The impact of technology on learning and communication in Grade 8 and 9 English classrooms

Dissertation by

Nthabiseng Francisca Temo

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DECLARATION OF ORIGINALITY

I, Nthabiseng Francisca Temo, student number 11287838, declare that the thesis entitled 'The impact of technology on learning and communication in Grade 8 and 9 English classrooms', which I hereby submit for the degree of Masters in Education, at the University of Pretoria, is my work and has not previously been submitted by me for a degree at this or any other tertiary institution. The sources used or quoted have been indicated and acknowledged by means of complete reference.

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- Informed consent/assent,
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- Data storage requirements.

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'With man this is impossible, but with God all things are possible.'

Matthew 19:26

ABSTRACT/ SUMMARY

ICT learning has become an integral part of the education system as it has brought forth 'new opportunities to restructure the language learning and teaching setting' (Bhasemi & Hashemi, 2011:3098). The use of ICT in South African schools is hampered by factors such as the availability of ICT resources, internet connectivity, power outages, and inadequate skills to use it. Most of the schools do not have the relevant ICT resources that teachers and learners require for teaching and learning. The purpose of this study was to investigate the effectiveness of ICT in assisting the learners in improving their English language skills, and therefore their communication skills; especially in Grades 8 and 9. The study was guided by the following research question, 'What is the impact of technology in Education on learning and communication in Grade 8 and 9 English classrooms?'

The study was conducted in three ICT schools in Gauteng that use e-learning in the classroom. These schools were part of the ICT initiative of the Gauteng Department of Education. A qualitative research approach was applied in this study, guided by an interpretivism paradigm. Six teachers and one ICT expert described their experiences of having dealt with ICT in their profession during the interviews. A total of 274 learners participated by sharing their experiences of ICT learning through the use of questionnaires. The data were analysed using transcription and thematic analysis.

Themes that emerged from the study were discussed separately, as well as in relation to other prevalent literature. The critical investigation of the findings presented in this study revealed that ICT has brought a positive change in teaching and learning English; however, causing distress and anxiety among teachers and affecting their psychosocial wellbeing. The findings of the study show that the integration of ICT in language learning has an influence on the way in which learners and teachers experience teaching and learning in the classroom. It was concluded that ICT has mainly impacted the schools positively by bringing a change in the academic performance of the learners. However, there are still challenges that have to be taken into consideration with regards to teacher training and the provision of adequate technological resources for both teachers and learners.

Keywords:

ICT, E-Learning, Language Learning, Child Development, SITES Module-1, Curriculum, Policy, Classrooms, Technology, Learner & Teachers' Perceptions, Neuroscience

LIST OF ACRONYMS

CALP	Cognitive Academic Language Proficiency
CAPS	Curriculum and Assessment Policy Statement
CPTD	Continuing Professional Teacher Development
EPSS	Electric Performance Support System
ICT	Information Computer Technology
IEA	International association for the evaluation of Educational Achievement
IWB	Interactive White Board
MEC	Member of the Executive Council
SITES	Second International Technology in Education Study
TPACK	Technology, Pedagogy and Content Knowledge

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CHAPTER 1: OVERVIEW AND PURPOSE OF THE STUDY

1.1 Introduction

Information Computer Technology (ICT) has brought 'new opportunities to restructure the language learning/teaching settings' (Ghasemi & Hashemi, 2011:3098). These opportunities have transformed education over the years, bringing forth both positive and negative classroom experiences.

The use of interactive whiteboards, smartboards and tablets has been introduced to a majority of schools in Gauteng by the MEC of Education. The aim of Information Computer Technology (ICT) education in the classroom is to enhance and transform learning and to improve the standard of education (Department of Education 2004:1). Koehler and Mishra (2009:61) indicate that 'teaching is a complicated practice that requires an interweaving of many kinds of specialised knowledge.'

ICT has become 'embedded and affected every aspect of our lives recently' (Floris, 2014:139). Whether at school, at the mall, or at work, the majority of people use technology on a daily basis as it has become an easier way of obtaining information and also getting in touch with reality through social media platforms. Yunus, Lubis and Lin (2009:1453) state that ICT is a useful tool that is able to 'represent information in many different forms'. In an ICT classroom, teachers use audio clips, voice recorders, audio stories, and online dictionaries to teach the language skills of listening, speaking and writing. While ICT continues to transform learning, 'most African countries still experience a lag in its implementation and that continues to widen the digital and knowledge divide' (Kinuthia, 2009:6).

1.2 Background

The way in which children develop cognitively is an intricate process, and Piaget aims to explain an adolescent's cognitive development by referring to the formal operational stage (middle school, high school, and beyond) (as cited by Snowman & McCown, 2013:27). Berk (2009:21) elaborates on this aspect by indicating that adolescents also have the ability to evaluate the logic of verbal statements without referring to real world circumstances. Learners in this stage are thus critical thinkers and can use reasoning skills (Louw & Louw, 2014: 229). At this stage learners are now able to analyse situations and become decision-makers.

Language is defined as a 'unified system of signs that permits a sharing of meaning' (Gamble & Gamble, 2006:100). This system has to be meaningful for teaching and learning to take place. It is much easier for learners to understand when the lessons are presented in a language with which they are familiar. In Janks' study (2014:11), he mentions that children prefer to learn in a language that they understand. Hence, this code or system has to be aligned with the learner's frame of reference. Joubert (2013:16) mentions that a person 'learns rather than acquires a second language' because schools provide formal education where the tasks are organised and structured.

The use of technology was implemented in the South African education system for the first time in 1998 (Engelbrecht, Ankiewicz & De Swardt, 2007:579). This implementation occurred during the Outcomes Based Education phase and was called Curriculum 2005 (Cross, Mungadi & Rouhani, 2010:172). The Department of Education subsequently introduced a programme to assist educators, and it was called CPTD. CPTD refers to 'Continuing Professional Teacher Development,' and it aimed to 'shape educators who are not only skilled in the classroom but who have the capability of thinking outside the box' (Steyl, 1998:112). The programme's main aim was to train educators and develop their skills in order to function effectively in e-classrooms.

In 2015 the Gauteng MEC of Education introduced ICT in many of the underprivileged schools in South Africa, and it was one of the most remarkable interventions, according to Adegbenro, Gumbo and Olakanmi (2017:79). The objective was to elevate the standard or level of education in township schools. This initiative was good, but there were challenges that educators faced (Bidaki & Mobasheri, 2013:143). Before the implementation of technology in schools, educators had to be trained on how to operate the technological resources. Most of the educators were from a generation that was not exposed to technology, and they were reluctant to be part of the project. This was one of the challenges that accompanied the implementation of e-learning or ICT in the classrooms (Kumar & Tammelin, 2008:7).

The ICT experience differs for leaners. Some learners have access to the internet at home, and they find it interesting to work with tablets and computers. Lehart, Arafeh, Smith and Macgill (2008:8) recognise that technology, in many instances, dominates the lives of adolescents. Most of the activities that the adolescents take part in revolve around the digital world. The CAPS (Curriculum and Assessment Policy Statement) mentions that the 'curriculum takes the issue of improving the education system seriously so that the learners

can be able to compete in a global economy' (Janks, 2014:19). One way to achieve this is to find measures and interventions that can be used to match the standards of other globalised countries.

As a language educator, I have seen the need for intervention in teaching English. Even though most of the learners have access to ICT at home and school, they still find it challenging to use it in a meaningful way that is beneficial for their education (Kumar & Tammelin, 2008:30). Educators need to be able to adapt the curriculum and find meaningful ways to make teaching and learning exciting for the learners.

The learners' language development differs from child to child. The formal operational stage of cognitive development is a stage where they can reason and use their cognitive skills more effectively, and this has an influence on their use of language. Vygotsky introduced the term 'scaffolding' in his theory of Cognitive Development (as cited by Snowman & McCown, 2013:37). He said that 'scaffolding is a technique that is used to help learners acquire knowledge and skills that they would not have learned on their own' (as cited by Snowman & McCown, 2013:37). The use of technology acts as a 'scaffolding' tool to assist the learners in their academic work, and they are also enabled to form social groups and take part on the social media platforms that educate them on ways of effectively communicating on a global scale.

The e-education policy has brought remarkable changes in schools and also how teaching occurs (Vandeyar, 2013:249). The Department of Education has a responsibility to revisit its policy document so that it is aligned with ICT education. It is for most educators a mammoth task to adapt to ICT classrooms because there are still a few of them who do not see the importance of using ICT or know how to use it.

1.3 Problem statement

As an educator in the intermediate phase, I have realised that many learners are unable to communicate and apply language skills effectively. The learners do not have enough knowledge on the correct use of the English language. They find it difficult to immerse themselves in the language of instruction at school. An example would be when writing a longer transactional text, and they are unable to comprehend and structure sentences. Janks (2014:9) states that 'language acts as a further barrier to participation inflows of information for children who speak local languages'. He further mentions that language can connect and also detach people from their environment (Janks 2014:9).

Hoff (2006:56) states that children acquire language in different ways. This means that the learner's environment and background have an impact on the way that they learn and acquire a language. The learners also differ in their level of communication, their vocabulary skills, the way they articulate words, and their pronunciation of words.

Today's adolescents live in a globalised world where they are surrounded by different resources (i.e. technology) that are supposed to make their lives easier. Therefore, I investigated the effectiveness of Information Computer Technology (ICT) in assisting the learners to improve their English language skills, and therefore also their communication skills.

1.4 The purpose of the study

'Changing conceptions of learning and rapid technological advances have been accompanied by changes in language teaching and learning' (Kumar & Tammelin, 2008:5). The purpose of the study was to investigate the effectiveness of ICT in assisting the learners to improve their English language skills and therefore their communication skills; especially in Grades 8 and 9.

1.5 Assumptions of the study

In my study, the following assumptions were made:

- Learners learn better when they are given resources that are interesting to them.
- How learners learn a language depends on the support of their surrounding environment.
- Learners in Grades 8 and 9 are unable to communicate and apply English language skills effectively.
- Educators are reluctant to attend ICT training sessions.

1.6 Research questions

1.6.1 Primary research question

What is the impact of technology in education on learning and communication in the Grades 8 and 9 English classrooms?

1.6.2 Secondary research questions

- To what extent does technology bring about change in classroom roles and in the school?
- What are the challenges faced by Grades 8 and 9 educators and learners with regards to using tablets, interactive whiteboards, and smartboards to teach English?
- How does the curriculum support the use of ICT in the classroom?
- What are the educators' and learners' perceptions regarding the use of ICT?

1.7 Concept clarification

- *CALP (Cognitive Academic Language Proficiency)* – this is 'a sophisticated, cognitively demanding language proficiency developed in formal academic settings' (Vachek, 1973:9). In this study, English is the language of instruction, and it is used in formal assessments in the classroom.
- *Child development* – '…a discipline examining how the human infant develops from dependence to independence (Cremin & Arthur, 2014:56). The way that an adolescent uses language is dependent on their cognitive development, and that is a crucial part of this study.
- *ICT* – this is a scientific, technological and engineering discipline and a management technique used in handling information, its application, and its association with social, economic and cultural matters (UNESCO, 2002). The focus of the study is on how the use of technology impacts the way in which the English language is taught at schools.
- *Language* – it is 'a socially shared code or conventional system for representing concepts through the use of rule-governed combinations of those symbols' (Owens, 2012:6). The main focus of the study was on the use of technology in teaching the English language. Language plays a significant role in the classroom, and the researcher interacted with language teachers during the study.
- *Technology* – this is 'a disciplined process using knowledge, skills, and resources to meet human needs and wants by designing, making and evaluating products and processes' (HEDCOM, 1996:12). In this study, the focus was placed on the use of interactive whiteboards and tablets in the classrooms.

1.8 Theoretical framework

In this study, I focused on Vygotsky's Sociocultural Theory, Bronfenbrenner's Bioecological Systems Model, and Blended Learning. Vygotsky's sociocultural theory states that interaction plays a fundamental role in the development of cognition (UNESCO, 2002:25). According to this statement, adolescents learn best when they interact with many groups of people, such as educators and friends. Vygotsky also mentions the Zone of Proximal Development and says that 'this relates to the difference between what a child can achieve independently and what they can achieve with the assistance of technological resources' (as cited by McLeod, 2014:3). Vygotsky believes that 'good learning' happens in the Zone of Proximal Development (as cited by Verenikina, 2010:17).

Children develop in different ways, and Bronfenbrenner introduced the bioecological systems theory to explain the different systems that are involved in a child's life during their developmental years (as cited by Berk, 2006:26). Berk (2006:26) states that the ecological systems model views a child's development as a result of the different relationships within the complex system.

Blended learning is defined as a 'teaching approach' that utilises different styles of teaching (Wu, Tennyson & Hsia, 2010:156). This teaching approach involves adapting the curriculum by using different technological resources, such as smartboards and tablets, to teach. Blended learning differs from 'face-to-face and on-line learning because the teachers assume more roles of being the facilitator, organiser, the policy maker and the impactor of knowledge in the classroom' (Diep, Zhu, Struyven & Blieck, 2017:476).

For this study, the themes of neuroscience, child development, cognitive development, language development, language learning, theories of learning, ICT policies, and the TPACK framework are discussed in more detail in the literature review. Research notes that the environment of the child plays a significant role in the way that they learn a language. Therefore, I examined the different social environments of the learners and the various interactions that they have with their teachers.

1.9 Epistemology of the study

An epistemological paradigm refers to 'a branch of philosophy that is concerned with the theory of knowledge and that tries to answer questions about *how* we can know and *what* we can know' (Lyons & Coyle, 2016:11). This study used an interpretivist lens that enabled the

researcher to be part of the research community and to view the situation from the inside with adequate experience, rather than from the outside (Mack, 2010:8). The teacher participants of the study therefore could construct knowledge through the use of different teaching strategies to suit the learners' needs. The researcher aimed to use the interpretivist paradigm lens to understand the current teaching situation and to provide alternative ideas, rather than focusing on how content is explained to the learners.

It is practical and allows for creativity to take place. The advantage of the interpretive paradigm is that the researcher is exposed to the immediate environment when conducting research. A disadvantage of using an interpretivist paradigm is that the data cannot be easily generalised because they involve the opinions and preconceptions that guided the study (Chowdhury, 2014:433).

1.10 Methodological approach

This study used qualitative research methods. Maree (2016:53) states that 'qualitative research focuses on the natural environment and seeks to answer questions that the researcher has regarding the topic'. I engaged with educators and learners by using semi-structured interviews, learner questionnaires, and classroom observation. The aim of using a qualitative methodology was to understand people's feelings and opinions, and this helped in strengthening my understanding of the reality of the situation. Since the educators worked closely with the learners, they were able to describe the situation and the challenges they faced.

Often teachers dislike being put under pressure, and therefore I did experience certain challenges of resistance from the educators and schools regarding the way in which I conducted the study. Hence I explained the importance of the study and assured them of anonymity. The research aim was to address the technological challenges that affect English language educators regarding writing and communication in the classroom.

1.11 Research design

I made use of a case study research design in this study. The reason underpinning the choice of the research design was because, as a researcher, I wanted to gain more in-depth knowledge through the interaction with the participants and I also wanted to be able to construct meaning from their feedback. Case study research refers to 'an empirical inquiry about a contemporary phenomenon, set within its real-world context' (Yin, 2003:18).

Eisenhardt (1989:534) further states that a case study research design is 'a research strategy which focuses on understanding the dynamics present within single settings'.

Within this design, I focused specifically on multiple case studies, and Baxter and Jack (2008:550) explain that multiple case studies aim to help the researcher 'understand the differences and similarities between cases'. This method is specifically used when there are multiple cases in different environments.

I further made use of a naturalistic case study design. Abma and Stake (2014:1150) state that naturalistic case studies are those studies that take place in an ordinary setting. The researcher was exposed to the reality that was happening around her. The naturalistic case study aims to help the researcher to understand the distinctiveness of a case from different viewpoints (Abma & Stake, 2014:1150). In this study, I participated in classroom observations and also had one-on-one interviews with the educators.

1.12 Selection of participants

Purposive sampling was used in the study. Sibona and Walczak (2012:3511) define purposive sampling as a method or approach where members have to adhere to specific criteria to be selected. Participants and schools were chosen to achieve the objective of studying the impact of technology in language teaching.

