend to visit social media platforms that are installed on their tablets. Therefore, they get distracted and are not focusing on the lesson at hand. |
| | Technical problems – the technical problems are internet access, whereby their wi-fi in malfunctioning or the tablets are not working properly; they keep freezing. |
| | Safe keeping – due to e-textbooks stored in tablets, the devices can be damaged, stolen or lost. As a result, the e-textbooks will be lost too. |

From the interviews, it seems that the advantages provided by participants outweigh the disadvantages. Furthermore, it appears as if the teachers see e-textbooks as a good teaching tool to use in the classroom. The disadvantages are not considered a hurdle, as some of them can be managed. Some participants suggested that learners' tablets could be controlled so that they cannot install applications that are not for educational purposes; therefore, this would remove the disadvantage of the distracted learners. Moreover, a backup wi-fi from a different network provider could be considered so that, when they are experiencing problems with the one they have, there will be another that will support them, assuming that the wi-fi problems are that wi-fi connection is overloaded with too many connections or there is a network problem.

### 5.2.3 SRQ 3: What are the perceptions of teachers regarding technology in the classroom?

Technology was introduced into the education system three or more decades ago (Aflalo, 2014). Aflalo (2014) further writes that the increased adoption of technology in schools can be confirmed by teachers and learners through existing studies. The increase according to her is due to policies in the education system and schools, accessibility of the devices and applications used and training that is given to teachers. However, the perceptions of teachers should be measured as to how they are integrating and using technology in the classroom.

There are several studies that focused on investigating teachers' perceptions of using technology in schools and the studies have found some of the factors that hinder teachers from implementing technology in the classroom. The findings from the literature review reveal that teachers felt they are receiving little support when new technology is introduced and that when they needed support on old technology the support was better (Bataineh & Anderson, 2015). According to them, the teachers' perception of technology integration and competency is determined by gender, the grade that the user teaches and the users' experience in teaching. In addition, a study by Park, et al. (2016), found that there was a positive attitude from teachers towards using technology in the classroom. This positive perception is due to teachers seeing that technology helped their learners to build their character and improve their creativity and learning. Even though they found technology to be beneficial to their learners, secondary school teachers' workload had increased due to technology being introduced. Another important fact they found was that inexperienced teachers and female teachers had a negative perception of technology unlike experienced teachers and male teachers who had a positive perception of technology.

There were some additional findings that were found from participants of this study. Some of the findings revealed positive perceptions and some findings revealed negative perceptions from teachers regarding technology use in the classroom. Even though the study had more males than females, the results showed that the male participants had positive perceptions as compared to female participants. This result is similar to the results of Koksal, Yaman and Saka (2016). A conclusion for this research question's findings is that the perceptions that teachers have regarding technology in the classroom are that they are good tools to use as they save them time and promote learning with some of their learners, among other things. However, it also interrupts lessons and takes away some learners' focus in classrooms.

### 5.2.4 SRQ 4: What are the perceptions of teachers regarding e-textbooks in the classroom?

Alawami (2016) writes that technology has created new advanced tools that are used for teaching and learning. As a result, the education system has seen an increase in the use of technology. The introduced tool referred to in this study is the e-textbook, which can someday replace the printed textbook (Alawami, 2016). Batoon, Morales and Figueroa (2018) state that the creation of the e-textbook was so that learners can be independent and learn by themselves. They further emphasise that, in order to have the correct learning material for the learners, teachers, who know the factors that can improve the learners' skills, need to be involved in the formulation of the study material.

As a result, there can be different views from teachers regarding these materials especially the use of e-textbooks. According to Grönlund, Wiklund and Böö (2017), teachers have expressed diverse views when using e-textbooks. For example, they discovered that teachers use e-textbooks the same way they use printed textbooks. This can imply a negative perception of e-textbooks, as they are not realising the improvements and benefits of using e-textbooks. Moreover, teachers can be reluctant to use e-textbooks because they serve the same purpose as printed textbooks. Another perception expressed by teachers is that they see e-textbooks as additional material which adds to the printed textbook (Alawami, 2016); therefore, they will not see the need to change from using printed textbooks to e-textbooks. However, the participants in this study do not support the findings of Alawani (2016) because to them e-textbooks are a replacement of printed textbooks that were used before the introduction of e-textbooks that the school decided will be used as the main textbook format. In addition, they mentioned that there are printed textbooks which they use as a backup.

De Oliveira et al. (2014) write that from their study they found that teachers had a negative perception regarding e-textbooks due to the function of highlighting information that learners wanted to highlight. To teachers, this function did not provide enough information to the learners, as they would have wished. In conclusion, the perceptions that teachers have when using e-textbooks in the classroom is mostly positive according to this study, unlike the perceptions of other studies (more is said about this in answering the main research question below). This contrasts with existing research and may be attributed to the fact that it is mandator. The positive perceptions from respondents and probably all teachers can increase if the challenges that teachers face daily can be reduced. There were a few suggestions that the participants suggested can reduce the difficulties teachers are faced with daily.

### 5.2.5 SRQ 5: What are the needs of teachers regarding the implementation of e-textbooks in the classroom?

In this study, UTAUT was used to identify the needs of teachers regarding the implementation of e-textbooks in the classroom. These needs were identified from both the literature and interview findings. The findings are discussed in detail in Section 5.2.6 below, as part of the third research objective which can be found under the heading Facilitating Conditions.

### 5.2.6 Main research question: How can UTAUT model help in reaching a better understating of teachers' use behaviour and acceptance of e-textbooks?

The objectives of the study will guide the answers to the main research question. Each objective is presented and then under that objective the information presented is in line with the constructs of the UTAUT model. The first objective was to use the constructs of the UTAUT model to investigate teachers' perceptions of e-textbooks on tablets and the analysis of the first constructs supported this objective. The second objective was to use the UTAUT model to determine the factors influencing teachers' acceptance of tablet-based e-textbooks in secondary school and the second and third constructs supported this objective. Lastly, the fourth construct, which is facilitating conditions, supported the third objective which was used to determine the needs of teachers when using e-textbooks in classrooms.

The UTAUT model was described in detail in Chapter 2, Section 2.6.4 and in this chapter we highlight and define its constructs. The constructs are Performance Expectancy, Effort Expectancy and Social Influence that influences Behavioural Intention and the last construct is Facilitating Condition, which together with Behavioural Intention influences use behaviour. Age, experience and voluntariness of use were added as control factors. The definitions of the main constructs, as defined by Gümüşoğlu and Akay (2017: 381) are:

- Performance Expectancy: the degree to which a user believes that if they use the technology, it will impact their job in a positive way. Their job performance will improve due to the technology.
- Effort Expectancy:  the degree to which a user believes that the technology will be easier to learn and use.
- Social Influence: the degree to which a user believes that other users believe he or she should use the technology.

- Facilitating Condition: the degree to which a user believes that there is infrastructure in place to use the technology.

**Performance Expectancy**

The first objective was to use the constructs of the UTAUT to investigate teachers' perceptions of e-textbooks on tablets. Out of the four constructs of the UTAUT model, the Performance Expectancy construct was the one that mostly supported the first research objective. There were several themes that were identified under this construct and they gave a good insight for understanding the perceptions of teachers towards the use of e-textbooks on tablets in classrooms. These themes are *Convenience for learners, Methods of delivering lessons and information, Factors preventing the use of e-textbooks in the classroom, Benefits of using e-textbooks, Disadvantages of printed textbooks, Tablet functions and use, Disadvantages of using tablets, Learners' performance when using e-textbooks and Compulsory use of e-textbooks.*

From the themes identified, it was found that most participants found it easier to perform their job because of the many positive things about e-textbooks. These positive things, as mentioned before, are the benefits received when using e-textbooks and tablets. The fact that they do not have to deal with the challenges that come with traditional e-textbooks is also an added bonus to most of them, as only a few participants mentioned that they preferred printed textbooks. There were a few participants that had some negative perceptions and this is due to several causes. The first cause was from one participant who mentioned that not being technologically "savvy" and being "born before technology" hinders her from using e-textbooks in the classroom, but that she must use them as their use is mandatory. The other reason was the fact that, when using tablets, the learners lose focus on studying and they focus on social media applications and this produced negative perception by participants towards using technology in classrooms. This was also found by Batoon et al. (2018) but it was the learners that noticed this behaviour. They are unable to control the learners and the applications they install on their tablets.