The research was conducted at three schools that use e-learning in the classroom. Two schools were located in Tembisa, and one in Olievenhoutbosch. These are township schools that were part of the implementation of the Information Computer Technology (ICT) initiative of the Gauteng Department of Education. These schools offer e-classrooms where the learners are taught using smartboards and computer applications.

Two educators at each school were interviewed. An expert in the field of ICT from a university focusing on Mathematics, Science, and Technology Education was also interviewed. Learners were furthermore asked to complete questionnaires in the two classes observed in each participant school.

The selection choice for the sample included the following criteria; each teacher participant had to have at least three years of experience in teaching English, the educator had to be employed full-time at the school (therefore not a volunteer) and had to be willing to participate in the study. They also had to be proficient in using e-learning in their teaching.

The expert should have had at least five years experience in his/her field of expertise. The learner participants had to be either in Grades 8 or 9 in the pre-selected schools.

1.13 Data collection

Data were collected for the study by means of semi-structured interviews, questionnaires, and observation. Each of the data collection methods is described in the following paragraphs.

1.13.1 Semi-structured interviews

Six semi-structured interviews with language teachers were conducted for the study at the selected schools. A semi-structured interview was furthermore conducted with an expert at a university. Leech (2002:665) defines semi-structured interviews as 'a method of providing detailed, in-depth formations, while at the same time allowing hypothesis testing and the analysis of interview responses'.

These interviews gave insight into what the participants were thinking regarding the use of technology to teach a language. The questions were 'open-ended and were followed by further probing and clarification about the impact of technology on learning a language' (Maree, 2016:93). I listened to the participants and captured their responses. The interview duration was 30 minutes. I used an audio recorder, and the participants were given a consent form that they were asked to sign before the interview commenced. At the end of the interview, the information was transcribed and reworked into text before it was analysed.

1.13.2 Questionnaires

Questionnaires were used for this study, and all the learner participants were provided with a copy thereof. Maree (2016:178) states that questionnaires 'should appear user-friendly and have clear instructions'. The learners needed to read the questions and ask if they did not understand a concept or if they needed further clarification.

The learners were given 30 minutes to complete the questionnaire, and this was to ensure that they had adequate time to reflect and answer the questions accurately. The questionnaires consisted of open-ended questions that 'enabled the respondents to give honest and detailed answers' (Maree, 2016:180). The respondents were able to indicate their reflection and express how they felt about the use of technology in language teaching and learning in their own words.

1.13.3 Observation

'There are four types of observations used in qualitative research,' according to Maree, (2016:91) and for this study, the option of researcher as observer participant was chosen. I observed as the educators taught their English classes. In this type of observation, 'the researcher remains uninvolved and does not influence the dynamics of the setting' (Maree, 2016:91). I investigated the different teaching methods, the applications used, and the responses from the learners. The aim of the observation was to investigate how the application of ICT influences language learning and communication in the classroom. During the observation, field notes were taken that were later transcribed and put into a table format.

There are different ways in which a researcher records observations, and I used the structured observation method. Maree (2016:92) states that structured observations are when the researcher identifies the specific behaviour that they identify to observe. I used a recording template to record what I observed and also stated my overall reflection on the lessons. I captured the observations on the recording template during the lesson presentations, and then reflected on them immediately after the presentation of the aforementioned lessons.

1.14 Data analysis and interpretation

'Qualitative data analysis is usually based on an interpretative philosophy that is aimed at examining meaningful and symbolic content of qualitative data' (Maree, 2016:109). This study focused on the case study research method, and Maree (2016:107) states that 'the case study method provides researchers with opportunities to triangulate data in order to strengthen the research findings and conclusions'. Cronin (2014:21) states that 'the overlapping of data collection and analysis not only assists the process but gives the researcher some flexibility to make adjustments in data collection in the tools'.

The first phase in the data analysis was to collect the notes and audio recordings in order for the documentation to be kept safe and sorted according to the different participating schools. The second phase involved transcribing the notes from the interviews and the questionnaires and then organising the information using themes. The last phase was to organise the observation templates and record my reflections.

In this study, I became an instrument and obtained a 'snapshot' view of the challenges that the teachers face when teaching English language to learners who have a different home language from the one that they are taught at school. 'Case studies report the data in a way that transforms a complex issue into one that can be understood, thus allowing the reader to question and examine the study and reach an understanding independent of the researcher' (Maree, 2016:108).

For this study, I measured trustworthiness in the following ways:

- Credibility and validity – this aims to ensure that the study measures what it is actually intended to measure (Shenton, 2004:64). For the study to be credible, I used the field notes that I gathered during the interviews for this study. I asked an expert in the field of ICT to review the research results and indicate possible mistakes. I also used member checking with the teacher and expert participants. Maree (2016:123) defines member checks as a process where the participants are allowed to correct mistakes on the transcripts of the interviews.

- Triangulation – this is when a researcher uses more than one method of collecting data (Maree, 2016:65). For the study to be credible, I used different data collection methods to triangulate the data; i.e. semi-structured interviews, questionnaires, and observation. I also had more than one group of participants that contributed to my study in terms of experience and knowledge.

1.15 Ethical considerations

The following ethical considerations were adhered to in this study, as proposed by Allan (2001), Brooks, Riele and Maguire (2014):

- I applied for ethical clearance from the Faculty of Education's Ethical Committee before conducting the study. I also applied for consent from the Gauteng Department of Basic Education to visit the participating schools and conduct the research at these schools.

- Informed and voluntary consent - The principals of the participating schools and the participants were fully informed that participation in the study was voluntary. The participants could indicate at any time during the study that they did not want to participate further.

- Privacy – Neither the names of the participants nor the schools in the study were used, and the identity remains anonymous. For privacy, pseudonyms and numbers were used for the participants.

- Respect – The participants were treated with respect, and the information collected will not be used for anything else except the current study. None of the personal information will be used in further studies.

1.16 Summary

This chapter highlighted the need to study the impact that ICT has on learning and communication in Grades 8 and 9 classrooms. The study focuses on how technological devices are used to support learners in developing their language and communication skills in English. The problem statement, purpose of this study, and assumptions were discussed; the concepts and theories were defined; and the methodology, epistemology, research design and ethical considerations were stated.

In Chapter 2, the focus is on a broad literature overview, the underlying conceptual framework, and the key concepts that underpin this study.

CHAPTER 2: LITERATURE STUDY

2.1 Introduction

In this chapter, the focus is on providing a background of the use of ICT (Information Computer Technology) in language learning. ICT has brought about a change in developing countries such as South Africa, and it has opened new opportunities on a global level (Howie, Muller & Patterson, 2005:1). ICT can improve one's quality of life by providing more opportunities and easy access to information (Huggins & Izushi, 2002:111). The use of ICT expands the learners' knowledge and allows them to have access to technological networks which can support them in learning new content and skills. It provides flexibility in learning, especially in the classroom, and it is vital that the policies that the Department of Education has implemented thus become aligned with ICT learning (Howie *et al.*, 2005:1). The successful implementation of ICT in South African schools will help to create well-informed citizens.

The implementation of ICT in the school curriculum provides the learners with the opportunity to become creators of knowledge, and they also become exposed to the hands-on experience of ICT usage, which will later assist them in acquiring the necessary skills that will benefit them in future work environments (Bingimlas, 2009:235). ICT can assist in eliminating illiteracy and poverty; especially in South Africa.

Mathevula and Uwizeyimana (2014:1091) state that the significant challenge that South Africa is facing regarding the use of ICT is in the provision of basic needs where the communities do not have access to infrastructure, ICT equipment, or adequate skills. That leads to most people being disadvantaged because they lose the opportunity to use ICT in order to improve their standard of living.

In this chapter the neuroscience of learning, child development, language learning, and language development and theories are discussed. The importance of ICT policies, and the impact this has on learning and communication, are furthermore articulated.

2.2 The neuroscience of learning

The development of a young child’s brain depends on environmental stimulation, especially the quality of care and interaction that the child receives (Young, 2002:5). If a child is exposed to poverty at a young age, they might be affected mentally because of the neglect.

Neuroscience is crucial in this study as it seeks to demonstrate the role of the brain in relation to the development of the child. The development of a young child's brain affects physical and mental health, capacity to learn, and behaviour throughout childhood and adult life (Young, 2002:vi). The mental skills of a child also play a major role in analysing and operating technological devices such as cellphones and computers.

Neuroscience forms a small portion of this study but it is a crucial element of child development. Neuroscience refers to the nervous system and how the brain functions (Schunk 2012:30). The brain is divided into two hemispheres; the left and the right hemisphere. The left hemisphere of the 'human brain controls language, routine, and behaviour' (MacNeilage, Rogers & Vallortigaga, 2009:60). This is where learned behaviour is stored. For example, if a person sets the alarm for six am every morning, the brain becomes accustomed to the conditioned stipulated time. Sometimes a person might wake up before the alarm rings; it has become a routine.

The right hemisphere controls 'creativity, spatial ability, and musical skills' (MacNeilage, Rogers & Vallortigaga, 2009:60). It is a creative space where people can think 'outside the box' and invent things. During the process of learning, the brain plays a significant role because 'the brain is where learning occurs' (Schunk, 2012:30). When a child experiences cognitive difficulties, it becomes problematic for them to make sense of anything; especially academically. This impacts how they interpret what happens around them.

Schunk (2012:38) mentions that different parts of the brain function uniquely to serve a specific purpose. The neurons are 'connected in a particular way' that cannot be easily identified with the human eye (Byrnes, 2001:24). Technology brings 'distinct biological and neurological changes' to the way learners learn and process information (Selwyn, 2011:14). The learners tend to be more focused and interested when working with resources and tools that they like. The digital age is likely to have physically changed the brains of the children and also their thinking patterns (Prensky, 2001:1). The following paragraphs explain the development of the child in detail and also the importance of education for a child's mental, physical and emotional development.

2.3 Child development

Child development is defined as 'patterns of change over time which begin at conception and continue throughout the life span' (Keenan & Evans, 2014:4). Development is an ongoing process that starts before a child is born. Children develop differently, and Louw

and Louw (2014:9) explain the different stages of child development. They mention four developmental domains; the physical, cognitive, emotional, and social development domains.

Child development theories focus on the growth or changes that occur on the way to adulthood (Charlesworth, 2008:13). A child goes through different developmental stages where they develop and learn new skills. As children grow up, they begin to ask their parents, teachers, siblings and friends questions about what they see around them because they want to understand. In the classroom, a learner might ask their teacher, 'why does 1 + 1 = 2?'. They want to understand the logic and make sense of the world around them. Vygotsky states that teaching and learning play a crucial role in the cognitive development of a child and that it facilitates the abstraction process (as cited by Gredler & Shields, 2008:87).

'In the early childhood, children exchange magical and egocentric thinking for a theory of mind, the ability to execute a plan of action, and a rudimentary logic' (McCartney & Phillips, 2006: xi). The execution of tasks requires a child to have the ability to use their mental ability appropriately. McCartney and Phillips (2006:62) further state that 'development is the property of change and change is never more rapid than in early childhood'. Furthermore, the cognitive ability of a child plays a significant role in the way they develop.

2.3.1 Cognitive development

Cognitive development is a process that includes a 'tremendous change in what children know and how they think and also the mental processes such as attention, sensation, perception, remembering, problem-solving and reasoning' (Gauvain, 2001:19). Vygotsky and Piaget's theories of cognitive development are relevant to this study. Vygotsky states that language development is enhanced by the social interactions around the child (as cited by Keenan & Evans, 2014:44). The child gets to learn a language by communicating with their parents or friends. Hence the environment plays a crucial role in the language development of the child.

Piaget's theory was recognised as the first theory of cognitive development that dealt with how children think (as cited by Goswami, 2011:649). He focused on the logic behind how children do things, how knowledge develops, and how children can acquire the necessary information so that they become knowledgeable. Piaget also said that the intellectual ability of a child is a result of the child's physical, social, and linguistic environment (as cited by Nuurenbern, 2001:1108). The more the children are exposed to an environment where they

interact with people, the more they learn the basics of using language by asking questions and being inquisitive.

Piaget mentions four stages of cognitive development, and they are summarised in the table below (as cited by Snowman & McCown, 2013:25).

Table 2-1: Stages of cognitive development, according to Piaget

Stage	Age range	Characteristics
Sensorimotor	Birth to 2 years	Develops schemes primarily through sense and motor activities. Recognises performance of objects not seen.
Preoperational	2 to 7 years	Gradually acquires the ability to conserve and decentre, but is not capable of operations or mentally reversing actions.
Concrete operational	7 to 11 years	Capable of operations but solves problems by generalising from concrete experiences. Is not able to manipulate conditions mentally unless they have been experienced.
Formal operational	11 years and older	Able to deal with abstractions, form hypotheses, solve problems systematically, and engage in mental manipulations.

Adapted from Snowman & McCown, 2013:25

The Grades 8 and 9 learners operate in the formal operational stage, according to Piaget's cognitive development theory, and this is when the learners experience adolescence and are conscious of the things that happen around them (as cited by Louw & Louw, 2014:26). These learners are also able to reason and question the things that they do not understand or agree with. They are also able to analyse situations and become decision-makers.

The second cognitive theory applied in this study is Vygotsky's theory of cognitive development. Vygotsky states that the learning environment offers children an opportunity to participate and be part of the 'co-construction of knowledge' (as cited by Kozulin, Gindis, Ageyev & Miller, 2003:246). He recognises the role of teachers as being the facilitator, organiser, policy maker and also the impactor of knowledge. Vygotsky also recognised the

impact that education has on the lives of the children (as cited by Kozulin, Gindis, Ageyev & Miller, 2003:246).

Cole and Cole (2001:500) mention that there are four processes that help increase cognitive performance during middle childhood. The processes are as follows:

- The ability to control attention and not be distracted.
- The ability to plan systematically before acting.
- The ability to think about and control one's thought processes.
- Increased linguistic abilities and associated classification skills.

The above-mentioned processes are considered signs of a cognitively mature child. A child who is able to make informed decisions regarding their lives and can also take greater responsibilities.

In addition, Vygotsky states that for educational change to occur, the learning experience of the child should correspond with the child's prior knowledge (as cited by Kozulin *et al.*, 2003:247). This statement indicates that the content being taught at school should be relevant to what the child's frame of reference so that they can be able to relate and understand. For example, a child who grew up in a rural area without electricity might not be able to relate to products such as a television or a computer. That is why Vygotsky believed in the power of educating a child so that they can be able to know more than what they already know (as cited by Kozulin, Gindis, Ageyev & Miller, 2003:246).

Children are not 'blank slates' that wait to be fed with information; they are active participants and are also considered critical thinkers (Flavell, 1992:998). Children are capable of being selective in what they choose to think and create meaning. Lastly, children develop in different ways, and Bronfenbrenner introduced the ecological systems theory that aims to explain the different systems that are involved in a child's life during the developmental years (Charlesworth, 2008).

2.4 Theoretical framework

This study focuses on an integration of three theories; Vygotsky's sociocultural theory, Bronfenbrenner's bioecological systems theory, and the blended learning theory. The

theories are applicable as they depict different views on integrating ICT in language learning and teaching. According to Johnson (2014:298), educational theory serves two functions; to provide the appropriate pedagogy that is useful for teaching and learning and also to identify the possible solutions that would enhance the learning process by making use of online resources.

2.4.1 Vygotsky's sociocultural theory

Vygotsky's sociocultural theory provides a 'profound understanding of teaching and learning that reflects the complexity of social and cultural contexts in the modern learner' (as cited by Verenikina, 2010:16). Vygotsky focused on the impact that interaction and culture have on teaching and learning. He states that 'the human mind is constructed through a subject's interactions with the world and is an attribute of the relationship between subject and object (Vygotsky 1978). The subject in this case is the learner, and the object is the classroom or the schooling environment of the learner.

Vygotsky believes that the key to consciousness is the development of the use of tools and signs to mediate human activity (as cited by Mahn, 1999:341). Mediation is defined as 'the key to understanding how human mental functioning is tied to cultural and historical settings since they provide the cultural tools that are mastered by individuals to form this functioning' (Allahyar & Nazari, 2012:81). The teacher becomes responsible for mediation where concepts are explained and demonstrated in a classroom.

Language development is enhanced by the social interactions around the child (Keenan & Evans, 2014:44). The child first gets to learn a language by communicating with their parents or friends. The child then achieves further refined language training, and in many instances second language training through formal school education. Hence, the environment plays a crucial role in the language development of the child.

The intellectual ability of a child is the result of the child's physical, social, and linguistic environment (Nuurenbern, 2001:1108). The more the children are exposed to an environment where they interact with people, the more they learn the basics of using language by asking questions and being inquisitive.

Verenikina (2010:17) states that 'good learning' happens in the Zone of Proximal Development and this concept is defined as the 'distance between what the child can do with and without help'. The more the learners are provided with the technological resources, the

more they will gain the appropriate skills in using them. The teachers need to train the learners how to engage with ICT and guide them through the process of learning. The Zone of Proximal Development aims to guide the learners and offer additional support that will assist in achieving their goals (Verenikina, 2010:17).

In a classroom situation, the teacher is there as a source of information and his/her responsibility is to assist the learners to reach their academic goals. The most important aspect that needs to be taken into consideration is that teachers are there to promote teaching and learning and that is why their presence is important in the classroom. The Zone of Proximal Development 'implies that a less knowledgeable person (learner) gets engaged in developmental changes through interaction with a more significant of more skilled other such as teachers (Shabani, 2016:6).

Vygotsky later introduced 'external mediated activity' which comes about as a result of external means in reaching a goal (as cited by Verenikina, 2010:18). Technology comes as a form of external learning. The teacher uses smartboards and electronic tablets to enhance the use of language in the form of online stories and audio clips. Caution must be taken not to see ICT tools as a replacement for a strong pedagogical approach. An effective use of ICT rather asks for the implementation of forward-thinking pedagogies (Verenikina, 2010:19-20). Moss, Jewitt, Levaãić, Armstrong, Cardini and Castle (2007:6-7) support this idea by indicating that to a certain degree, 'the kinds of changes the technology fosters depend on what teachers think it is for'. When the use of technological tools takes precedence over a clear understanding of pedagogic purpose, the technology is not exploited in a way that would or could substantially enhance learning.

A significant amount of research focusing on technology in the education sector utilises the Activity Theory as a theoretical framework (Verenikina, 2010:19). The Activity theory supports Vygotsky's (1978) sociocultural theory. This theory is sometimes referred to as the Cultural-Historical Activity Theory (CHAT), which explains how and why human practical activity occurs (Hasan & Kazlauskas, 2014:9). Murphy and Rodriquez-Manzanares (2008) theorise that the Activity theory provides researchers with the opportunity to explain ICT as a resource within a complex system where learning activities take place at an individual level (i.e. learner and teachers) and also in a wider organisational and community context (i.e. a school). The Activity theory is summarised below.

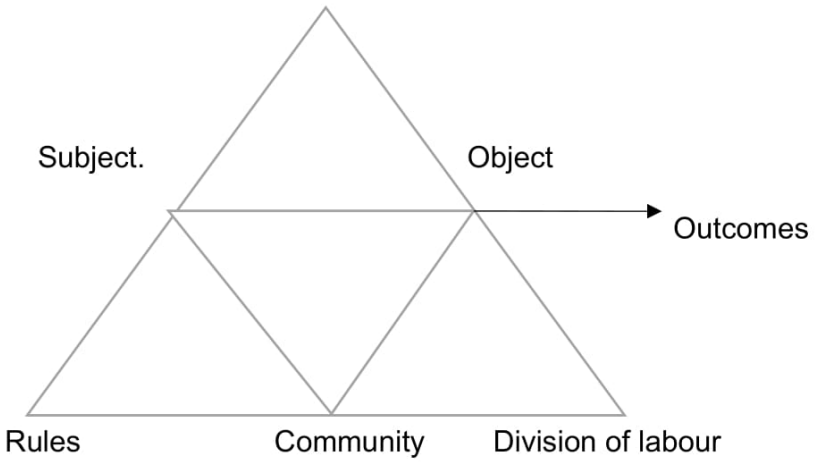


Figure 2-1: The six components of CHAT

Adapted from Engeström, 2000:962

The Activity theory describes six components which are in a dynamic interrelationship; tools, object, subject, rules, division of labour, and community. Foot (2014:331) explains the Activity Theory as follows:

- Tools - could either be material or conceptual and are used in the activity.
- Object - this is the desired outcome of the activity.
- Subject - this is the actor or person responsible for facilitation.
- Rules - they regulate the subject's actions towards an object.
- Division of labour - refers to what is being done by whom towards the object.
- Community - people that share the same outcome with the subject.

The following example illustrates the six components of the Activity theory for technology as used in an English language lesson. The technology *tools* required are headphones and a laptop. The tools used by teacher also include the lesson materials, assessment procedures and the teaching method used. The *object* is that at the end of the lesson, learners will be able to recall as much information as possible from the audio and answer questions using the correct grammar (outcome). The *object* will also entail that more advanced technologies are used to teach language and thus enhance the communication skills of the learner. The *subject* is the teacher and he/she gives instructions (*rules*).

The first instruction is that learners should make sure they put on their headphones correctly and be silent during the listening session. The teacher then monitors the learners as they type their answers. The teacher and learners have different roles to play in the lesson (division of labour). The teacher becomes the facilitator and transfers knowledge to the learners while the learners have the responsibility to complete the work that is assigned to them. Eventually, feedback will be provided in the form of corrections. Lastly, the *community* in this scenario is the classroom which is situated in a school.

In every classroom, learners are given activities to tackle and there has to be progress in terms of meeting the outcomes of the lesson. The theory comprises 'interlinked, tool-mediated actions through which actors engage, enact, and pursue an object or outcome' (Foot, 2014:335). As stated earlier in Chapter 2, learning is not an isolated act; rather it is situated in time and space and influenced by the surrounding actors, resources, and behavioural constraints (Meyers, 2007:3). According to Verenikina (2010:21), Vygotsky explains learning as a 'process of social negotiation or collaboratively making senses of theories, mentoring and joint knowledge construction'.

Thus, the Activity theory comprises a useful model that explains the everyday practices in schools, and also provides reasons for disturbances in the schooling environment that have an impact on learner performance. The sociocultural theory is profound in this study as it the use of mediation that 'provides opportunities to foster cooperation that may stimulate the necessary change in schools so that they can better meet the demands of the knowledge society' (Schulz-Zander, Büchter & Dalmer, 2002:447).

2.4.2 Bronfenbrenner's bio-ecological systems model

The second theory that makes a positive contribution to the study is Bronfenbrenner's bio-ecological systems model. Children develop in different ways, and Bronfenbrenner's theory aims to explain the different systems that are involved in a child's life during their developmental years (Berk, 2006:26). Berk (2006:26) states that the ecological systems model views a child's development as a result of the different relationships within the complex system. The bio-ecological systems model 'explores the child's environment as regards quality and context; and how the surrounding environment assists or hinders the child's development' (Alkhawaldeh, Olimat & Al-Rousan, 2015:35).

Even in the different systems, the development of a child is seen as 'occurring simultaneously and each area being affected by the development in the other areas'

(Neaum, 2013:47). The environment influences a child's development. The bio-ecological system theory summarises the interrelationships between children and their environment in the following figure.

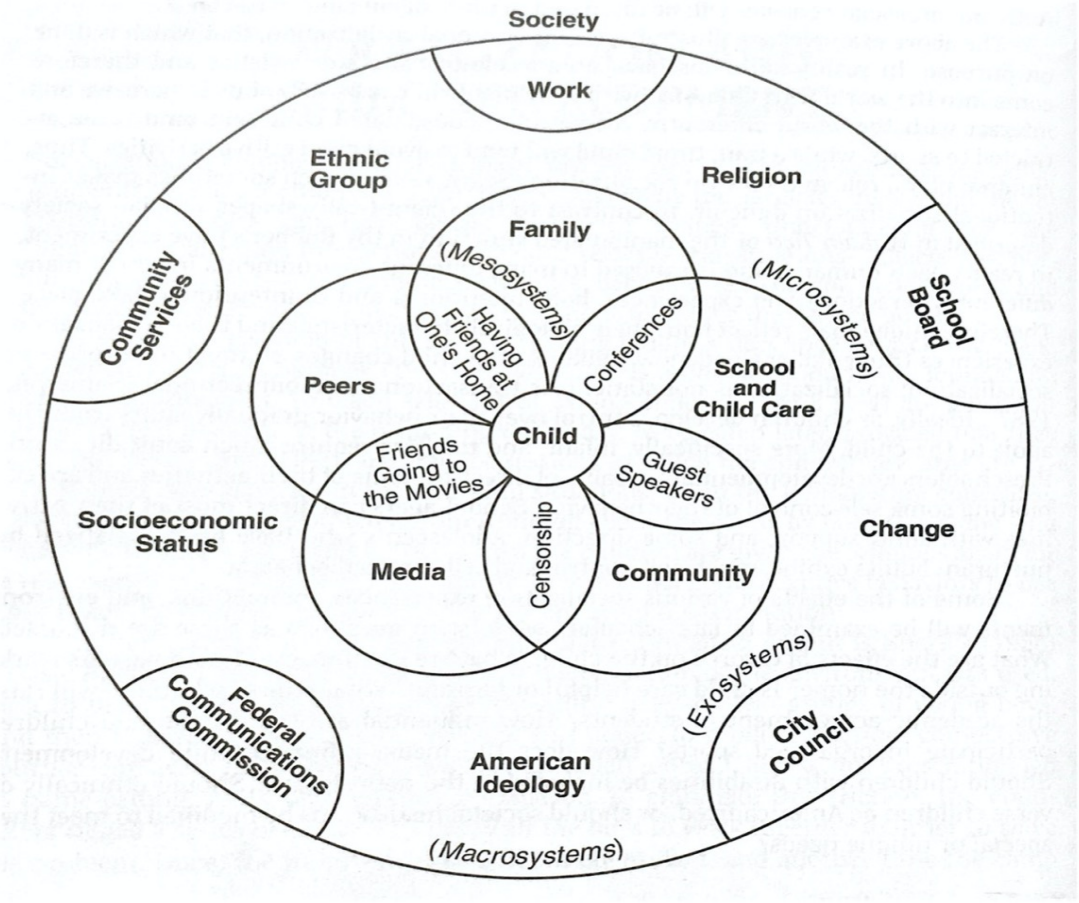


Figure 2-2: The bio-ecological model of human development

Adapted from Berk, 2009:47

Figure 2.2 shows the relationship between the child and the educator, and how this relationship enhances development. For example, if a child is active during a lesson and obeys the rules in the classroom, the interaction between them will be positive. They will have a mutual understanding and this understanding leads to socialisation being frequent and effective between them. If a learner is stubborn and refuses to listen to the educator's instructions, the educator might ignore the learner during lessons and the interaction might be less frequent.

In our society, individuals are expected to fit into an organised way of life (Berk, 2009:47). Children are expected to develop in relationships and specific contexts. For example, if a child is born into a family that uses technology such as computers, they are expected to grow up knowing how to use this technology. If we view socialisation from a personal perspective, this is where children discover who they are and also their potential, and it enhances personal growth (Berk, 2009:47).

2.4.3 Bronfenbrenner's bio-ecological systems model as relating to ICT

Furthermore, the bio-ecological systems model plays a significant role in explaining the impact of the ICT environment where learners are trained and taught how to integrate technology in their daily learning routines and also to practice independence during lessons (Kerr, 2005:1013). The importance of ICT in children's varying contexts is demonstrated below using different diagrams to indicate their link to Bronfenbrenner's bio-ecological systems model.

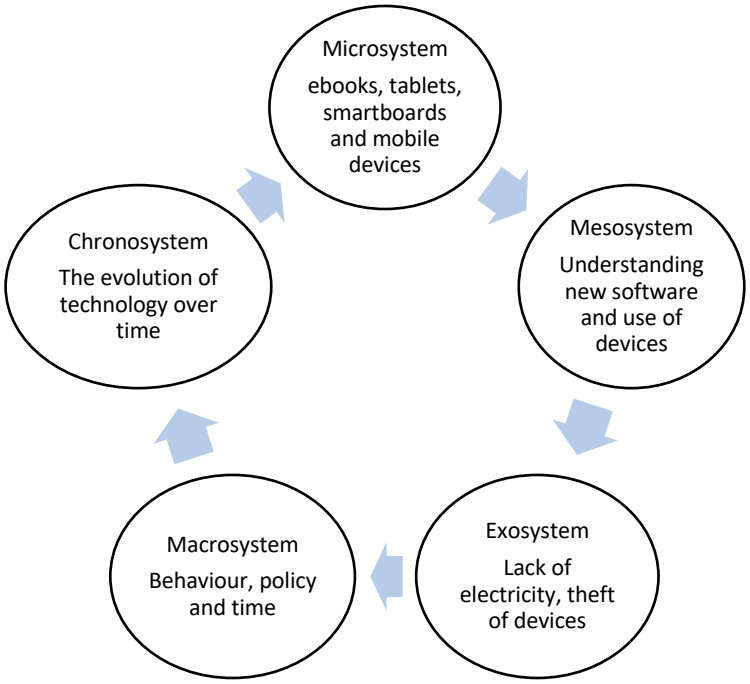


Figure 2-3: Bronfenbrenner's bio-ecological systems theory as related to ICT

Adapted from Berk, 2013:27

Bronfenbrenner's bio-ecological systems theory as related to ICT versus the ecological techno sub-system:

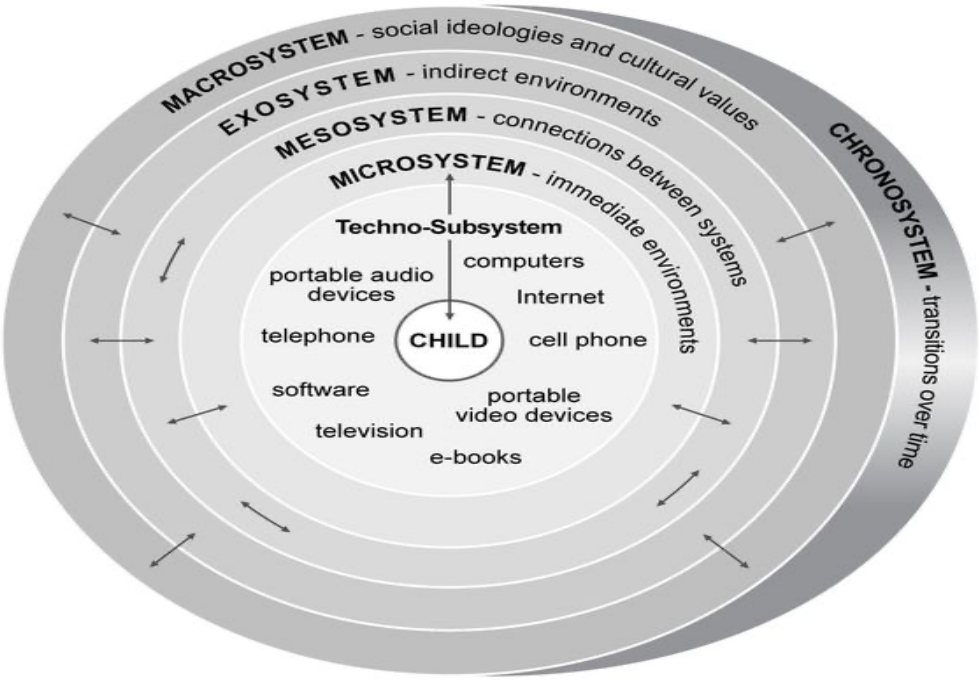


Figure 2-4: The ecological techno-subsystem

Adapted from Johnason & Puplampu, 2008:178

The first system is the *microsystem*, and this refers to the child's immediate environment (Berk, 2013:27). A child is affected by his/her relationship with their parents, school, friends, finances, and the cultural issues that surround them. How they learn is also influenced by their families, friends, school, and is even influenced by religion. In the ICT context, the microsystem focuses on the learner's exposure and also their understanding of the devices. The learners learn how to use applications from their peers, family members, teachers, and other people around them. Their exposure to other people could also influence their attitude towards the use of technology.