Furthermore, the positive perceptions towards the use of technology in the classroom were also due to the other functions that the EduX platforms provide to teachers and that some participants see some improvement in their learners' performance. Besides the use of e-textbooks, there are several other functions that EduX provides. Some of them are the ability to check if a learner is logged in and reading their e-textbooks, the ability to give learners assessments to do at home or in the classroom, to mark the assessments and provide

marks to their learners quickly and pushing resources to their learners, which is the most-used function by teachers. Even some participants mentioned it is the only function they use other than using e-textbooks. They use the pushing of resources function more because they understand the function more than others and it saves them time as they do not have to give learners information by printing copies and distributing them or writing on the board. However according to one participant, using e-textbooks can be time consuming. He mentioned that, "If I know that I'm on time I will use them but if I know I'm now falling behind then I will use other mechanism to ensure that I pick up my pace". The assumptions for falling behind on time could be that it takes time to setup and project the book or that learners may be slow to access their e-textbooks, therefore wasting time and delaying the lesson's start. However, provided that the participant is on time, the use of e-textbooks saves time. On the other hand, some participants mentioned that there are printed textbooks available so this can be one of the mechanisms that they use when they cannot use e-textbooks due to the mentioned assumption. Other mechanisms could be the use of a chalk and board.

Another positive perception that participants had was the suitability of e-textbooks for the subjects they are teaching. Most of the participants said that the e-textbooks being used daily for all the subjects that are being taught at the school are suitable for the subjects they are teaching. However, the negative perception that was found was mentioned by Participant 4 who said that, "Yes, they [e-textbooks] are suitable. However, we are not given an option to choose the books we feel are more user-friendly". The last positive perception identified in this construct was support. The participants mentioned that they are getting support from EduX personnel and their colleagues. The support that they are getting from EduX is that they help them fix their tablets and load applications and e-textbooks for both learners and teachers. Colleagues support each other by assisting other teachers who are struggling to use other functions of the EduX platform. Other positive views from participants were influenced by the advantages that they are getting from the e-textbooks and the use of tablets. Due to the benefits received by both teachers and learners, there are positive perceptions towards the use of e-textbooks, as they boost their job performance. This influences Behavioural Intention positively.

**Effort Expectancy**

The second objective was to use the UTAUT model to determine the factors influencing teachers' acceptance of tablet-based e-textbooks in secondary school. Two of the constructs from the UTAUT model supported the second objective. The constructs are Effort

Expectancy and Social Influence. There were only three themes found under these constructs. Out of the three themes, Effort Expectancy had one theme, that is *Adapt to e-textbooks.* The remaining two, which are *Learn from others* and *Advanced users of e-textbooks,* were found under Social Influence.

There are several factors that influence the adoption of tablet-based e-textbooks in secondary school. The first measure was to determine if both learners and teachers are adapting well to using e-textbooks on tablets. It seems that according to fewer participants the learners are struggling to adapt to the technologies being used but most participants said the learners are adapting well and they love technology. Some teachers even mentioned that they struggled in the beginning when they started using e-textbooks and tablets but over time they improved. This can affect the acceptance of e-textbooks because some learners and some teachers are struggling to adapt, like the participant who described herself as "being born before technology", which implies that they may be struggling to adapt to using e-textbooks. Furthermore, some participants mentioned that they preferred the lower grades to use e-textbooks and the higher grades to use printed textbooks.

However, the use of these technologies should be easy to use just like printed textbooks for both parties involved. When one party struggles, it can affect the other party; therefore, the adoption and acceptance will be negatively affected. From the analysis of these constructs it can be said that Behavioural Intention is negatively affected due to the factors that were found under these constructs. The first factor that was found that is influencing teachers' acceptance of tablet-based e-textbooks in secondary school was that some of the teachers and learners are struggling to adapt to the use of e-textbooks on tablets. Learning was the second factor that was found. The teachers need to learn from one another to influence support from those that are advanced users of the technologies. Some teachers mentioned that they learn from others while some are not even interested in knowing what others know and what those teachers can teach them about the e-textbooks and tablets.

**Social Influence**

The second factor was to measure the influence that other teachers had on their peers to influence them to use e-textbooks. According to the interviews, the social influence was positive. Some participants mentioned how they are influenced by other teachers to use e-textbook and what they learn from their peers on how to use certain functions also had a positive influence. Another aspect was that there are teachers who are advanced users of these technologies. According to most participants, teachers who are teaching CAT are

experts in using these technologies. This could be because they have an advantage as technology teachers; therefore, it becomes easy for them to learn faster and utilise the technologies than is the case with other teachers. These teachers also mentioned that for them it's easy to learn and use e-textbooks and other functions. Although social influence can be a good influencer to improve the use of e-textbooks, there are some teachers who do not socialise with other teachers. Therefore, they are not aware of what others are using these technologies for and they do not learn anything from others. The results from this construct indicate a positive influence towards Behavioural Intention to use the technologies.

**Facilitating Conditions**

The third objective was to determine the needs of teachers when using e-textbooks. Facilitating Conditions was used to investigate the things that teachers need so that they can accept and use e-textbooks in the classroom. Literature findings identified three needs which were found from a study by Lin et al. (2015). The needs they identified are detailed in Chapter 2, Section 2.7 above. From the interview findings, the needs were identified from answers that were related to infrastructure and training. The infrastructure in this study is software and hardware that the learners and teachers use daily when using e-textbooks. When it comes to software, there are different operating systems that are used and among them there is one that performs better than others. Therefore, the school needs to look at what works better and use that. Regarding hardware, for teachers the devices such as laptops, projectors and tablets are available but the problem is when a learner does not have the device, it disrupts the use of e-textbooks.

Furthermore, there were four needs that were identified from the literature findings and another three found from the interviews. Some of these needs were identified by the themes found under this construct, which are *Tools, Training* and *Support*. The tools that they are using, which are laptops, tablets and overhead projectors, according to participants are good tools for using e-textbooks in the classroom. Training seemed to be a problem, as some participants mentioned that they never had training when they joined the school; therefore, they are learning in classrooms as they use e-textbooks and tablets and they struggled in the beginning to use e-textbooks. However, over time when they used them frequently and got training from their peers, it became easier for them to use the technologies. Furthermore, there was a complaint from some of the respondents that the training they receive from EduX is sometimes excessive and therefore they struggle to grasp what was taught; thus, they will not implement what they were taught. Therefore, the first need that was identified was the need for training before using the e-textbooks.

The second need that the researcher identified under this sub-question research from the interviews analysis was the need to an accessible device. Some participants mentioned that there are several learners that are without tablets and that this affects the use of e-textbooks in the classroom and outside the classroom. They mentioned that there are a few reasons as to why some learners do not have tablets and these reasons are that the tablet got lost, got damaged, or even got stolen. Therefore, some parents are unable to replace the e-textbooks immediately so that the learner's learning progress does not get affected.

The third need that was identified under this research sub-question from the interviews was the need to choose the e-textbook that teachers wanted to use for their specific subject. One of the participants mentioned that they are unable to choose the e-textbooks they would like to use. This statement is supported by the response from Teacher 1 from the Lin, et al. (2015) study. This implies that EduX, as it provides the platform and the e-textbooks, also controls the type of e-textbooks that the teachers can use. It also implies that some of the e-textbooks might not be good to use for certain subjects.