Johnson and Puplampu (2008:1) state that the ecological techno-subsystem 'encourages the holistic exploration of the developmental consequences of internet use during childhood'. The ecological techno-subsystem has similar intentions to Bronfenbrenner's ecological system. The most important part of the ecological techno sub-system is that it integrates technology in the process of development.

Figure 2.4 also refers to the additional elements that structure the ecological techno sub-system. The microsystem of the child looks different to Bronfenbrenner's ecological system as it involves ICT implementation. The ecological techno sub-system 'provides a precise

description of micro-systematic mechanisms of developmental influence which lead to intervention strategies' (Johnson, 2010:182). Children get to experience technology in their immediate environment, as seen in Figure 2.4. Children learn by imitating what other people are doing around them. For example, a child who sees their parents playing games on the phone might eventually want to try and do the same thing.

The second system is the *mesosystem*, and this refers to the relationship of the child with their family, religious places, school, and the neighbourhood (Charlesworth, 2008:30). In terms of ICT, this is an opportunity for a child to experience new technology that will enhance their knowledge. They first learn how to operate the electronic devices, such as laptops, and then learn ways of downloading new content. How a child adapts to the new technology helps the learners to cope better in classes where technology use is a prerequisite, thus making learning easier for them.

The third system is the *exosystem*, and this is the 'social setting that does not affect the child directly but their experience in their immediate environment' (Berk, 2013:29). An example would be if the transformer that connects the server explodes or load-shedding occurs, and the learners are affected because ICT teaching and learning will be interrupted due to the lack of electricity. This event will affect the learners because computer labs and smartboards will not be functional due to the outage.

The fourth system is the *macrosystem*, and it focuses on social context, cultural values, and customs (Paat, 2013:961). These factors contribute to the development of the child. During lessons in an ICT class, learners learn how to effectively consider time when using the devices. Their conduct and work etiquette are considered as it reveals the lesson taught to the children in terms of values. An ICT policy, in this instance, governs the children's behaviour when using ICT in class. Some of the children might use the devices for watching restricted movies or pictures. Thus, this behaviour influences how they learn.

The last system is the *chronosystem*, and it refers to time 'as it relates to events in the child's life' (Boon, Cottrell, King, Stevenson & Millar, 2012:390). The chronosystem is also a 'description of the evolution, development or stream of development of the external systems in time' (Härkönen, 2007:13). This system explains the change that happens over time in relation to the development of the child. For example, the 'cognitive maturity' of a learner as they grow up, and also the exposure to the latest form of technology, contribute to the chronosystem of the child (Johnson & Cooke, 2016:2).

There are similarities between Bronfenbrenner's bio-ecological model and the ecological techno sub-system as they discuss the immediate environment as the learning curve for children. ICT 'enables teachers to foster learner-centred learning, individualisation and support building up a sense of belonging to a community' (Mullamaa 2010:38). Children have access to cellphones, computers, television, online games, and the internet which they use for their schoolwork and also for entertainment. The most effective measure of online games is that it 'stimulates aspects of cognitive development, research also establishes a link to distractibility, over-arousal, hostility and aggression' (Johnson & Puplampu, 2008:3). Therefore, the microsystem of the child contributes to the way ICT is perceived and taught (Meyers, 2007:3). ICT has been a part of our lives for many years and it keeps evolving. The next theory discusses the adaptation of technological methods of teaching to enhance learner achievement.

2.4.4 Blended learning

Blended learning is defined as a 'teaching approach' that utilises different styles of teaching (Wu *et al.*, 2010:156). This teaching approach involves adapting the curriculum by using different technological resources such as smartboards and tablets to teach. Blended learning differs from 'face-to-face and on-line learning because the teachers assume more roles of being the facilitator, organiser, the policy maker and the impactor of knowledge in the classroom' (Diep, Zhu, Struyven & Blieck, 2017:476). Furthermore, it uses 'multiple teaching and guiding methods by combining face-to-face sessions with online activities and utilising a mix of technology-based materials' (Kumar & Tammelin, 2008:5). Learners are not limited to resources as they have more options to choose from, especially the internet. For example, learners might engage in online chatrooms, discussions, and also complete online tests that do not require much time.

Blended learning 'provides various benefits over using any single learning delivery medium alone as it limits the reach of a learning program or critical knowledge transfer in some form' (Singh, 2003:57). For example, a paper-based activity is limited to the learners who are currently in the physical classroom, whereas a virtual or online activity can extend to the learners who are at home and could not attend school on that particular day.

There are issues that need to be addressed when dealing with blended learning, such as 'equal opportunities, cultural diversity and nationality' (Singh, 2003:61). These issues contribute immensely to knowledge acquisition because if the digital divide increases, the

level of understanding of the learners will not be the same. Schools should be able to provide learners with equal opportunities despite the learners' background or socioeconomic status. Poon (2013:273) explains that the main feature of blended learning is to accommodate the different needs of learners and their preferences. Learners are not the same and they learn differently; that is why it is crucial to consider the needs of all the leaners when implementing curriculum changes. Furthermore, Singh (2003:52) mentions that learner preferences, and their way of learning, differ in every classroom. Therefore, blended learning should be aligned with the teaching outcomes of every lesson.

Table 2.2 shows the benefits and challenges that arise when adopting blended learning. Even though the policies look good on paper, the implementation comes with challenges that need to be addressed. The 'initial development of blended learning requires a great deal of upfront resources, including financial resources, effort and expertise' (Poon, 2013:278). It is not just a short-term teaching method; it is considered as a 'continuous process' (Singh, 2003:56).

Table 2-2: Summary of benefits and challenges of blended learning

Benefits	Challenges
• Enhanced student learning outcomes. • Greater flexibility for learners and teachers. • Improved autonomy, reflection and research skills. • Reduced learner withdrawal rate. • Ability to foster a professional learning environment. • Potential cost and resource savings.	• Unrealistic learner expectations. • Learner-perceived isolation. • Technological problems for students. • Invasiveness into other areas of life. • Time commitment. • Technological problems for schools. • Lack of support for the redesign of subjects. • Difficulty in acquiring new teaching and technology skills.

Adapted from Poon, 2013: 276

The summary above shows that blended learning comes with both benefits and challenges. The benefits are crucial because they contribute to effective learning and they encourage increased participation between the learners and the teachers. Blended learning provides a powerful way of fully engaging learners in the learning process (Ghasemi & Hashemi, 2011:3099). The challenges contribute because they interfere in a providing a conducive environment. When the smartboards freeze, they consume time and that affects teaching and learning. It leads to a loss of teaching time and might also result in undesirable

academic results. These challenges are useful in terms of devising solutions that could support teaching and learning. Floris (2014:140) states that teaching has proven to contribute positively to education and also the 'improvement of language learning.'

Bloom's taxonomy can be used effectively by integrating the six cognitive levels to enhance learning through the use of technology (as cited by Krathwohl, 2002:212). Bloom's taxonomy was 'conceived as a means of facilitating the exchange of test items, each measuring the same educational objective' (as cited by Krathwohl, 2002:212). It consists of six levels; creating, evaluating, analysing, applying, understanding, and remembering. These levels range from 'lower-order skills that require less cognitive processes and higher-order skills that require a deeper understanding' (Adams, 2015:152).

The cognitive levels of Bloom's taxonomy enable children to fully engage in the learning process. Therefore, a blend of technology and facilitation has the capability to enhance the learning process. Blended learning has proven to useful in 'combining traditional approaches to the learning process with online learning' (Pikhart & Klimova, 2019:1). For example, a teacher gives learners a research project and the learners have to use search engines to find the information. The internet would be a good starting point, provided there is an internet connection at the school. Blended learning becomes a support structure of Bloom's taxonomy in terms of practicality.

Figure 2.5 indicates the different levels of Bloom's taxonomy applied in an ICT classroom.

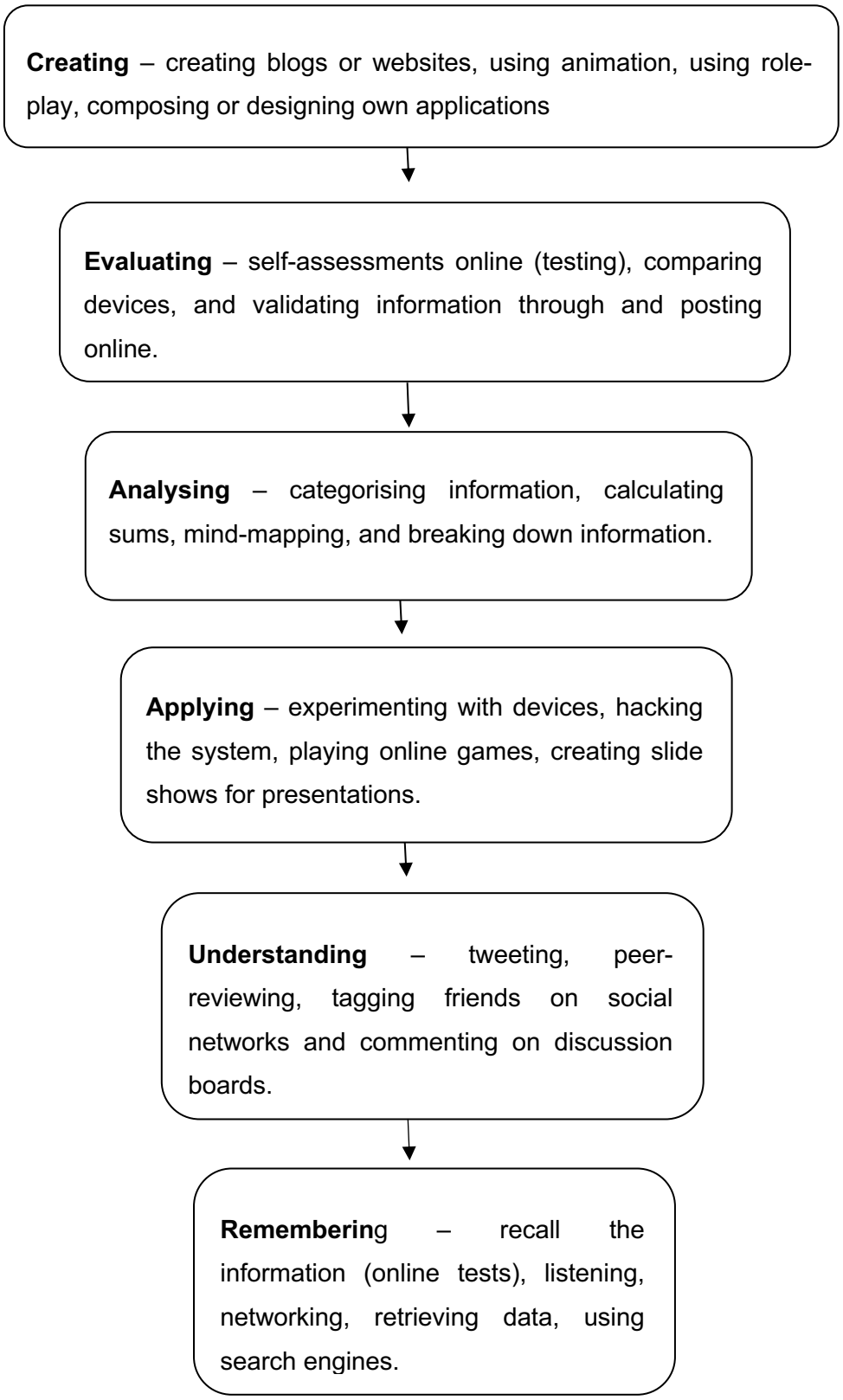


Figure 2-5: Bloom's taxonomy in an ICT classroom

Adapted from Carleton University, 2019

Bloom's taxonomy 'encourages teachers to think of learning objectives in behavioural terms to consider what the learner can do as a result of the instruction' (Adams, 2015:153). This theory provides teachers and learners with an opportunity to adapt to technological ways of acquiring information from multiple sources, such as the internet; thus making sure that teachers more informed than they were before they started using technology. ICT is a resourceful tool that 'assists decision makers' in making informed decisions affecting the day-to-day teaching and learning processes (Tjoa & Tjoa, 2016:10). ICT has also proven to 'positively impact learner achievement' (Poon, 2013:273).

Learners require prior knowledge to be able to handle new knowledge. For a learner who has never seen a computer, it will be difficult for them to use computers or tablets for the first time in the classroom. Their previous knowledge will be of great assistance when operating the latest technology. Therefore, the use of technology becomes a useful tool for learners who have different learning needs. The visual learners can make use of visual devices that may enhance their learning.

In conclusion, blended learning and Bloom's taxonomy aim to explain the importance of 'bridging the digital divide for all people left behind to utilise potentially available information to create new knowledge' (Tjoa & Tjoa, 2016:4). These theories aim to support teachers and learners as they engage in new ways of teaching and learning. Their main focus is on finding meaningful ways of impacting knowledge through the use of technology. The next paragraph discusses the importance of language during the early stages in a child's life.

2.5 Language development

Language enables humans to develop the ability to reason, as well as develop one's characteristic patterns of behaviour (Berk, 2009:44). As the child develops, they learn the receptive and expressive skills of language. Otto (2014:3) states that receptive language refers to the comprehension of words that might be oral or written, and expressive language refers to how a child produces a language in order to communicate with the people around them.

Language is defined as a 'unified system of signs that permits a sharing of meaning' (Gamble & Gamble, 2006:100). This system has to be meaningful for teaching and learning to take place. Language can also be defined as a mode of communication that plays a significant role in our behaviour, culture and identity, and it is what makes us human because animals do not use language to communicate (Christiansen & Kirby, 2003:1 & 319).

It is much easier for learners to understand when the lessons are presented in a familiar language; i.e. their home language.

Learning a language consists of different components that relate to meaning and sound, and they are referred to as phonology, semantics, syntax, morphology, and pragmatics (Berk, 2006:354). These components occur in different stages and eventually form a significant part of language learning as a collective. The first component is phonology, and this refers to the knowledge of sounds (Otto, 2014:4). The child learns the different sounds and identifies symbols that could be associated with the sound. An example is the sound of the letter 's'. The child learns how to pronounce it before he/she associates it with a letter. The second component is semantics, and this refers to the meaning of words and sentences (Löbner, 2013:1). An example would be when the learner knows what the letter 's' looks like and associates it with the word 'snake'. The child could be taught that when a snake moves, it imitates the shape of its first letter. It is all about meaning and understanding.

The third component is syntax, and this refers to the 'structural organisation of words in a sentence of a particular language' (McGuiness, 2005:328). An example is when a child writes, 'I to school go' instead of writing, 'I go to school'. If the sentence is not structured correctly, the sentence will lose its meaning. The fourth component is morphology, and this refers to the knowledge of the word structure and the word elements (Otto, 2014:8). When a child constructs a sentence, for it to make sense, it has to be in the correct structure. An example is when a learner knows that the words 'beauty, beautiful and beautifully' have the same meaning even though the spelling differs. The difference in the words means that the words could be used in different ways.

The last component is pragmatics, and it refers to 'the study of meaning in relation to speech situations' (Leech, 1983:10). The main focus is on trying to understand what the speaker is saying. An example would be if someone says, 'will you crack open the door?' This question can be understood in different ways for the listener. The listener will try to understand the meaning of 'cracking' and maybe decide to break down the door while the speaker intended for the door to be opened slightly. The way utterances are understood depends on the setting of both the speaker and the listener because linguistic terms are used differently in communities. Learning has an impact on the development of the child and the way in which they interact with the community. The learning process is discussed in the next paragraph.

2.6 Learning defined

Classroom learning 'occurs in a teacher-directed instructional context with face-to-face interaction in a live synchronous environment' (Wu *et al.*, 2010:155). The teacher is present and engages with the learners physically as they learn. During the early school years of a child, 'close attention' of necessary skills such as reading, and knowing how to write is essential (Paul & Dylan, 1998:12). Learning promotes development and refers to changes in behaviour that simultaneously result from experiences and practices (Rogoff, 1990). Learning and development share a similar goal of bringing growth and change (physical, emotional, social) in a child's life.

Perceptual learning is a process of 'differentiation and the specification of significant information' (Gibson, 2000:296). The child can differentiate between different items such as the difference between the smartboard and the whiteboard. The moment the learners can discriminate between the two devices, the process of learning is taking place. Traditional learning includes the 'acquisition of knowledge and understanding across a range of subject areas, practical and process skills to a lesser extent' (Condie & Livingston, 2007:339). An example of a traditional approach would be a teacher who is dependent on textbooks for information rather than on-line resources.

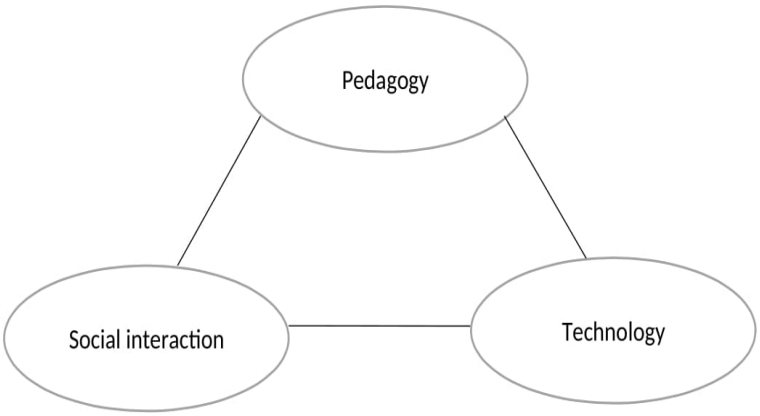


Figure 2-6: Key components of the generic model

Adapted from Wang 2008:412

This study looks at a generic model of ICT integration, as shown in Figure 2.6. In terms of ICT learning, the generic model plays a major role in educating teachers about the effectiveness of ICT integration in the classroom. The generic model is made up of three key components; pedagogy, social interaction, and technology (Wang, 2008:412). These

components are responsible for providing a conducive environment for both teachers and learners.

Pedagogy refers to 'the teaching strategies, techniques or approaches that teachers use to deliver instruction or facilitate learning' (Wang, 2008:412). It is crucial for teachers to know which programmes work best for their learners and thus enhance learner achievement. If a teacher wants to teach language, there are applications such as Siri that Apple users have (Floris, 2014:141). This application has the capability of operating a mobile phone through voice recognition and learners get the opportunity to practice speaking English on this application. During the planning of lessons, teachers have a variety of teaching materials that they can choose from that fit better with the learners' needs according to their age level and abilities (Floris, 2014:141).

Social interaction focuses on how the learners and teachers interact emotionally and create a comfortable and safe place for teaching and learning. A welcoming classroom promotes healthy discussions and conversations. The last component of the generic model is technology. In an ICT educational setting, ICT involves the use of technological devices such as smartboards, cellphones, and laptops in the classroom. Technology promotes interactive and engaging content which provides real opportunities for individualised instruction (Yusuf, 2005: 316).

Ghasemi and Hashemi (2011:3100) state that technology 'enables the teacher to transmit more information to a larger number of learners in a short time'. The generic model highlights the important contribution that ICT has on teaching and learning. The components of the model need to be aligned to achieve effective ICT integration in schools. Lastly, learning transpires through a variety of modalities (visual, auditory, kinaesthetic) and follows irregular paths (Asamen, Ellis & Berry, 2008:19).

2.7 Theories of learning

Schunk (2012:10) states that a theory is 'a scientifically acceptable set of principles offered to explain a phenomenon'. It justifies the reasons why something is important and also the kind of impact that it will bring. Learning refers to 'behavioural changes caused by environmental influences' (Charlesworth 2008:13). 'Language develops through a series of identifiable sequential stages' (Neaum, 2013:56). It challenges the cognitive ability of a person and allows them to develop and grow in whatever they do.

Nel, Nel and Hugo (2013:26) mention the three different learning theories; the behaviourist, the cognitivist and the constructivist theories of learning.

2.7.1 The behaviourist theory

Firstly, the behaviourist theory refers to learning that occurs as a result of observation from how people behave (Harasim, 2012:10). The behaviourist theory is a theory of learning focusing on 'observable behaviours and discounting any mental activity' (Pritchard, 2009:6). The behaviourist theory shows how the learners prepare to be able to react and respond to stimuli, but it does not educate the child on how to do it. It does not impact the knowledge of the child, and thus a child will know or learn something mainly through observation (Ertmer & Newby, 1993:48).

In the behaviourism theory, Skinner mentions the concept of operant conditioning (as cited by Gillani, 2003:28). He states that 'organisms learn to operate on their environment to obtain or avoid a particular consequence' (as cited by Snowman & McCown 2013:149). Skinner believes that 'stimuli could cause responses in human behaviour' (as cited by Gillani, 2003:28). Operant conditioning notes that for every reaction there is a consequence, or result. When a learner misbehaves in class, there will be some sort of punishment as a result of the action. When a learner performs well in their studies, the teacher might offer rewards; for instance, a form of merit or certificate. Learners enjoy working with gadgets, so it becomes a reward when they work with technology in their classrooms.

2.7.2 The cognitivist theory

The second theory is the cognitivist theory, and this entails the way that people think (Nel, Nel & Hugo, 2013:28). It refers to the mental skills of how people obtain knowledge and also how they use it to their advantage. By actively involving the learners, they get the opportunity to become creative and innovative. Learners get the opportunity to process information when using technology in their lessons. Schunk (2008:131) states that information processing approaches have been associated with 'learning, memory, problem-solving, visual and auditory perception, cognitive development, and artificial intelligence'.

The cognitivist theory 'perceives learning as a mental process' where the mind of the learner is the main tool that is responsible for transforming the lives of the learners' (Ertmer & Newby, 2013:51). This theory focuses on the acquisition of knowledge and the role that the environment has in educating the learner. In an ICT classroom, the use of the electronic

devices has a way of bringing excitement to the learners, leading to them being intrigued and giving them the will to explore more about technology. The leaners are exposed to ICT and then learn how to utilise it by practicing and also learning from their peers and teachers.

2.7.3 The constructivist theory

The third and last theory of learning applicable to this study is the constructivist theory. This theory focuses on children creating their knowledge through their different experiences (Harasim, 2012:12). Since people have different views of the world, they do not see the world through the same lens. Their experiences determine their views on life. Constructivism refers to when people 'actively try to make sense of the world by filtering new ideas and experiences through existing knowledge structures called schemata (Snowman & McCown, 2013:211).

In constructivism, the learners have a responsibility to make sense of how to use mobile devices in an ICT classroom. They are given instructions and taught, but the learners will have different ways of analysing the information and making sure that it makes sense to them. Learning will, therefore, begin when the learners fully understand what is expected from them.

Boethel and Domick (2000:6-8) outline six assumptions of constructivism:

- Learning is an adaptive activity.
- Learning is situated in the context where it occurs.
- Knowledge is constructed by the learner.
- Experience and prior understanding play a role in learning.
- There is resistance to change.
- Social interaction plays a role in learning.

The constructivist theory focuses mainly on the learners' construction of knowledge within their social context. The environment contributes to what the learners know, and this includes their everyday experiences. Learners become active participants during the lesson when they work with what they love; for example, electronic tablets and laptops. The

learners engage in collaborative learning where they sit in groups and use their laptops and electronic tablets to complete classroom activities. This interaction leads to effective learning; the main focus of the constructivist theory.

2.8 The changing role of the teacher

The teacher's role in blended learning is to support the learners to 'learn for themselves and to provide them with opportunities to have ownership of the learning process' (Condie & Livingston, 2007:339). Teachers who are from traditional (face-to-face) teaching school, and are having to adapt to blended teaching, feel that they are losing their identities in the profession (Redmond, 2011:1051).

Below is a diagram that shows the differences between a traditional teacher and a teacher in an ICT classroom.

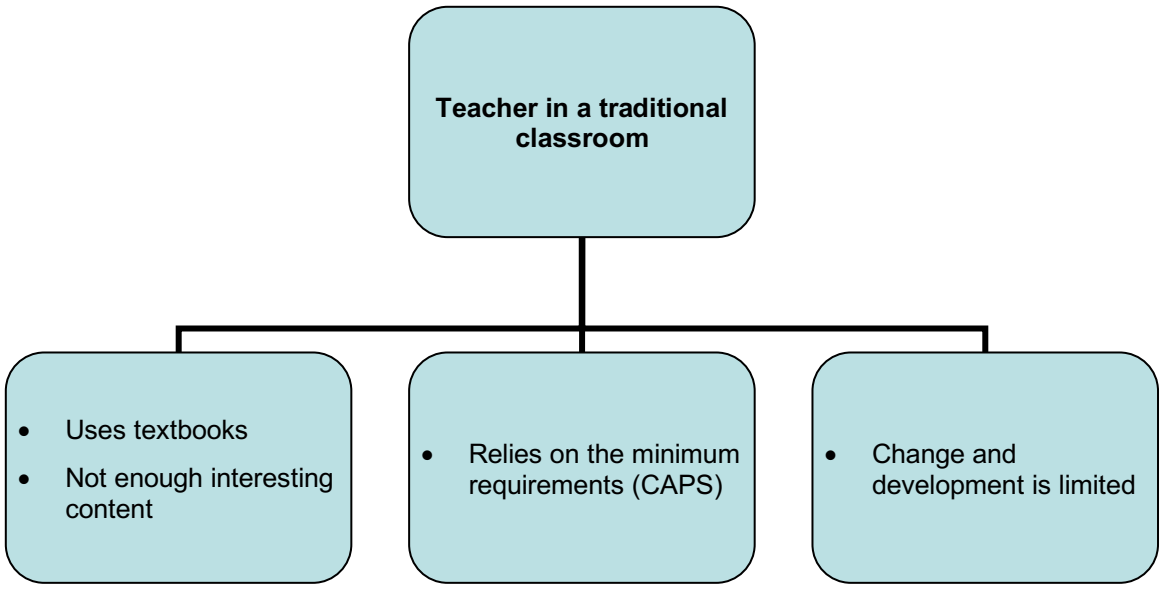


Figure 2-7: Teacher in a traditional classroom

Adapted from Sheninger, 2017:1

A traditional teacher versus a teacher in an ICT classroom:

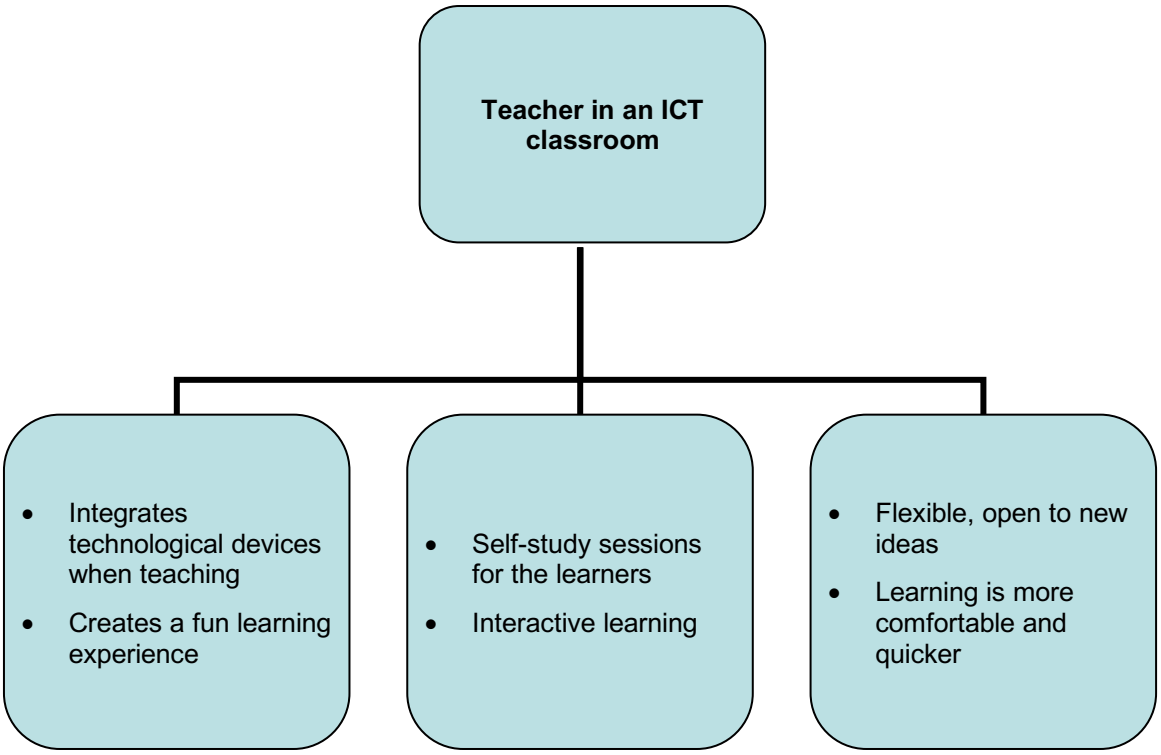


Figure 2-8: ICT equipped teacher

Adapted from Sheninger, 2017:1

As discussed earlier that the role of the teacher changes in an ICT classroom, Baishakhi and Deb (2016:4) elaborate further on the role that ICT plays in teacher education in the 21st century, noting that ICT helps teachers to:

- Access websites, universities and online education programmes.
- Gain knowledge in effectively using ICT software and hardware for teaching and learning processes.
- Improve their teaching methodologies. Instead of using a textbook, the teachers incorporate videos and online tests.
- Communicate effectively with their learners in terms of assessments and evaluation over a short period of time.
- Learn from their own networks and also from others with the help of ICT.

Teachers take on the crucial task of maintaining stability and discipline through the usage of ICT in the classroom. The role of teachers is guided by the school policies that govern how learning should take place. Therefore, it is crucial for teachers to adapt to the school policies that incorporate ICT to create a balanced environment and a bright future for the learners.

2.9 ICT education policy

The introduction of ICT education in South Africa dates back to the 'post-apartheid era' (Vandeyar, 2010:4). During the apartheid era, the majority of black people did not have access to a quality education because of the unfair laws, and this brought about the digital divide (DoE, 2004:10). The new government intended to 'prevent social exclusion' among South Africans and also to 'accelerate the achievement of national education goals through the use of ICT' (DoE, 2004:10 & 14). The government believes that everyone has a right to have equal opportunities.

Howie *et al.* (2005:12) state that ICT was first introduced during the 1980s, and it was for well-resourced schools such as private schools where they were able to afford the installations and maintenance. The policy views the use of ICT as a useful resource that can transform teaching and learning in schools. Some teachers were not adequately trained at the time, so they opted to use ICT only for administration and office work first (Howie *et al.*, 2005:12).

The education system has been evolving over the years, and since 2005 the use of ICT in schools has brought a significant change (Aduwa-Ogiegbaen & Iyamu, 2005:105). Schools that use ICT have smartboards and tablets, and the old system of a chalkboard and duster is slowly passing away. Computers, tablets and smartboards have changed the way that teaching and learning occurs at school.

As a way of addressing the inequality, the government drafted a policy that assisted in bridging the equality gap in schools; the e-education policy. The policy aims to bring change in the way children learn and also how teachers teach (Vandeyar, 2010:4). The policy helps people to function and cope in a globalised world where things change all the time. ICT is a 'principal driver of economic development and social change worldwide' (Kozma, 2005:117). It has improved how people interact with each other and also how they do business. The social and learning distance between people is not a matter of concern anymore because ICT has made it possible to go across borders without much effort. For example, instead of

going to the library to borrow a book, a person can access the same book online which saves time.

2.9.1 The benefits of ICT learning

Throughout the world, schools are implementing ICT with the intention that it will improve the standard of teaching and learning in schools (McCormick, 2004:159). ICT plays an important role in society in terms of the cultural, social and economic needs of the people (Tondeur, Van Braak & Valcke, 2007:962).

Teachers are able to employ different teaching styles in the classroom because of the learner's different learning needs, and the IWB (interactive white board) enhances these possibilities for teachers. The use of ICT is by far the most significant game changer in the education system because it has changed the way that teachers teach and deliver their lessons (Higgins, Beauchamp & Miller, 2007:221). Not all the learners can read and write, and some of them need visual resources to understand, and that is where the interactive whiteboards play a significant role.