A tablet has limited space for storing applications and other forms of information. One participant mentioned that there is some access that they do not have to the EduX platforms, which can assist them in performing certain functions without relying on the EduX personnel to assist them. He further gave an example of the functionality which he would like the teachers to have and that is access to remove old resources that are no longer needed. Furthermore, he elaborated that it was communicated to EduX that there are old videos that were still on the devices that they had requested to be deleted. This implies that teachers do not have all the permissions they may need to do certain things. The information that cannot be deleted on devices takes up space of other new resources to be loaded. The need for access to all the functions that teachers need was identified as the fourth need. The findings from this construct influence Use Behaviour in a positive way.

The conclusion to the findings of this research sub-question is that many studies have researched the introduction and use of e-textbooks at different levels of the education system. Moreover, they have been introduced in different countries, whether developed or developing countries. This shows that the demand to use e-textbook in the classroom is increasing and there should be some processes in place to assist schools that are yet to introduce e-textbooks. Therefore, the needs identified under this research sub-question from both the literature and interview findings can be helpful and if applied when e-textbooks are introduced in schools the integration of e-textbooks can yield positive results

**Behavioural Intention and Use Behaviour**

According to the UTAUT model, Behavioural Intention is influenced by Performance Expectancy, Effort Expectancy and Social Influence. Behavioural Intention is used to measure user's behaviour to see if they are willing to use e-textbooks. From the findings of the three constructs, Behavioural Intention seems to be positive as most participants are willing to use e-textbooks, provided they get support, tools, better software, and their needs are taken into consideration. However, Behavioural Intention was also influenced by the schools' policy to use e-textbooks daily as the main textbook format. Other factors that motivated use behaviour were that some participants get support from other teachers and that their learners enjoy learning using e-textbooks.

The theme found under Use Behaviour was *Voluntariness of use: Mandatory use of e-textbooks.* Use behaviour of a technology or technologies can be influenced by the rules put in place by organisations and the willingness of the user to use it. In this case, the influence comes from the rule that the school has and that participants are seeing benefits from these technologies. The second positive factor that was identified that influences positive use behaviour is that some participants believed that using e-textbooks helps them to deliver better lessons and information to their learners. This was emphasised by one of the participants who noticed and mentioned that when she is using e-textbooks the lessons are more interesting to her learners than when she is using printed textbooks and the old way of teaching with a chalk and board.

The negative factors that were found that produce a negative influence on Use Behaviour were the distraction of learners in classrooms when using e-textbooks; a great deal of training that is provided on a regular basis by EduX; and that some participants struggle to understand and apply in the classroom. Furthermore, the learners that do not have tablets, due to loss or damage, are also the reason that there was a negative influence on Use Behaviour. It can be concluded that the finding from Use Behaviour influences a negative attitude towards the use of e-textbooks in the classroom by teachers.


**5.3 Comparing the value of UTAUT with other technology acceptance models**

There are many acceptance models that are used to understand the acceptance and use of technology in educational settings (Çuhadar, 2014). The literature review in this study has highlighted some of the acceptance models that are used in technology acceptance in education. The models highlighted were Technology Acceptance Model (TAM) (Davis, 1989), Theory of Reasoned Action (TRA) (Ajzen & Fishbein, 1980, Fishbein & Ajzen, 1975),

Theory of Planned Behaviour (TPB) (Ajzen, 1991) and Unified Theory of Acceptance and Use of Technology (UTAUT) (Venkatesh et al., 2003), which was the model used in this study. From all the models mentioned, there were two that the researcher decided to use for comparison with the findings of the UTAUT model and for reflecting on the value of the UTAUT to provide an understanding of e-textbook acceptance of teachers. The chosen models are TAM and TRA.

### 5.3.1 Technology Acceptance Model

The TAM model was developed by Davis (1989) (Önal, 2017). Önal (2017) further said, since the development of TAM, there have been other TAM models that were created to modify the original TAM and these other models are TAM2, TAM3 and UTAUT. For this comparison the researcher focused on TAM1 as illustrated in Figure 2.1 in Chapter 2. According to Çuhadar (2014); Gyamfi (2016); Önal (2017) and Çakıroğlu, Gökoğlu and Öztürk (2017), TAM has two main factors that are used to measure the use and acceptance of technology in education settings. The first factor is Perceived Usefulness, which they define as the extent to which a user has a belief that the technology introduced can help him or her to perform their jobs better. They write that the second factor is Perceived Ease of Use, which they defined as the extent to which a user believes that the technology introduced would be easier to use. They further emphasise that both factors of TAM influence Attitude Towards Using (ATU). Gyamfi (2016: 108) defines ATU as "the evaluative effect of negative or positive feeling of the individual in performing a particular behaviour". Furthermore, ATU together with Perceived Usefulness influences Behavioural Intention to Use which measures an individual's intention to use the technology introduced (Gyamfi, 2016). Lastly, Actual System Use, which is the last component of TAM, is influenced by Behavioural Intention to use.

The first main factor of TAM is Perceived Usefulness and it measures the belief that participants have that when they use e-textbooks their work performance will increase, meaning they will perform their duties better. From the participants' responses, there were several participants that mentioned that their e-textbooks help them work simpler and quicker; therefore, e-textbooks help them perform better. This statement is support by what Participant 3 said, namely, that, "The speed at which you work is much faster as compared to using an ordinary textbook" and Participant 6 added that, "The notes; it's not time consuming; you don't have to use notes on the board you just have to push".

The second main factor of TAM is Perceived Ease of Use, which measures the belief that participants have that e-textbooks would be easy to use in the classrooms. Due to some

participants not getting training when they started teaching at the school and having no experience in using e-textbooks in the classroom, a few participants said they found it difficult to use them at first but that over time they became easy to use. This statement is supported by the statements from Participant 1: "At first I didn't find it easy but gradually I'm comfortable with it" and from Participant 10 who said "At first no, because I wasn't used to the process, I was just taking down notes. After I got used to it, it was pretty much easy; there was nothing actually hard about it". Furthermore, many of the participants showed a positive attitude to using e-textbooks in the classroom and Participant 8 even said that, "I'm excited regarding the e-textbooks in class". Furthermore, the positive attitude is due to the benefits that the teachers and learners gain from the functionalities provided on the EduX platform. The penultimate component of TAM is Behavioural Intention to Use, which showed a positive result as the majority of participants intended to use e-textbooks. However, their intention to use them is mostly influenced by the rules of the school. Actual System Use was found to be positive and high due to the schools' policy to use e-textbooks as their main textbook format, learners' interest in e-textbooks and tablets, and the benefits received from both technologies.

### 5.3.2 Theory of Planned Behaviour

Theory of Planned Behaviour described in Chapter, Section 2.6. is used to measure the behaviour of an individual to understand if they do it or not (Karademir & Erten, 2013). Karademir and Erten (2013) further explain that in TPB, the individual's behaviours are influenced by certain factors and to see the behaviour of an individual there should be some intention to enact that behaviour of that individual. Kyle, White, Hyde and Occhipinti (2014) and Bidin, Hashim, Sharif and Shamsudin (2011) write that the model consists of three constructs and the constructs influence individual's Behavioural Intention and Behaviour. They named the constructs as Attitude Towards Behaviour, Subjective Norm and Perceived Behaviours Control. They further explained them as follows discussed below.

Attitude Towards Behaviour is defined as the individual's attitude to show a certain behaviour towards something. With regards to the study, this construct measured the teacher's behaviours towards using e-textbooks on tablets in the classrooms. Their behaviour resulted in a negative attitude towards using e-textbooks due to the challenges they face when using them. Their biggest challenge is that some of the learners are distracted when using e-textbooks in classrooms. Another aspect that showed a negative behaviour was that proper training was not received by all the participants before using e-textbooks but they were given training while they use the e-textbooks. However, some

participants did not understand the training they received and therefore they end up not applying what they were taught. However, there was some positive behaviour that most participants showed and the positive behaviour was influenced by the many benefits they received from using e-textbooks.

Subjective Norm measures the individual's "social pressure to perform or not to perform the behaviour" (Bidin et al., 2011: 142). From the findings, some participants were not socially pressured to use e-textbooks and tablets to their full extent, as did their colleagues, and they were not even interested in finding out how some of their colleagues were using the two technologies. Moreover, some participants, due to not understanding other functions both technologies offer, were not socially pressured to use them in the way other teachers do.

Perceived Behavioural Control is defined as "the perceived ability to execute a target behaviour" (Bidin et al., 2011: 143). It attributes an individual's perception that certain behaviour is difficult or easy to execute and it is based on an individual's experience (Bidin et al., 2011). Bidin et al. (2011) further emphasise that it is influenced by the individual's skills and resources that are available to execute the behaviour. When applying this construct to the findings from the interviews, a few participants found it difficult to use e-textbooks in the classroom and this is due to the little or no experience of using e-textbooks in the classroom or even of using technology for educational purposes in the classroom. However, the majority of participants found it easy to use e-textbooks in the classroom and this showed positive behaviour to use e-textbooks.


**Conclusion of the comparison of findings**

To summarise, the three models have constructs that describe similar concepts. Table 5.3 below show a comparison of the constructs of each model and the themes that were identified through each construct.

**Table 5.3 Comparing constructs of each model**

| UTAUT | TAM | TPB | Themes |
|---|---|---|---|
| Performance expectancy | Perceived usefulness | Perceived behavioural control | Methods of delivering lessons and information, Benefits of using e-textbooks, tablet functions/use, Learners' performance when using e-textbooks |
| Effort expectancy | Perceived ease of use | | Adapt to e-textbooks |
| Facilitating conditions | External conditions | | Tools, Training, Support |
| Behavioural intention | Behavioural intention to use | Behavioural intention | Disadvantages of printed textbooks, Disadvantages of using tablets, |
| Social influence | External conditions | Subjective norm | Learn from others, Advanced users of e-textbooks |
| | Attitude towards use | Attitude | Factors preventing the use of e-textbooks in the classroom |
| Use behaviour | Actual system use | Behaviour | Compulsory use of e-textbooks |

Lastly, findings from TAM and TPB and comparing them to the findings from UTAUT model, it can be concluded that the TPB model was not the better model to investigate the understating of teachers' use behaviour and acceptance of e-textbooks. The reason is that the model lacked Effort Expectancy/Ease of Use and Facilitating conditions/External Condition that UTAUT and TAM have. Although UTAUT model was used and proved to provide much better results, it lacked Attitude Towards Use, which TAM and TPB have. In addition, TAM does not cater for Facilitating Conditions, but through External Conditions it caters for it. TAM would also have been a suitable model to investigate all angles that contribute to understanding the factors that cause teachers not to use e-textbooks in classrooms and it may have produced the same results.

## 5.4 Recommendations for the improvement of teachers' acceptance of e-textbooks in the classroom

According to the researcher and the findings analysed, the following are the recommendations that the school and other schools can use as guidelines when implementing e-textbooks in classrooms.

The first recommendation that was identified was application blocking. Most participants mentioned that their learners have installed social media applications and they are using those applications during lessons in the classroom. Therefore, they are not focusing on the work given to them at that particular moment. The suggested recommendation from two

participants to resolve this was to block the installation of other applications that are not for educational purposes. The other recommendation is that EduX can monitor or audit regularly what the learners have installed without checking the learner's tablets individually and block the tablet from functioning until the learners comes to them to unblock it. This will help the school to discipline their learners because they can enforce rules that, if a learners' tablet is blocked due to finding unwanted applications, the learner can be suspended.

The second recommendation was generated from a theme that is Training. Several participants mentioned that they never had training because, when they started working at the school, the e-textbooks were already implemented. Therefore, they have to learn in the classroom or from their colleagues. The school and EduX should design an entry level training course that new teachers can do before they enter the classroom. This can be basic functions that most teachers are using, such as projecting e-textbooks with the use of overhead projector and pushing of resources.

Another challenge of training that some participants experienced was that the training sessions are too long and that the EduX people put more focus on teachers who understand better what they are teaching and ignore those who do not understand. The recommendation here is that EduX should look at redesigning their courses so that they are short and so that every teacher can follow the lessons and not be overloaded with information they later forget. Then, the EduX platform will not be utilised to its full extend.

The third recommendation for the school is tablet replacement. Some participants mentioned that when a learner loses his or her tablet, sometimes the parents do not replace the tablets immediately. Thus, they are left behind or they have to share with other learners; alternatively, the e-textbooks will not be used until all the learners have tablets. A solution to this is that the school should find a way to replace the tablet and then add the charge to the learners' school fee. This will provide continued learning because some participants mentioned that when one learner losses a device, it disrupts their lessons and they cannot give learners activities that are in their e-textbooks because some will not be able to participate.

## 5.5 Limitations of the study

There were some limitations to the study. These limitations were solely experienced during data collection. The first limitation was the data were obtained from only one school. The researcher chose one school from many schools that are in South Africa in the province called Gauteng because the chosen school had already implemented e-textbooks and

tablets and both learners and teachers were using them. A better representation of teachers' views would have been obtained if more schools were involved. Another limitation was the number of teachers who participated in the interviews. Only 14 teachers who were already using e-textbooks in the classroom from secondary level participated in the study and they were not chosen based on gender, age, experience or the subject they taught. The last limitation was the time that the researcher was allowed to conduct the interviews. The researcher was given lunch time to interview as many participants as she could and on average she managed to interview two teachers per day. Each interview lasted for approximately 20 minutes.

## 5.6 Recommendations for further research

This study identified some areas for future research. The identification of it comes from the interviews with participants and themes found when the data was analysed. There were several challenges that participants face when using e-textbooks. The challenge that produced the first future research was the challenge of learners being able to install and access any applications they want to on their tablets. A few participants suggested that some applications should be blocked. Therefore, future research can investigate the monitoring of tablets in schools and their effectiveness.

Another need that was identified is improved in-service training. It is clear that training is of utmost important to ensure the successful implementation of e-textbooks in the classroom. From the interviews it is clear that the EduX (or service providers in general) will benefit from investing time and effort into determining the best way to deliver training. As far as the researcher knows, little research has been done on in-service training of teachers by educational-technology service providers.

## 5.7 Conclusion

Chapter 5 concludes this study. In this chapter, the findings of the study were presented with analysis from the literature review and responses from the 14 participants who are teachers. Research limitations, recommendations to improve teachers' acceptance of e-textbook in the classroom and recommendations for further research were also presented in this chapter. The most highlighted findings from this chapter were the challenges that teachers face when using e-textbooks in the classroom and their biggest challenge is the distraction of learners that use social media platforms during lessons. Another highlighted finding was the benefits that both users receive from have e-textbooks and not printed textbooks in school. Lastly,

training seems to be a problem as some teachers seem to be struggling to learn more about e-textbooks and the EduX platforms that are given to them to assist them in their daily interactions with their learners. These findings negatively impacted the acceptance of e-textbooks on tablets in the classroom by teachers.

In general, though it seems that by providing support, training and a good IT infrastructure, by controlling information access of learners and by making e-textbook use mandatory, teachers will start finding e-textbooks a useful teaching tool.

# Bibliography

Ahmad, S. & Nisa, M. 2016. The Significance of Educational Technology in Teaching Learning process. International Journal of Indian Psychology, vol. 4, no. 79, p. 163-170.

Ajzen, I. & Fishbein, M. 1980. Understanding Attitudes and Predicting Social Behaviour. Prentice-Hall, Englewood Cliffs, NJ.