Various studies reveal that learners who have access to computers and utilise them show more interest in school and are more motivated than those who do not (Mikre, 2011:111). The use of ICT in education has the ability to re-structure the role of the teacher in the classroom from being the facilitator to an overseer. Another important advantage is the use of online learning and online tutoring. Online tutoring is when a teacher supports a learner academically via the internet (Davide, Valentina & Andrea, 2013:102). This tool helps to build a relationship between the teacher and the learner. Having all the work online would be an advantage for both the teacher and the learner so that no learner misses out on any work, even when they are absent.

ICT offers 'new opportunities and also new challenges for both teachers and learners' (Redmond, 2011:1050). The opportunity includes being able to use tablets and smartboards in the class compared with using only textbooks and chalkboards. There are also challenges that are encountered because the teachers and the learners have to adapt to the new way of teaching and learning in the classroom.

The use of ICT stimulates the leaners' perceptual skills that enable recognition and discrimination, and enables communication to take place through multiple media platforms such as using images instead of only written words (Shams & Seitz, 2008:415).

Aktaruzzaman, Shamim and Clement (2011:117) discuss the benefits of ICT learning:

- Promotes learning anytime and anywhere.
- Helps in accessing remote learning resources.
- Prepares individuals for the workplace.
- Improves the quality of education.
- Transforms the learning environment into learners centered.

The use of technology was implemented in the South African education system for the first time in 1998 (Engelbrecht, Ankiewicz & De Swardt, 2007:579). This was during the Outcomes Based Education (OBE) curriculum phase, and this caused anxiety among educators because they were worried about how they were going to teach using the new system.

After the implementation of e-education, the government realised that more and more learners were becoming inventive and critical thinkers (DoE, 2004:16). Critical thinkers have a higher chance of succeeding in life and becoming responsible citizens, which will benefit the country. Critical thinkers are people who are able to create a conducive environment of working by thinking creatively and positively and not being sceptical or judgmental (Chan, 2013:236). They rather aim to seek answers and solutions to the problems that people are complaining about in the education system. Despite the successful implementation of ICT in schools, challenges were also encountered due to a number of reasons which are discussed in the next section.

2.9.2 Challenges of using ICT in schools

In 2015 the Gauteng MEC of Education introduced ICT in many of the underprivileged schools in South Africa (Adegbenro, Gumbo & Olakanmi, 2017:79). The aim was to elevate the standard or level of education in township schools. Before the implementation of technology in schools, educators had to be trained on how to operate the technological resources. Most of the educators were from a generation that was not exposed to technology, and they were reluctant to be part of the project. Mikre (2011:112) states that the teachers' resistance to the use of ICT led to a lack of enthusiasm in the classroom. This

was one of the challenges that accompanied the implementation of e-learning or ICT in the classrooms (Kumar & Tammelin, 2008:7).

In Australia, New Zealand and the United Kingdom, teachers experienced challenges with a lack of confidence, competence, and access to resources when they were first expected to use ICT in classrooms. They felt like they were not in control of their classes anymore, and this affected their professional development (Salehi & Salehi, 2012:40). This shows that teachers around the world experienced similar challenges relating to ICT teaching and learning in their classrooms.

Some learners have access to the internet at home, and they find it stimulating to work with tablets and computers. Lehart, Arafeh, Smith and Macgill (2008:8) recognise that technology has dominated the lives of teenagers in the new millennium. Most of the activities that the children perform revolve around the digital world. The CAPS (Curriculum and Assessment Policy Statement) mentions that the 'curriculum takes the issue of improving the education system seriously so that the learners can be able to compete in a global economy' (Janks, 2014:19). One way to achieve this is to find measures that can be used to match the standards of other globalised countries.

Despite ICT presenting a positive change in the education system, there are impediments that accompany it. Aduwa-Ogiegbaen & Iyamu (2005:108-109) mention the three impediments that they identified from using ICT:

- Cost – to install smart boards, internet access, provide security for the units, and also to service the units is expensive. In many schools there were break-ins where schools lost their tablets and smartboards. In order to make sure that the schools do not experience losses, there has to be tight security at the school, and this is costly. The provincial education department cannot afford to sponsor schools' technological equipment as there are still schools without electricity, water or infrastructure (Howie *et al.*, Muller & Paterson 2005:12). They have to deal with more pressing socio-economic issues before implementing ICT in all the South African schools.

- Weak infrastructure – due to the irregular electricity outages, most of the electronic equipment is prone to damage. The cost for maintenance and repairs is of concern. In regions where there is no, or limited, access to electricity, schools cannot have access to

computers and the internet. Limited access becomes a disadvantage that leads to poor achievement in rural and underprivileged schools.

- Lack of skills – the installation of ICT programmes requires skilled workers that have to be trained on a regular basis, and this also includes the teachers. The teachers require knowledge on how to use tablets in schools and also how to operate smartboards during the lessons. Teachers are expected to discard the ancient ways of writing on the chalkboard, and they need to be adequately trained. Such training workshops will have a negative economic impact on the department's budget.

2.9.3 The myths about e-education

There are three myths that Njenga and Fourie (2010:202-204) discuss with regards to the implementation of e-learning and e-education at schools:

- It is believed that e-learning is a 'saviour' and it is able to solve all the academic challenges in schools. This poses the question if it would really change and improve teaching and learning in schools.

- 'E-learning can replace human interaction'. E-learning has the ability to reach out to many learners compared with one teacher teaching 60 learners in a class. The learners make use of the resources that they have and their surrounding environment to construct their own meaning. In this regard, the teacher can easily be assisted by means of online learning. The learners become 'active agents' in enhancing their knowledge (Snowman & McCown, 2013:213).

- E-learning reduces the costs of education. In reality, this is not true because bringing technology to schools is expensive. The electronic devices have to be serviced and maintained, and teachers require continuous training, system upgrades, and there is also the high cost of Wi-Fi and internet access.

ICT learning is indeed a saviour as it is able to foster the process of teaching and learning and enables flexibility in the classroom (Ghasemi & Hashemi, 2011:3098). The notion of ICT replacing human interaction is not possible because 'technology cannot replace good teaching but it can enhance it' (Ghasemi & Hashemi, 2011:3101). The use of ICT has brought many expenses that are required for its implementation. The technological resources have to be serviced and the internet connection requires a subscription. This study shows that ICT is expensive in 'implementing and running' (Floris, 2014:141).

Therefore, some of the myths seem to be true and relevant to the current situation of ICT learning. Thus it is imperative to find solutions to adapt the ICT curriculum as it brings exciting methods of teaching and learning.

2.10 The TPACK framework

The TPACK framework, also known as Technology, Pedagogy and Content Knowledge, is a framework that focuses on teaching using technology in the classroom (Koehler & Mishra, 2007:60). The framework is a tool that teachers can use in the classroom to enhance the ways in which they teach. Teaching requires specialised knowledge and the TPACK framework makes effective learning possible. It enables the teacher to be creative, innovative, and reflexive during teaching time. It is about knowing how to use technology, when to use it, and where it can be applied to improve the way teachers teach. The TPACK framework also provides a 'basis for understanding teacher knowledge that supports successful technology integration into classroom learning environments' (Abbitt, 2011:136).

The diagram below shows the TPACK model and its relevance in the ICT classroom as explained above. The model shows the different components that make up the TPACK model.

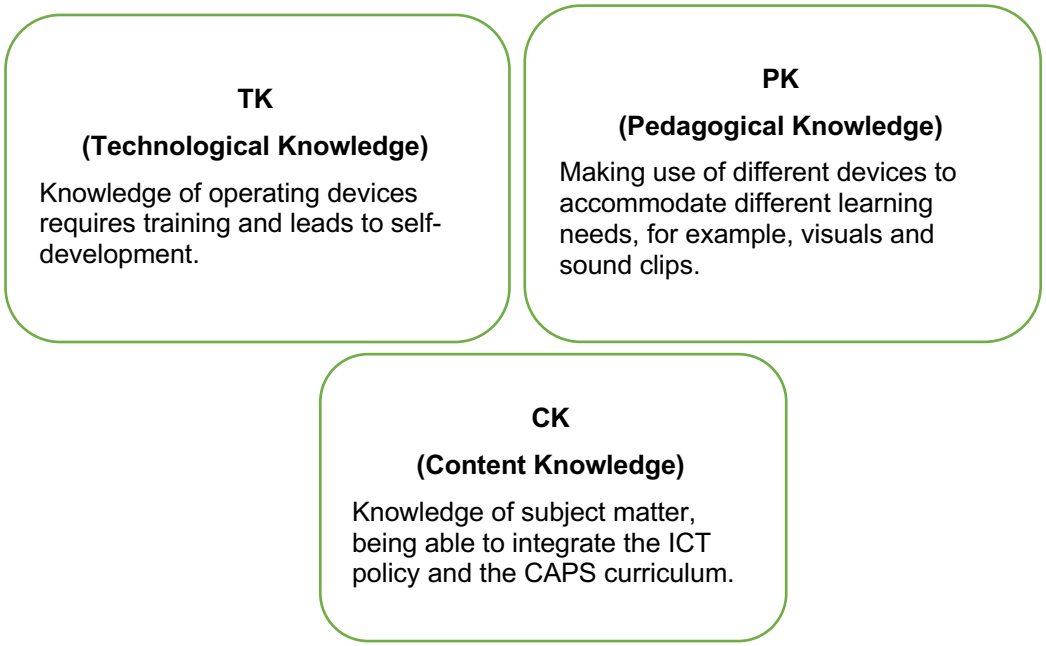


Figure 2-9: The Technological Pedagogical Content Knowledge model (TPACK)

Adapted from Rubin, 2019:46

The different components of the TPACK framework are discussed below and their relevance in the current study.

2.10.1 Content knowledge

Content knowledge is a deeper understanding of a teacher and their teaching domain as to what learners should master (Krauss, Brunner, Kunter, Baumert & Neubrand, 2008:717). It is about being able to connect the learner's prior and current knowledge. As a teacher, it is important to be knowledgeable in the subject taught because it contributes to the way that the learners respond.

Teachers who know what they are doing find fulfilment in assisting the learners because they understand what they are teaching. When teachers are not knowledgeable, they put the future of their learners at risk because they will be teaching them incorrect information. This incorrect information will lead to underperformance. Hence it is crucial for educators to understand completely that their knowledge is transferred to the learners that they teach. A teacher needs to be updated with content from different educational websites that will enable the learners to search for relevant information in an ICT class.

2.10.2 Pedagogy knowledge

Pedagogical knowledge is 'an idea rooted in the belief that teaching requires considerably more than delivering subject content knowledge to students, and that student learning is considerably more than observing information for later accurate regurgitation' (Loughran, Berry & Mulhall, 2006:9). Pedagogy also focuses on finding alternative and multiple methods of teaching in order to accommodate all the needs of the learners academically. It becomes easier for a knowledgeable teacher to identify the learners' needs and also implement the appropriate teaching methods to assist the learners.

2.10.3 Technology knowledge

Technology knowledge refers to the ability of teachers to utilise Information Technology (IT) and knowledge and when it will benefit or impede the achievement of the learners (Schmidt, Baran, Thompson, Mishra, Koehler & Shin, 2009:125). Technology knowledge refers to the knowledge of how to 'teach specific content-based material, using technologies that best embody and support it, in ways that are appropriately matched to student's needs and

preferences' (Harris & Hofer, 2011:213). A teacher needs to fully understand the basics of using technology so that they can use it competently during their presentations.

Through the use of technology, new ideas are explored and viewed in a different way globally. The type of technology used has a major impact on the learner's level of achievement and hence it is important to implement relevant materials that will benefit the learners.

Technology has the ability to transform a traditional classroom into a modernised one by making use of tablets, computers, smartboards, and e-books. It is evident that TPACK plays a crucial role in schools. Teachers have a responsibility to develop themselves and adopt the globalised way of teaching in their classrooms. This involves constantly attending ICT workshops and training to gain more knowledge.

2.11 The SITES project

SITES is the acronym for second information technology in education study, and it was 'initiated in 1997 by the International Association for the Evaluation of Educational Achievement (IEA), and its role was to identify the effectiveness of Information Computer Technology (ICT) in education' (Ainley, Eveleigh, Freeman & O'Malley, 2010:5). This project consisted of two modules.

Module 1 (SITES- M1) provides an overview of the use of ICT in schools of 26 countries (South Africa, among them) between 1998 and 1999. It focused on the implementation of ICT and how the resources were being managed at schools (Blignaut, Hinostroza, Els & Brun, 2010:1552). Module 2 (SITES-M2) focused on the 'relationship between ICT and teaching in greater depth, and it involved 28 education systems from around the world' (Ainley, Eveleigh, Freeman & O'Malley, 2010:2) It focused on innovations that came into practice during the implementation of ICT in schools. The focus was to determine whether the ICT tools were used appropriately during lessons.

The primary aim of the SITES project was to evaluate the competency of teachers and learners in using ICT-related tools in the classroom (Howie *et al.*, 2005:20). The SITES project aimed at ensuring that teachers understand how ICT impacts the learners' performance (Casterns & Pelgrum, 2009:12). The SITES project focused on the technical ability of a learner in class and the impact that ICT has on their education.

The SITES project played a major role in the implementation of ICT in education and provided policymakers with information that gave them a better understanding of ICT integration in schools (Doornekamp, 2002:256). It assisted in enabling policymakers to make informed choices regarding the education system and the curriculum (Plomp, Pelgrum & Law, 2007:84).

2.11.1 The emerging paradigm

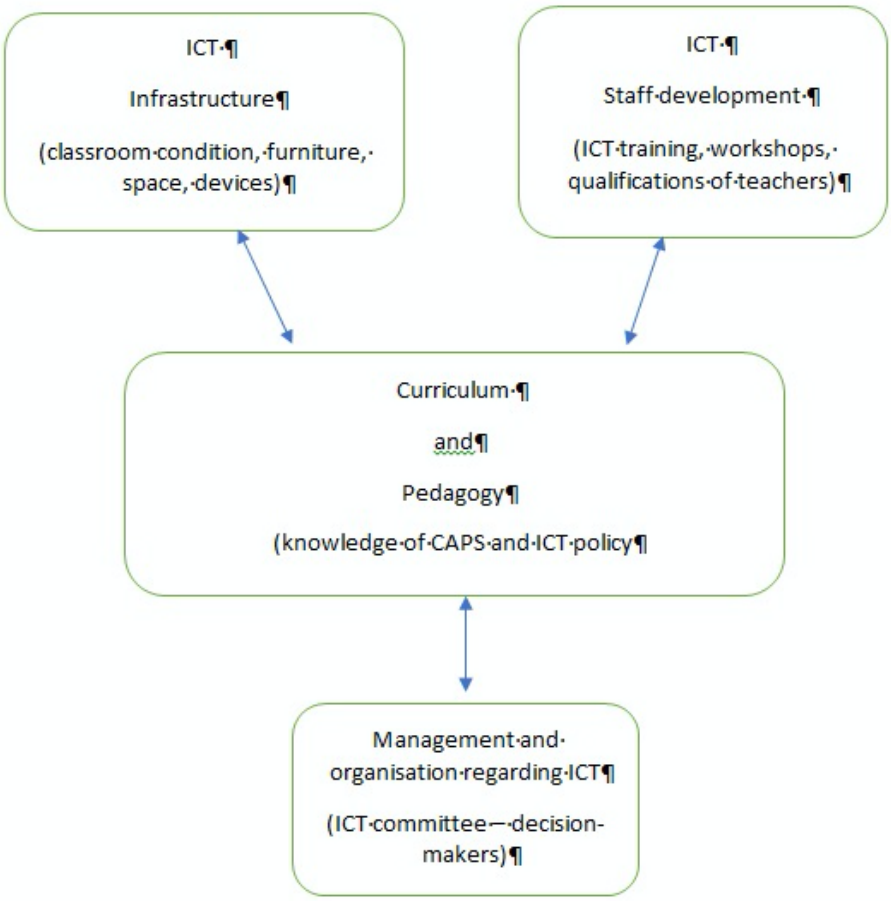


Figure 2-10: A conceptual framework for SITES module 1

Adapted from Plomp *et al.*, 2007:86

Howie *et al.* (2005:23-25) discuss four important elements from the SITES project:

- The first element is the curriculum. The curriculum deals with pedagogy and the content that is taught to the learners. Teachers need to be knowledgeable about how to integrate the CAPS curriculum and the ICT policy. The curriculum provides a guideline of how and when to use technology during the lesson. The learners first need to read

the aims and objectives of the activity before they open their tablets and laptops. The curriculum gives a framework on how learning and teaching should take place.