Ajzen I. 1991. The theory of planned behavior. Organizational Behavior and Human Decision Processes. Elsevier, vol. 50, no. 2, p. 179-211.Ajzen, I. 2015. Consumer attitudes and behavior: the theory of planned behavior applied to food consumption decisions. Rivista di Economia Agraria, vol. 70, no. 2, p. 121 – 138.

Alawami, N. A. 2016. Examining Teachers' and College Students' Perspectives Toward E-textbooks as an Educational Tool. Student Research at Scholarship & Creative Works @ Digital UNC. P. p. 1-318.

Alfahad, F.N. 2012. Effectiveness of Using Information Technology in Higher Education in Saudi Arabia. Procedia - Social and Behavioral Sciences, vol. 46, no. 0, p. 1268-1278.

Aflalo, E. 2014. The invisible barrier to integrating computer technology in education. Journal of Education and Learning, vol. 3, no. 2, p. 120-134.

Algoufi, R. 2016. Using Tablet on Education. World Journal of Education, vol. 6, no. 3, p. 113-119.

Alhassan, R. 2016. Mobile learning as a method of ubiquitous learning: Students' attitudes, readiness, and possible barriers to implementation in higher education. Journal of Education and Learning, vol. 5, no. 1, p. 176-189.

Alshehri, M., Drew, S., & AlGhamdi, R. 2012. Analysis of citizens' acceptance for e-government services: Applying the UTAUT model. IADIS International Conferences Theory and Practice in Modern Computing and Internet Applications and Research, p. 69-76.

Al-Mashaqbeh, I. & Shurnan, M.A. 2015. The Adoption of Tablet and e-Textbooks: First grade core curriculum and school administration attitude. Journal of Education and Practice, vol. 6, no. 21, p. 188-194.

Banerjee, A., & Chaudhury, S. 2010. Statistics without tears: Populations and samples. IIndustrial Psychiatru Journal, vol. 19, no.1, p. 60-65.

Barreh, K. A., & Abas, Z. W. 2015. A framework for mobile learning for enhancing learning in higher education. Malaysian Online Journal of Educational Technology vol. 3, no. 3, p. 1-9.

Bataineh, M., A., & Anderson, S. 2015. Jordanian social studies teachers' perceptions of competency needed for implementing technology in the classroom. Contemporary educational technology, vol. 6, no. 1, p. 38-61.

Batoon, M. V. P., Morales, L. D. G. & Figueroa, J. A. Y. 2018. Instructional design to measure the efficacy of interactive e-books in a high school setting. Turkish Online Journal of Distance Education, vol. 19, no. 2, p. 47-60.

Bedi, K. 2014. Tablet PC & smartphone uses in education (TabletTour). Miproproceedings, no. 0, p. 1058-1063.

Behera, S.K. 2013. E- and M-learning: A comparative study. International Journal on New Trends in Education and Their Implications, vol. 4, no. 3, p. 65-78.

Bidin, Z., Hashim, M.F.A.M., Sharif, Z. & Shamsudin, F.M. 2011. Using the Theory of Planned Behaviour (TPB) in Predicting the Intent to Use the Internet for Academic Purposes. Malaysian Journal of Learning and Instruction, vol. 8, p. 139-150.

Biloš, A., Turkalj, D., & Kelić, I. 2017. Mobile learning usage and preferences of vocational secondary school students: The cases of Austria, the Czech Republic, and Germany. Naše gospodarstvo/Our Economy, vol. 63, no. 1, p. 59–69.

Blackwell, C.K., Lauricella, A.R., Wartella, E. & Robb, M. 2013. Adoption and use of technology in early education: The interplay of extrinsic barriers and teacher attitudes. Computer & Education, vol. 69, no. 0, p. 310-319.

Boticki, I., Baksa, J., Seow, P. & Looi, C.K. 2015. Usage of a mobile social learning platform with virtual badges in a primary school. Computers & Education, vol. 86, 120–136.

Boundless, Defining the sample and collecting data. [Online]. Available: https://www.boundless.com/sociology/textbooks/boundless-sociology-textbook/sociological-research-2/the-research-process-26/defining-the-sample-and-collecting-data-169-5911/ [Cited 27 March 2017].

Braun, V. & Clarke, V. 2006. Using thematic analysis in psychology. Qualitative Research in Psychology, vol. 3, no. 2, p. 77-101.

Buabeng-Amdoh, C. 2012. Factors influencing teacher's adoption and integration of information communication technology into teaching: A review of the literature. International Journal of Education and Development using Information and Communication Technology. Vol. 8 no. 1, p. 136-155.

Çakıroğlu, Ü., Gökoğlu, S. & Öztürk, M. 2017. Pre-service computer teachers' tendencies towards the use of mobile technologies: a technology acceptance model perspective. European Journal of Open, Distance and e-Learning, vol. 20, no. 1 p. 175-190.

Central Queensland University ESLS Unit (2001) Referencing: The Harvard referencing system, [Online]. Available: http://www.cqu.edu.au/edserv/89ndergrad/clc/content/resources.htm [Cited 14 Aug 2001].

Chee, K.N., Yahaya, N., Ibrahim, N.H. & Noor Hassan, M. 2017. Review of Mobile Learning Trends 2010-2015: A Meta-Analysis. Educational Technology & Society, vol. 20, no. 2, p. 113-126.

Çuhadar, C. 2014. Information Technologies Pre-service Teachers' Acceptance of Tablet PCs as an Innovative Learning Tool. Educational Sciences: Theory & Practice, vol. 14, no. 2, p. 741-753.

Cummings, J. & Hill, S. 2015. Enhancing the classroom experience: Instructor use of tablets. Information Systems Education Journal, vol. 13, no. 5, p. 62-70.

Curro, n.d. [Online]. Available from: https://www.curro.co.za/. [Cited 11 June 2014].

Davis, F.D., Bagozzi, R.P. & Warshaw, P.R. 1989. User Acceptance of Computer Technology: A Comparison of Two Theoretical Models. Management Science, August 1989, vol. 35, no. 8, p. 982-1003.

De Luna, T.P.S. 2015. Innovation in Education: Utilisation and Employment of e-Books in Philippine Educational institutions. International Journal of Information and Education Technology, vol. 5, no. 4, p. 265-269.

De Oliveira, J., Camacho, M. & Gisbert, M. 2014. Exploring Student and Teacher Perception of E-textbooks in a Primary School. Media Education Research Journal, vol. 21, no. 42, p. 87-95.

Dobler, E. 2015. E-Textbooks: A personalized learning experience or a digital distraction. Journal of Adolesencent & Adult Literacy, vol. 58, no. 6, p. 482-491.

Doering, T., Pereira, L, & Kuechler, L. 2012. The use of E-Textbooks in Higher Education: A case study. Berlin, Germany: E-Leader.

Education South Africa 2013. Striving for the highest – achieving educational excellence. [Online]. Available from: http://www.macmillan.co.za/news/media-coverage/3/public-school-goes-100-digital-e-books/1. [Cited 2 February 2017].

Eicker-Nel, S., & Matthee, M. 2014. The adoption of tablet based e-textbooks in a South African private school. Proceedings of the e-Skills for Knowledge Production and Innovation Conference 2014, p. 109-123.

Embong, A.M., Noor, A.M., Hashim, H.M., Ali, R.M. & Shaari, Z.H. 2012. E-Books as Textbooks in the Classroom. Procedia - Social and Behavioral Sciences, vol. 47, no. 0, p. 1802-1809.

El-Gayar, O., Moran, M., & Hawkes, M. 2011. Students' Acceptance of Tablet PCs and Implications for Educational Institutions. Educational Technology & Society, vol. 14, no., 2, p. 58-70.

Erlingsson, C. & Brysiewics, P. 2017. A hands-on guide to doing content analysis. African Journal of Emergency Medicine, vol. 7, p. 93-99.

Fishbein, M. & Ajzen, I. 1975. Belief, Attitude, Intention and Behaviour: An Introduction to Theory and Research. Reading, MA: Addison-Wesley.

Fojtik, R. 2014. Ebooks and Mobile Devices in Education. Procedia - Social and Behavioral Sciences, vol. 182, p. 742-745.

Fulantelli, G., Tailbi, D. & Arrigo, M. 2015. A framework to support educational decision making in mobile learning. Computers in Human Behavior, vol. 47, no. , p. 50-59.

Gaudioso, E., Hernandez-del-Olmo F. & Montero, M., 2009. Enhancing E-Learning through teacher support: two experiences. IEEE Transactions on education, vol. 52, no. 1, p. 109-115.

Githinji, R.K., Mwaniki, M., Kirwa, K.J. & Mutongwa, S.M. 2014. Information and Communication Technology (ICT) on Revenue Collection by Kenyan Counties. International Journals of Academic Research in Business and Social Sciences, vol. 4, no. 11, p. 238-260.

Goldkuhl, G. 2012. Pragmatism vs interpretivism in qualitative information systems research. European Journal of Information Systems, vol. 21, no. 2, p. 135-146.

Goslin, G. 2008. The History of the Textbook. [Online]. Available: http://courses.educ.ubc.ca/etec540/May08/goslina/researchtopic/Definition%20of%20textbooks.html. [Cited 13 June 2014].

Grönlund, Å., Wiklund, M. & Böö, R. 2018. No name, no game: Challenges to use of collaborative digital textbooks. Education and Information Technologies: Official Journal of the IFIP technical committee on Education, vol. 23, no. 3, p. 1359-1375.

Gu, X., Wu, B. & Xu, X. 2015. Design, development, and learning in e-Textbooks: what we learned and where we are going. Journals of Computer Education, vol.2, no. 1, p. 25-41.

Gümüşoğlu, E.K. & Akay, E. 2017. Measuring Technology Acceptance Level of Teachers by Using Unified Theory of Acceptance and Use of Technology. International Journal of Languages' Education and Teaching, vol. 5, no. 4, p. 378-394.

Gyamfi, S.A. 2016. Identifying Ghanaian pre-service teachers' readiness for computer use: A Technology Acceptance Model approach. International Journal of Education and Development using Information and Communication Technology, vol. 12, no. 2, p. 105-122.

Hamdani, D.S.A. 2013. Mobile Learning: A Good Practice. Procedia - Social and Behavioral Sciences, vol. 103, no. 0, p. 665-674.

Hamedi, M.A., & Ezaleila, S.M. 2015. Digital Textbook Program in Malaysia: Lessons from South Korea. Department of Media Studies, Faculty of Arts and Social Sciences, University of Malaya, 50603 Kuala Lumpur, Malaysia. [Online]. Available: https://pdfs.semanticscholar.org/bcc9/64eefa68873a0ef85f8578a7ae7636e6ba6f.pdf [Cited 29 August 2018].

Harness, J. 2015. The advantages of eBooks vs. Traditional Books. [Online]. Available: https://www.toptenreviews.com/services/articles/the-advantages-of-ebooks-versus-traditional-books/. [Cited 20 September 2018].

Harris, J.L., Al-Bataineh, M.T. & Al-Bataineh, A. 2016. One to one technology and its effect on student academic achievement and motivation. Contemporary Educational Technology, vol. 7, no. 4, p. 368-381.

Hawes, B. 2018. Pros and cons of e-Textbooks. [Online]. Available: https://www.uloop.com/news/view.php/263424/Pros-and-Cons-of-eTextbooks [Cited 22 August 2018].

Hidayat, A. & Utomo, G. 2014. Open source based m-learning application for supporting distance learning. TELKOMNIKA, vol. 12, no. 3, p. 657-664.

Holden, R.J, & Karsh, B.T. 2010. The Technology Acceptance Model: Its past and its future in health care. Journal of Biomedical Informatics, vol. 53, p. 159-172.

Hua, Z. 2013. Empirical Study and Model of User Acceptance for Personalized Recommendation. Research Journal of Applied Sciences, Engineering and Technology, vol. 5, no. 6, p. 2091-2097

Alhojailan, A.M. 2012. Thematic analysis: a critical review of its process and evaluation. West East Journal of Social Sciences, vol. 1, no. 1, p. 39-47.

Ifenthaler, D. & Schweinbenz, V. 2013. The acceptance of Tablet-PCs in classroom instruction: The teachers' perspectives. Computers in Human Behavior, vol. 29, no. 3, p. 525-534.

Ifenthaler, D. & Schweinbenz, V. 2016. Students' Acceptance of Tablet PCs in the Classroom. Journal of Research on Technology in Education, vol. 48, no. 4, p. 306-321.

Information Technology School Innovation, n.d. [Online]. Available from: http://www.itschools.co.za/. [Cited 11 June 2014].

iNtgrty, 2016. Research Paradigm: Interepretivism. Publishing and the Mentoring Network Journal. [Online]. Available: http://www.intgrty.co.za/2016/08/15/research-paradigms-interpretivism/. [Cited 30 August 2016].

ITWeb 2012. Free e-textbooks for SA students. [Online]. Available: http://www.itweb.co.za/index.php?option=com_content&view=article&id=54928. [Cited 2 February 2017].

Johnson, G.E. & Buck, G.H. 2014. Electronic Books versus Paper Books: Pre-Service Teacher Preference for University Study and Recreational Reading. International Journal of Humanities Social Sciences and Education, vol. 1, no.8, p. 13-22.

Johnson, J.A., Wesley, W.M. & Yerrick, R. 2016. Exploring the use of tablets for student teaching supervision. I-manager's Journal on School Educational Technology, vol. 12, no. 1, p. 8-17.

Johnston, D., Berg, S.A., Pillon, K. & Williams, M. 2015. Ease of Use and Usefulness as Measures of Student Experience in a Multi-Platform E-Textbook Pilot. Library Hi Tech, vol. 33, no. 1, p. 1-29.

Jones, T. & Brown, C. 2011. Reading engagement: a comparison between e-learning and traditional print books in an elementary classroom. International Journal of Instruction, vol. 4, no. 3, p. 5-22.

Jugder, N. 2016. The thematic analysis of interview data: an approach used to examine the influence of the market on curricular provision in Mongolian higher education institutions, vol. 3.

Kam, M., Wang, J., Iles, A., Tse, E., Chiu, J., Glaser, D. and Canny, J. 2005. Livenotes: a system for cooperative and augmented note-taking in lectures. Paper presented at the Proceedings of the SIGCHI conference on Human factors in computing systems.

Karademir, E. & Erten, S. 2013. Determining the factors that affect the objectives of preservice science teachers to perform outdoor science activities. International Journal of Education in Mathematics, Science and Technology, vol. 1, no. 4, p. 270-293.

Kee, C.L. & Samsudin, Z. 2014. Mobile devices: Toys or learning tools for the 21st century teenagers?, vol. 13, no. 3, p. 107-122.

Kivunja, C. & Kuyini, A., B. 2017. Understanding and applying research paradigms in educational contexts. International journal of higher education, August 2017, vol. 6, no. 5, p. 26-41.

Knight, B.A. 2015. Techer's use of textbooks in the digital age. Cogent Education, vol. 2, no. 0, p. 1-10.

Koksal, M. S., Yaman, S., & Saka, Y. 2016. Analysis of Turkish Prospective Science Teachers' Perceptions on Technology in Education. Australian Journal of Teacher Education, vol. 4, no. 1, pp. 21-41.

Korucu, A.T. & Alkan, A. 2011. Differences between m-learning (mobile learning) and e-learning, basic terminology and usage of m-learning in education. Procedia - Social and Behavioral Sciences, vol. 15, no. 0, p. 1925-1930.

Kukulska-Hulme, A. 2010. Mobile learning for quality education and social inclusion. UNESCO Institution for Technologies in Education, no. 0, p-1-11.