- The second element is the infrastructure. This infrastructure is divided into two areas; hardware and software. The hardware refers to the computers, laptops, smart-boards, tablets and workstations that learners use in the classroom. The software deals with the operating systems that are installed in the computers to make sure that connections are successful. The size and condition of the classroom is also a crucial aspect to be taken into consideration. The software needs to be installed effectively, and the smartboards, laptops and tablets should be maintained annually.

- The third element is staff development. Teachers were given a questionnaire to check their competency, level of qualifications, the resources they use in their lessons, and their perceptions regarding the use of ICT. Workshops and training play a major role in the development of a teacher because they gain new knowledge. Teachers also need to upgrade their technological knowledge and skills.

- The fourth and last element is management and organisation. This dealt with decision-making when it comes to policy and organisation of computer facilities. In an ICT school, the safekeeping of the devices should be a priority. A committee is formed where decisions are made regarding the policies to be used and the correct use of the devices.

The SITES policy plays a significant role in this study as it reveals the importance of ICT usage in schools. The policy guides the Department of Education, especially the policy makers, to draft polices that enable teachers and learners to adapt and make use of technology in the classroom. The policy also brings transformation in schools by changing the way in which teaching and learning occurs. The teachers are encouraged to implement the changes of globalised learning in the schools. South Africa needs to have skilled teachers who will be able to assist in transforming the lives of the future generation.

2.12 Summary

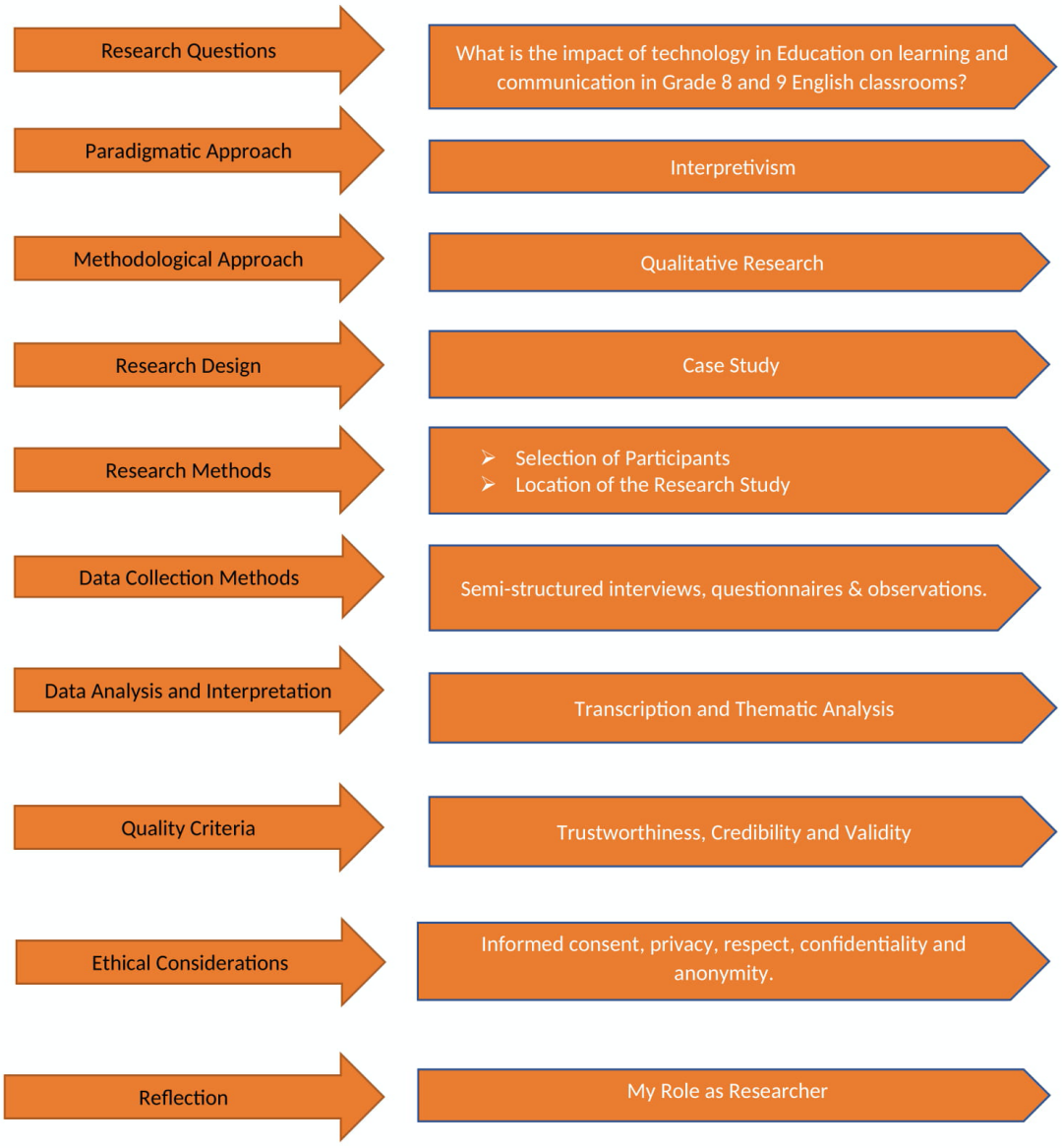
In this chapter, I discussed all the concepts that are relevant to my study. I chose diagrams and tables to indicate the different learning theories of language development, neuroscience, the SITES conceptual framework, the TPACK framework, and how they apply to the learners and the teachers in an ICT classroom.

I also discussed the theories of Vygotsky, Bronfenbrenner and blended learning that form the theoretical framework of this study. Furthermore, I discussed the ICT policies that govern the education system and the different cognitive levels that influence the way in which children learn. In the next chapter, the research methodology that underpins the crucial part of this study is discussed.

CHAPTER 3: RESEARCH DESIGN AND METHODOLOGY

3.1 Introductory orientation

In this chapter, I focus on the research designs, paradigms and methods of this study.



The study employed qualitative research methods. Qualitative research relies on words rather than numbers, which means that its main focus is on constructing meaning in order to understand (Maree, 2016:53). Qualitative research aims to pursue three important objectives namely; 'transparency, methodic-ness and adherence to evidence', and it enables the researcher to experience the 'contextual richness' of the different settings (Yin, 2016:3).

I interviewed English language teachers, ICT experts, and learners in Grades 8 and 9 in this study. Data were collected through engaging with the study participants.

3.2 Research questions

Research questions are vital in a qualitative study as 'they determine the manner in which the study will be conducted' (Mantzoukas, 2008:372). Research questions serve as a guideline of what the study will address. This study explores the learners' and teachers' perceptions regarding the integration and implementation of ICT in the English Language Curriculum. The study seeks to answer these critical questions:

3.2.1 Primary research question

What is the impact of technology in education on learning and communication in Grades 8 and 9 English classrooms?

3.2.2 Secondary research questions

- To what extent does technology bring change in the classroom roles and organisation?
- What are the challenges faced by Grades 8 and 9 educators and learners with regards to using tablets, Interactive whiteboards, and smartboards to teach English?
- How does the curriculum support the use of ICT in the classroom?
- What are the educators' and learners' perceptions regarding the use of ICT?

3.3 Paradigmatic approach

I adapted an interpretivism paradigm for this study because it assisted me to understand the realities that people are faced with. The interpretivism paradigm states that 'our knowledge of reality is a social construction by human actors' (Walsham, 1995:376). The aim of the interpretivism paradigm is to 'understand the different meanings, acknowledge their existence, reconstruct them and to avoid distorting them' (Goldkuhl, 2012:138). In order for the information not to be distorted, the researcher needs to be in that environment and interact with the people that are affected.

Interpretivism does not condone generalisation (Williams, 2000). The information is purely based on the interaction with the people. In my study, I interacted with an expert, six

teachers, and various learners, and I visited three different schools and observed and experienced the different environments. I had the opportunity to talk to teachers and listen to their frustrations and their experiences.

3.4 Methodological approach

This study adopted a qualitative research approach, as stated earlier in the introduction. The 'Research Onion' depicted by Saunders, Lewis and Thornhill (2019:130) outlines the progression of the qualitative research methodology. It commences with the philosophy, which in this research study is interpretivist in nature; and the research approach, which is qualitative.

The next section is a description of the research strategy used, which is a qualitative case study research design in this study. The last section is a discussion of the data collection methods and the data analysis used. The data collection methods used in this study were interviews, questionnaires and observations. The data analysis techniques included transcriptions of interviews and a thematic analysis.

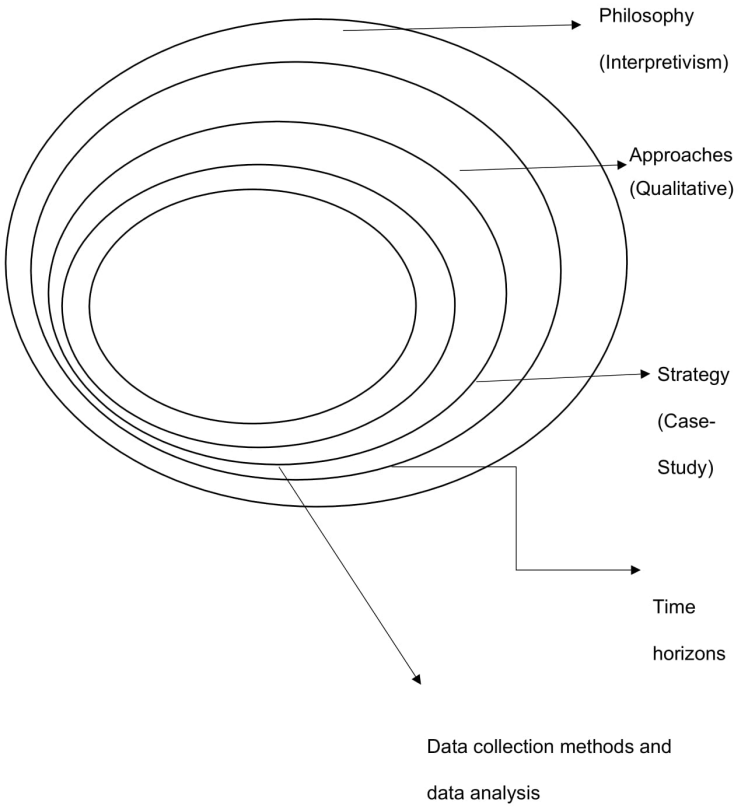


Figure 3-1: The Research Onion

Adapted from Saunders, Lewis & Thornhill, 2019:130

Below is a diagram that illustrates how the data were collected, the instruments used, and the number of participants that took part in the study:

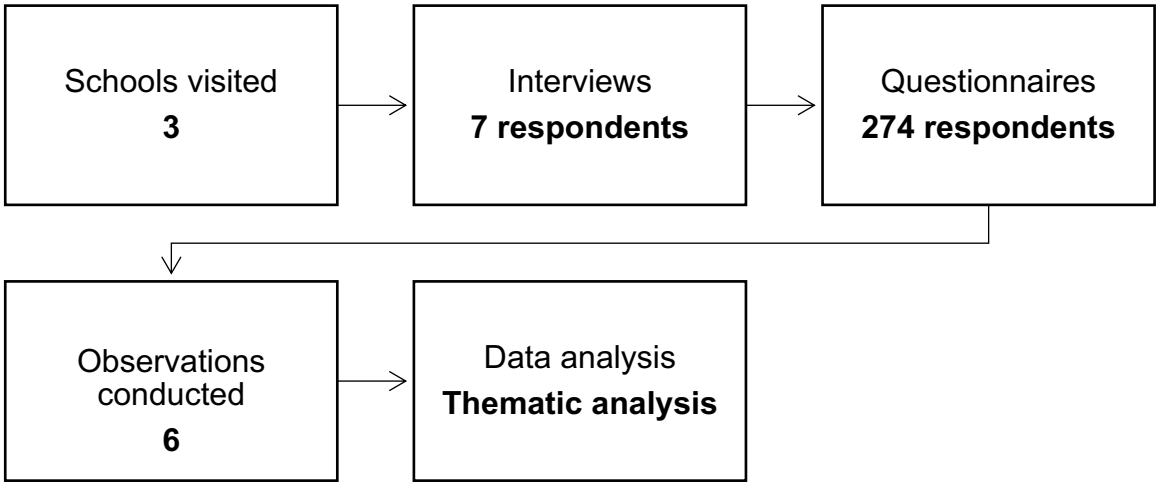


Figure 3-2: Outline of data collection instruments and respondents

3.5 Research design

This study used a case study research design. Yin (2014:16) defines case study research design as 'an empirical enquiry that investigates a contemporary phenomenon within its real-life context, especially when the boundaries between phenomenon and context are not clearly evident'. The aim of using the case study research design focuses on 'specific situations' that interest the researcher, and the information should be from multiple variables (Palic, Vignali, Hallier, Stanton & Radder, 2015:18).

The reason I chose the case study is because it provides rich information that leads to a better understanding of the concepts and themes involved. Another reason for choosing the case study as the research design is because of the multiple number of ways of retrieving data that could lead to 'different types of research output' (Cavaye, 1996:228).

Adelman (1980:59-60) discusses the advantages of using the case study research design:

- Allows for generalisations.
- Recognises the complexity of social truths.
- Is a 'step to action'.

- Presents research or evaluation data in a more publicly accessible form than other kinds of research.

Despite these advantages, Cavaye (1996:229) states that there are also disadvantages that occur as a result of using the case study research design.

- The researcher has no control over independent variables, leading to the limitation of the internal validity.
- The case study research design cannot indicate the direction of causation between variables.

A further reason for selecting the case study design was because the purpose of my study is to understand people's perspectives on the use of ICT in the context of the conditions and circumstances of their lives (Ritche, Lewis, Nicholas & Ormston, 2014).

3.6 Selection of participants

Seven participants were selected using purposive sampling. Purposive sampling is a 'deliberate choice of a participant due to the qualities the participant possesses' (Etikan, Musa & Alkassim, 2016:2). The reason for selecting purposive sampling is to intentionally find participants that will provide relevant information to the study. 'Members of the sample are chosen with a purpose to represent a type in relation to key criterion' (Ritche, Lewis, Nicholas & Ormston, 2014:113).

Six of the participants were language teachers and they taught English in Grades 8 and 9. One of the participants was an expert in the field of Information Computer Technology (ICT). Furthermore, the six teachers resided in Tembisa and Olievenhoutbosch; thus close to the researcher. The learners who participated were chosen from the classes that were observed for the study. The learners at these schools were in Grades 8 and 9, and were between the ages of 13 and 15.

The selection criteria of participants should be in line with the aim of the study (Marshall, 1996:522). For my study, the selection criteria of participants were as follows:

3.6.1 Teacher selection criteria

Teachers had to have at least three years of experience teaching English, had to be employed at the school (not a volunteer), and had to be willing to participate in the study. The teachers also had to be able to teach using ICT.

3.6.2 Learner selection criteria

Learners had to be in Grades 8 or 9 to participate and they needed to get consent from their parents or guardians.

3.6.3 Expert selection criteria

He/she needed to have the relevant qualifications and skills in his/her field of expertise.

All the participants were asked to sign consent or assent letters for participation in the study.

3.7 Location of the research study

The location of the qualitative research study is crucial because, 'a researcher who lacks knowledge of the culture they investigate or even has difficulties understanding the basics of the language of the culture' will experience difficulty engaging with participants during the study (Knoblauch, 2005:4).

The research was conducted in the East Rand and Tshwane areas. I chose a natural setting which entails conducting research 'at the site where participants experience the problems or issues discussed in the study' (Creswell & Poth, 2018:45). The participants were selected from three schools; two of which were part of the Ekurhuleni North District and the other school was part of the Tshwane South District. The schools had a functional ICT department that made it easy for teaching and learning to take place. The participants also included an expert that was working in the field of Mathematics, Science and Technology. He was chosen as an expert participant for his knowledge in the ICT field.