Kyle, V.A, White, K.M, Hyde, M.K & Occhipinti, S. 2014. The role of goal importance in predicting university students' high academic performance. Australian Journal of Educational & Developmental Psychology, vol. 14, p. 17-28.

Lai, C. 2016. Integrating e-books into science teaching by preservice elementary school teachers. Journal of Education in Science, Environment and Health, vol. 2, no.1, p. 57-66.

Lee, J., Cerreto, F., & Lee, J. 2010. Theory of Planned Behavior and Teachers' Decisions Regarding Use of Educational Technology. Educational Technology & Society, vol. 13, 152-164.

Leedy, P.D. & Ormrod, J.E. 2009, Practical research: Planning and design, NJ.

Lehner, F., Nosekabel, H, & Lehmann, H. 2003. Wireless E-Learning and Communication Environment: WELCOME at the University of Regensburg. E-Service Journal, vol. 2, p. 23-41.

Leonhardt, D. 2018. 18 pros and cons of eBooks. [Online]. Available: https://thgmwriters.com/blog/18-pros-cons-ebooks/. [Cited 22 August 2018].

Lin, Y., Liu, T. & Kinshuk. 2015. Research on teachers' needs when using e-textbooks in teaching. Smart Learning Environment, vol. 2, no. 1, p. 1-17.

Lo, F.C., Hong, J.C., Lin, M.X.. & Hsu, C.Y. 2012. Extending the Technology Acceptance Model to Investigate Impact of Embodied games on Learning of Xiao-Zhuan. Procedia - Social and Behavioral Science, vol. 64, no. 0, p. 545-554.

Marchewka, J. T., Liu, C., & Kostiwa, K. 2007. An Application of the UTAUT Model. Communications of the IIMA, vol. 94, no. 7, p. 93-104.

Mayring, P. 2014. Qualitative content analysis: theoretical foundation, basic procedures and software solution. [Online]. Available: https://www.psychopen.eu/fileadmin/user_upload/books/mayring/ssoar-2014-mayring-Qualitative_content_analysis_theoretical_foundation.pdf. [Cited 30 August 2016].

Mehdipour, Y. & Zerehkafi, H. 2013. Mobile Learning for Education: Benefits and Challenges. International Journal of Computational Engineering Research, vol. 3, no. 6, p. 93-101.

McQuiggan, S., McQuiggan, J., Kosturko, L. & Sabourin, J. 2015. Mobile learning: A handbook for developers, editors and learners. North Caroline: SAS Institute Inc.

Millar, m. 2015. Digital or Printed Textbooks: Which do Students Prefer and Why?. Journal of Teaching in Travel & Tourism, vol. 15, no. 2, p. 166-185.

Moldavska, A. & Welo, T. 2017.The concept of sustainable manufacturing and its definitions: A content-analysis based literature review. Journal of Cleaner Production, vol. 166, p. 744-755.

Montrieux, H., Vanderlinde, R., Courtois, C., Schellens, T. & De Marez, L. 2014. A Qualitative Study about the Implementation of Tablet Computers in Secondary Education: The Teachers' Role in this Process. Procedia - Social and Behavioral Sciences, vol. 112, no. 0, p. 481-488.

Mujere, N. 2016. Sampling in research. in B Mette & J Janice (eds), Mixed methods research for improved scientific study, Information Science Reference, IGI Global, Hershey, PA, p. 107-121.

Myers, M.D. 1997. Qualitative Research in Information Systems. MISQ Discovery.

Myers, M.D. 2009. Qualitative Research in Business & Management, London: Sage.

Myers, M.D. 2013. Qualitative Research in Business & Management, Sage.

Niehaves, B. & Plattfaut, R. 2014. Internet adoption by the elderly: employing IS technology acceptance theories for understanding the age-related digital divide. European Journal of Information Systems, vol. 23, no. 6, p. 708-726.

Oates, BJ 2006. Researching information systems and computing, Sage Publications, London, Thousand Oaks, New Delhi.

Oberer, B. & Erkollar, A. 2013. Mobile learning in higher education: A marketing course design project in Austria. Procedia - Social and Behavioral Sciences, vol. 93, no. 0, p. 2125-2129.

Önal, N. 2017. Use of Interactive Whiteboard in the Mathematics Classroom: Students' Perceptions within the Framework of the Technology Acceptance Model. vol. 10, no. 4, p. 67-86.

Ozdamli, F. & Tavukcu, T. 2016. Determination of secondary student attitudes towards tablet PC supported education. Journal of Universal Computer Science, vol. 22, no. 1, p. 4-15.

Öztürk, E. 2018. A study of primary school teachers' and Turkish language teachers' anxiety about tablet PC assisted teaching. International Education Studies, vol. 11, no. 6, p. 66-72.

Parajuli, K.P. 2016. Mobile learning practice in higher education in Nepal. Open Praxis, vol. 8, no. 1, p. 41-54.

Park, H., Byun, S., Sim, J., Han, H. & Baek, Y. S. 2016. Teachers' perceptions and practices of STEAM education in South Korea. Eurasia journal of mathematics, science & technology education, vol. 12, no. 7, p. 1739-1753.

Patel, H. & Morreale, P. 2014. Education and learning: electronic books or traditional printed books? Journal of Computing Sciences in Colleges, vol. 29, no. 3, p. 21-28.

Patton, MQ & Cochran, M. 2002. A Guide to Using Qualitative Research Methodology. [Online]. Available: http://fieldresearch.msf.org/msf/bitstream/10144/84230/1/ Qualitative%20research%20methodology.pdf. [Cited 11 June 2014].

Rekha, N. & Muthuchamy, I. 2015. Tablet as tablets for the treatment for deficiencies in primary education: A study. Golden Research Thought, vol. 4, no. 7, p. 1-5.

Ritchie, J., Lewis, J., Nicholls, C. M. & Ormson, R., 2013. Qualitative Research Practice - A guide for social science students and researchers, Sage.

Rockinson-Szapkiw, A.J., Courduff, J., Carter, K. & Bennett, D. 2013. Electronic versus traditional print textbooks: A comparison study on the influence of university students' learning. Computer & Education, vol. 63, no. 0, p. 259-266.

Sauro, J., 2015. 5 Reasons to perform a qualitative study. [Online]. Available: https://measuringu.com/qualitative-study/. [Cited 04 September 2017].

Scotland, J. 2012. Exploring the Philosophical Underpinnings of Research: Relating Ontology and Epistemology to the Methodology and Methods of the Scientific, Interpretive, and Critical Research Paradigms. Canadian Center of Science and Education, vol. 5, no. 9, p. 9-16.

Shin, W.S. & Kang, M. 2015. The use of a mobile learning management system at an online University and its effect on learning satisfaction and achievement. International Review of Research in Open and Distributed Learning, vol. 16, no. 3, p. 110-130.

Şimşek, M. & Doğru, İ.A. 2014. Tablet Pc based Classroom. Procedia - Social and Behavioral Sciences, vol. 116, no. 0, p. 4246-4249.

Southafrica.info 2013. Free tablets, wi-fi for Gauteng schools. [Online]. Available: http://www.southafrica.info/services/education/elearning-160813.htm#.V5hx9NK7ikp. [Cited 8 May 2014].

Sönmez, A., Göçmez, L., Uygun, D. & Ataizi, M. 2018. A review of current studies of mobile learning. Journal of Educational Technology & Online Learning, vol. 1, no. 1, p. 13-27.

Teo, T. 2014. Unpacking teachers' acceptance of technology: tests of measurement invariance and latent mean differences. Computers and Education, vol. 75, no. 0, p. 127-135.

Thanh, N.C & Thanh, T.T.L., 2015. The Interconnection between Interpretivist Paradigm and Qualitative Methods in Education. American Institute of Science, vol. 1, no. 2, p. 24-27.

Venkatesh, V., Morris, M.G., Davis, G.B. & Davis, F.D. 2003. User Acceptance of Information Technology: Toward a Unified View. MIS Quarterly, vol. 27, no.3, p. 425-478.

Wang, J.T., Hung, L.C., Hsieh, H.M., Tsai, J.T. & Lin, I.H. 2012. Computer technology integration and multimedia application for teacher professional development: The use of instructional technology in the classroom settings. Procedia – Information Engineering Research Institute, vol. 2, no. 0, p. 616-622.

Wang, S. & Bai, W. 2016. University Students Awareness, Usage and Attitude Towards E-books: Experience from China. The Journal of Academic Librarianship, vol. 42, no. 3, p. 247-258.

Weilbach, L. & Matthee, M. 2015. Using the PSIC model to understand change in an educational setting: the case of an e-textbook implementation. Twenty-Third European Conference on Information Systems, no. 0, p. 1-14.

Wong, K., Liong, C., Lin, Z., Loer, M, & Lam, P. 2011. Ebooks as teaching strategy – preliminary investigation. Proceedings ascilite 2011 Hobart, p. 1343-1352.

Wong, K.T., Osman, R.B., Goh, P.S.C. and Rahmat, M.K. 2013. Understanding Student Teachers' Behavioural Intention to Use Technology: Technology Acceptance Model (TAM) Validation and Testing. International Journal of Instruction, vol. 6, no. 1, pp. 89-104.

Woods, P. 2007. Qualitative Research. [Online]. Available: http: //www.edu.plymouth.ac.uk/resined/qualitative%20methods%202/qualrshm.htm. [Cited 4 June 2014].

Woody, W.D., Daniel, D.B. & Baker, C.A. 2010. E-books or textbooks: Students prefer textbooks. Computers & Education, vol. 55, no. 3, p. 945-948.

Yin, R. K. 2010. Qualitative Research from Start to Finish, Guilford Press.

Yusri, I.K., Goodwin, R. & Mooney, C. 2015. Teachers and mobile learning perception: towards a conceptual model of mobile learning for training. Procedia - Social and Behavioral Sciences, vol. 173, no. 0, p. 425-430.

Zainal, Z., 2007. Case study as a research method. Jurnal Kemanusiaan, p. 1-6.

## Appendix A: Permission letter to conduct the interviews



**CURRO CENTRE FOR EDUCATIONAL EXCELLENCE** / **CURRO**

June 2016

**To whom it may concern**

**Research study – Factors influencing the acceptance of an e-textbook platform by teachers**

Machdel Matthee, Associate Professor, Department of Informatics, University of Pretoria approached Curro to grant permission to one of her students to do research in some of our Curro schools.

As a result of the above request, permission has been granted to Ms S Mello (student number 28345089) from the University of Pretoria to conduct research at various Curro schools in Tshwane. The study will investigate the factors influencing the acceptance of an e-textbook platform by teachers.

Working with our Executive Heads, we will allow her access to all classrooms including teachers and pupils, where the tablet based e-textbooks will be implemented. The Executive Heads of the particular schools will be continuously informed.

All learners and teachers involved will sign a document to give their informed consent to participate in this research.

Thank you so much for your kind cooperation.

Kindest regard

Alta Greeff
Head:  Research and Development, Curro Holdings

## Appendix B: Ethical Clearance

From: Marcel Deysel <Marcel.Deysel@up.ac.za>
To: Machdel Matthee <Machdel.Matthee@up.ac.za>
Cc: Alta vdm <Alta.vdm@up.ac.za>, Rhona VanDerMerwe <Rhona.VanDerMerwe@up.ac.za>
Bcc:
Date: Thu, 30 Jun 2016 11:31:00 +0200
Subject: Ethics clearance

Dear Machdel

I attach hereto the approval letter for ethics clearance of S Mello for your attention.

**Marcel Deysel**
Secretariat: Research Ethics Committee
Faculty of Economic and Management Sciences
Tel:    +27 12 420 4381
Fax:    +27 86 746 7412
marcel.deysel@up.ac.za

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**Appendix C: Consent Form**

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**Faculty of Economic
and**

**Management Sciences**

**Dept. of Informatics**

**Title of the study**

The acceptance of e-textbooks on tablets by teachers in secondary schools

Research conducted by:

Miss S. Mello, 28345089

Cell: 0723914425

Dear Participant

You are invited to participate in an academic research study conducted by Professor Machdel Matthee and Sarah Mello, Masters student from the Department Informatics at the University of Pretoria.

The purpose of the study is find out the perceptions that secondary school teachers have towards the use of tablet-based e-textbooks in classroom.

Please note the following:

- This is an <u>anonymous</u> study survey as your name will not appear on the interview answer sheet. The answers you give will be treated as strictly <u>confidential</u> as you cannot be identified in person based on the answers you give.

- Your participation in this study is very important to us. You may, however, choose not to participate and you may also stop participating at any time without any negative consequences.

- Please answer the interview questions as completely and honestly as possible. This should not take more than 30 minutes of your time.

- The results of the study will be used for academic purposes only and may be published in an academic journal. We will provide you with a summary of our findings on request.

- Please contact my study leader, Prof M. C. Matthee, at 0124203365, and Machdel.Matthee@up.ac.za if you have any questions or comments regarding the study.

Please sign the form to indicate that:

- You have read and understand the information provided above.
- You give your consent to participate in the study on a voluntary basis.

_____

_____

**Participant's signature**                                                    **Date**

**Appendix D: Interview questions**

| Construct | Question |
|-----------|----------|
| Demographics | 1.     Gender: Male or Female<br>2.     How old are you?<br>3.     How many years of teaching experience do you have?<br>4.     How long have you been teaching at present school?<br>5.     Which subject(s) do you teach?<br>6.     Have you used e-textbooks before in any way (in your classroom or for your own studies if any)? |
| Use behaviour | 7.     How do you use the e-textbooks in your class?<br>8.     Do you use the other functionalities provided by the EDUX platform (e.g. pushing resources to the books)<br>9.     Are there any other ways in which you use the e-textbooks that you would like to share with me?<br>10.   How often do you use the e-textbooks in your classroom? |
| Behavioural intention | 11.   What is your attitude towards the use of the e-textbooks in class?<br>12.   What is your attitude towards the other functionalities provided by the EDUX platform?<br>13.   Would you like to get training such that you can use the e-textbooks platform to its full extent? |
| Performance expectance | 14.   In your opinion are the e-textbooks suitable for use in classroom?<br>15.   In your opinion are the e-textbooks suitable for use your specific subject?<br>16.   Which format do you prefer: e-textbooks or traditional printed books? books and why?<br>17.   Since the implementation of the e-textbooks at school have you seen any benefits in your teaching activities?<br>18.   Since the implementation of the e-textbooks at school have you seen any benefits towards your students?<br>19.   What do you consider the most effective uses of your e-textbook in the classroom?<br>20.   How do you decide when to use e-textbooks to support student learning?<br>21.   In your opinion who should use e-textbooks in classroom? |
| Effort expectancy | 22.   Are your students adapting well to e-textbooks?<br>23.   Did you find it easy to use e-textbooks?<br>24.   Are you able to solve or assist your students when they are experiencing problems with e-textbooks? |
| Social influence | 25.   Is the use of the e-textbook platform mandatory?<br>26.   Do the ways in which other teachers use this technology influence you in any way?<br>27.   Are there any champions (teachers who are taking the lead with the technology), in the school?<br>28.   How do you as teachers learn from each other (ideas on how to use the software etc.)? |

| | |
|---|---|
| Facilitating conditions | 29.     Do you have the relevant resources such as software and hardware to use and implement the e-textbooks in your classroom?<br>30.     Was training provided before the implementation of e-textbooks? Was is helpful?<br>31.     Is there maintenance in-place to support you with any problems you have or may experience with e-textbooks?<br>32.     What things prevent you from effectively using e-textbooks with students? |