I collected the data and conducted the interviews. I also observed six English lessons where teachers integrated ICT in their teaching. Fortunately, the participants felt comfortable using English during the interviews so the information did not have to be translated. The locations were an advantage because they formed part of the ICT implementation done by the

Gauteng Department of Education. These schools had all the required resources that were prerequisites for this study.

3.8 Data collection methods

In this study semi-structured interviews, questionnaires, and observation were used as data collection methods. The different methods and their justifications are subsequently discussed.

3.8.1 Semi-structured interviews

Semi-structured interviews 'employ a blend of closed and open-ended questions' (Newcomer, Hatry & Wholey, 2015:492). The questions are structured but not too formal. Semi-structured interviews (see Appendix A) make it less stressful for the participants. Semi-structured interviews are 'open to following leads of informants and probing into areas that arise during interview interactions' (Hatch, 2002:94).

Patton (2015:444-445) explains the six different kinds of research questions that 'seek to understand the various realms of people's experiences in the interpretive processes' and they are briefly discussed below;

- Experience and behaviour questions – these are questions that focus on what a person has done, will do, or is currently doing.
- Opinion and values questions - these questions are designed to explore what a person thinks and believes about a topic, experience, phenomenon or event, and the value that he or she places on it.
- Feeling questions - these questions explore what people feel and their emotional experiences.
- Knowledge questions - these questions seek facts and information that someone knows about a topic, phenomenon, event or specific context.
- Sensory questions - these questions probe for what people have experienced at the sensory levels as in what they see, hear, touch, taste or smell.
- Background questions - these questions focus on people's social location, identities, and 'positionalities' as they conceptualise and describe them.

It is important for the researcher to know and understand the differences between the questions when developing the interview questionnaires. This study made use of experience questions, opinion and values questions, and background questions.

I interviewed six teachers and one expert in the ICT sector, and I asked both open-ended and closed questions (see Appendices). During the interview, I used a tape recorder to record important information from the responses and the teachers signed a consent form to be recorded. The teacher interviews were conducted at schools after observing their lessons, and the expert interview occurred at his office at the university.

One of the advantages of semi-structured interviews is that the language barrier is taken into consideration (Barriball & While, 1994:330). The participants were offered the opportunity to respond in their language of choice, which resulted in more accurate and detailed responses.

3.8.2 Transcripts of semi-structured interviews

There were seven recordings that were transcribed; six teacher interviews and one expert interview. After every interview I transcribed the information. Transcription is defined as a process of 'reproducing the spoken words' from different sources, such as interviews and audio devices (Halcomb & Davidson, 2006:38). The interviews lasted between 20 and 30 minutes. The participants communicated using English during the interviews and the information did not have to be translated. The transcribing process took longer than planned because of the in-depth content provided by the interviewees.

After the lesson observations, each participant was asked questions (see Appendix for the teacher's interview protocol) related to ICT use in the classroom. During the interviews, participants were afforded the opportunity to respond freely and use the language of their choice but they preferred using English as the communication medium. Each participant had a different view relating to ICT usage in schools and this was used to identify themes of perception versus experience. The use of themes enables the researcher to use 'different research methods to communicate with each other' (Nowell *et al.* 2017:2).

3.8.3 Questionnaires

Furthermore, I used questionnaires as a second method of collecting data. The reason for using questionnaires in this study is because 'they are detailed and they cover many issues

on one important area and they are simple and focused' (Wilkinson & Birmingham 2003:8). Questionnaires are easy to use, and a researcher is able to collect much information from a large group of people (Munn & Drever, 1990:10).

The questionnaires consisted of open-ended and closed questions (see Appendix). The learners were asked to complete the questionnaires after their observation lesson. The aim of the questionnaire was to obtain an idea of how the learners experienced being taught using ICT in their classes.

Ravitch and Carl (2016:172-173) state the advantages and disadvantages of using questionnaires in qualitative research and they are discussed below:

Advantages of using questionnaires:

- They are an efficient way of collecting data from a range of people across different locations.
- Responses can be easier to compile and analyse.
- Significant amounts of information can be collected from a large number of people in a short period of time.
- They are relatively cost- and resource-effective.
- Individuals can remain anonymous.
- The results can be quickly accessed.

Disadvantages of using questionnaires:

- The responses provide only a limited amount of information without explanations.
- They work best when the questions are objective rather than subjective.
- They do not tend to generalise rich or contextualised data, and therefore responses can be hard to analyse.
- It is not possible to know if a respondent is being truthful.

- It can be difficult to tell how much thought has gone into the responses, which can affect accuracy.

- They require literacy, and therefore might marginalise people who are not literate.

Questionnaires were distributed by the researcher during the school visits and the learners signed the consent forms and the parents were requested to also sign the consent forms before the questionnaires could be handed out to the learners. Learners were asked to answer questions relating to their feelings, perceptions, and experiences about the use of ICT in Grades 8 and 9. Each questionnaire was allocated a study number for easy identification and to ensure anonymity. The responses were then later compared to identify themes that had similar ideas.

3.8.4 Observation

The last method of data collection used in this study was observation. Observation in research refers to a 'prolonged period of intense social interaction between the researcher and the subjects, in the milieu of the latter, during which time data, in the form of field notes, are unobtrusively and systematically collected' (Bogdan, 1972:3). The goal of observation 'is to understand the culture, setting or social phenomenon being studied from the perspectives of the participants' (Hatch, 2002:72). I observed two lessons from each school, which resulted in six observations in total and I used an observation template to record the findings (see Appendix).

The reason for using observation to collect data was to observe how teachers integrate ICT during their lessons. The aim was not to judge the teachers' teaching, and that was indicated to them before the observation session. Six teachers' classes were observed. A recording template was used to record the actions and deliberations during the ICT lessons. The observations were conducted in an ICT-equipped class. During the observation, the researcher was able to see the real life teaching situation and experience the challenges and benefits of ICT from the viewpoint of the learners and the teachers.

Below are the strengths of observational data, as discussed by Patton (1990:202-205):

- Observation permits better understanding of the context.

- The researcher obtains first hand experience of the environment.

- The researcher has the opportunity to see things that are taken for granted by participants.
- The researcher may learn sensitive information from being present in the setting that participants may not be willing to share.
- The researcher has the opportunity to share his/her own experience by getting close to the social phenomenon.

The observations enabled me as a researcher to note the following aspects:

- The environment (ICT classes) and the atmosphere in the observed classes.
- The attitude of learners in the classroom and their work etiquette.
- The interaction between the teachers and the learners.
- The discipline and classroom management of the teacher.
- The challenges that learners and teachers encountered as a result of not having sufficient resources to ensure that optimal teaching and learning took place.

3.9 Quality criteria

This section details some of the issues pertaining to ensuring high quality research.

3.9.1 Trustworthiness

Trustworthiness is defined as 'the degree of confidence in data, interpretation and methods used to ensure the quality of a study' (Pilot & Beck, 2014:435). Trustworthiness in qualitative research is beneficial in 'yielding meaningful and useful results' (Nowell *et al.* 2017:1). There are different components of trustworthiness that assure a reliable and valid study.

3.9.2 Validity

Yin (2016:89) defines validity as a study that has 'properly interpreted its data so that the conclusions accurately reflect and represent the real world that was studied'. Creswell (2014:201) states that qualitative validity means making sure that the findings are accurate by employing certain procedures.

Brink (1993:36) mentions the crucial responsibilities of a researcher in order to achieve validity in a qualitative research study:

- Build a trust-relationship with the participants by spending time with them before the commencement of the study.
- Interview the same participants on several occasions over a period of time.
- Compare results obtained with other evidence.
- Keep accurate and detailed field notes at all times.
- Get a second opinion by showing the field notes to other researchers.

The social context where the data were collected has an influence on the validity or trustworthiness of the study (Brink 1993:36). Data were collected from schools that utilise ICT on a daily basis, and this gave further validity to the study.

3.9.3 Triangulation

I made use of data triangulation, which is defined as 'a set of processes that researchers use to enhance the validity of a study' (Ravitch & Carl, 2016:194). Triangulation focuses on using multiple data collection strategies and collecting data from multiple sources. In this study, I used three data collection methods; semi-structured interviews, questionnaires and observations. I worked with six teachers, one expert, and 274 learners. A relevant literature review was conducted, and this included academic books, articles and academic websites. The main objective of triangulation is to ensure that the researcher has enough relevant information for a valid study.

3.9.4 Credibility

Credibility refers to 'whether a researcher perceives information as meeting the standards of scientific plausibility and technical adequacy' (Cash *et al.* 2002:4). For the data to be credible, the information collected has to be a true reflection of people's experiences. The criteria of 'trust value' highlights the kind of information that is required to assure a credible study. Trust value 'establishes how confident the researcher is with the truth of the findings based on the research design, informants and context' (Krefting, 1991:215).

The information obtained in this study was a result of people's experiences and their perceptions regarding ICT use in schools. Teachers and learners mentioned their 'untold' stories of daily challenges and advantages of being in an ICT environment.

The information from the interviews and questionnaires was merged with the literature to validate the study. The researcher revisited the audio recordings and transcripts to identify inconsistencies and to verify the information. 'Member checks' is another strategy that improves the quality of qualitative data as it is known as the 'heart' of credibility (Lincoln & Guba, 1985). Member checks control the biased information during data analysis by giving other participants a chance to evaluate the interpretation of the information (Anney, 2014:10).

In this study, I conducted research at three schools where teachers were interviewed and observed as they taught and learners completed the questionnaires. Observation templates and an audio recorder were used to collect data to make sure that the findings were thoroughly evaluated and accurate. The participants from each school provided unique information which was later analysed to identify themes and gaps.

The important aspect of the sources is that they were from different settings and backgrounds. Three data collection methods were utilised in the study; semi-structured interviews, questionnaires, and observations. I also made use of member checking, which included follow-up interviews with the participants where they were given an opportunity to comment on the findings of the study. Member checking is defined as a process where the participants are given an opportunity to correct mistakes on the transcripts of the interviews (Maree, 2016:123).

3.10 Data analysis and interpretation

This study followed the qualitative research approach, which is defined as 'an approach to research that facilitates exploration of a phenomenon within its context using a variety of data sources' (Baxter & Jack, 2008:544). Data analysis is a 'process of resolving data into its constituent components to reveal its characteristic elements and structure' (Dey, 1993:30).

Qualitative data analysis consists of three features; material collection, data definition, and data interpretation (Melnikova & Khoroshilov, 2010:48). Material collection includes the

collection of raw data for processing. The raw data were collected from teacher interviews, learner questionnaires, and field notes obtained during observation of lessons.

The processing in this study involved audio recordings, transcribing interviews, classifying information according to themes, and also taking field notes during classroom observations. The refining of the data was done by examining the transcripts, field notes, and audio recordings. Maxwell (2004) states that the 'structural analysis is based on categorising data'.

I analysed data from the teacher interviews, learner questionnaires, and classroom observations. The data were coded and I created themes that linked to the results. Strauss and Corbin (1998:43) state that 'selective coding involves the process of selecting one, main core category and relating the other categories to it'. The process of coding and categorising reduces the volume of data by narrowing the process through 'compact classes' (Melnikova & Khoroshilov, 2010:52).

3.10.1 Three phases of data analysis

Baptiste (2001:2) states that qualitative data analysis occurs in three phases and these phases do not necessarily have to occur sequentially. The three phases are; defining the analysis, classifying the data, and making connections.

The first phase of refining the analysis was to record the interviews, administer the questionnaires, and collect the notes and tape recordings in order for the documents to be kept safe and sorted according to the different participating schools. The second phase of classifying data involved transcribing the notes from the interviews and the questionnaires, and then organising the information by identifying themes. The information selected had to be relevant and in support of the purpose of the study. The selection process involved grouping the data into themes.

The last phase of making connections was performed by organising the observation templates and recording the reflections. Transcriptions were made as they 'help researchers to systematically organise and analyse data' (McLellan, MacQueen & Neidig, 2003:64). For connections to be made, the information has to flow and serve to answer the research questions of the study. In some instances, spot-checking had to be done by examining a few questionnaires and listening to the recording again to maintain the accuracy of the

information. Spot-checking saves time and also assists the researcher to 'discuss any questions from the transcriptionist from the onset' (MacLean, Meyer & Estable, 2004:115).

Making connections results in the interpretation of information, and Brannen (2004) mentions that interpretation 'starts with an empathic exposure when the researcher attempts to wear the respondent's shoes to get the widest data spectrum'. Data were grouped according to themes and interpreted by merging information and explaining the results obtained from the study through transcriptions.

In this study, the researcher became an instrument and obtained a 'snapshot' view of the challenges that the teachers face when teaching English language to learners who have a different home language from the one that they are taught at school.

3.11 Ethical considerations

In conducting this study, learners in Grades 8 and 9 participated by completing questionnaires to uncover the realities of ICT learning in the classrooms. Ethical considerations were important to ensure the protection of the participants and the data collected. Ethics is defined as a 'method, procedure, or perspective for deciding how to act and for analysing complex problems and issues' (Gajjar, 2013:8). Ethics plays a role in governing the proceedings of the study and ensuring that the information does not violate anyone's rights.

- Permission was obtained from the Faculty of Education Ethics Committee at the University of Pretoria (see Appendix). The Research Data Management Policy of the University of Pretoria states that the data collected must be stored for a period of 15 years after the completion of the study, and the data can be made 'discoverable enabling the broader research community to evaluate the research' (University of Pretoria, 2015:3).

- Permission was also obtained from the Gauteng Department of Education to collect data from three schools. The schools were from two districts; Ekurhuleni North and Tshwane South districts in Gauteng. All the participants signed consent forms and the Grades 8 and 9 learners signed the consent (assent) forms before the research commenced. Informed consent is beneficial in a sense that it 'fosters public trust of the research community and increases the participants' adherence to the research study' (Pedroni & Pimple, 2001:2).

- The names of the schools and the participants were not mentioned in the study and they were treated as anonymous. It is essential to protect the identity of participants and respect their privacy as they might be prone to discrimination or violations of their rights for participating in the study (Chen, Chen & Yang, 2008:231).

- The teachers were provided with a pseudonym and the learners were allocated a participant number to protect their identities. The principals of the schools and the participants were fully informed that the participation in my study was voluntary. If the participants opted to withdraw during the study, they could do so at any point in time. The participants were treated with respect and the information collected was not used for anything else except the study. The information without names might be accessible online for future research.

3.12 My role as a researcher

In this study, I embarked on a journey of discovering information regarding the use of ICT and I also consulted different sources to locate relevant information for this study. I made sure that the participants understood the purpose of the study and their involvement as participants. I explained the ethical components of the study with the participants before conducting the research.

During the interviews, I answered questions and also explained some of the concepts that the participants were unsure of. I was an observer during the English lessons and I resorted to structural observation, which entails having direct 'access to the lived experiences of people' (Mansell, 2011:1). I followed the instructions that were set out on the observation template. An audio recorder was utilised and readily available during the observation of lessons and the learners were made aware of the purpose of my presence during their English lessons. After the interviews were conducted, the participants were enlightened about how the data would be analysed and interpreted so that they understood the importance of their contribution to this study.

After the collection of data, I transcribed the information and organised the data according to themes. The findings from the data have assisted me in understanding the purpose of ICT in language learning, and also the perceptions that teachers and learners have towards it.

3.13 Summary

In this chapter, an outline of the research design was provided. The paradigm that underpins this study was interpretivism, which entails 'viewing the world through the perceptions and experiences of the participants' (Thanh & Thanh, 2015:24). Interviews, questionnaires, and observations were the data collection methods that were utilised.

English language teachers, an ICT expert, and Grades 8 and 9 learners took part in the research study. Furthermore, the trustworthiness, validity, and ethical considerations of the study were elucidated.

In the next chapter, a discussion of the results in terms of qualitative research procedure follows.

CHAPTER 4: DATA PRESENTATION, ANALYSIS AND DISCUSSION

4.1 Introduction

This chapter provides an interpretation of the data collected by using semi-structured interviews, observations and questionnaires. The data were analysed then coded to create themes according to the research questions stated in Chapter 1. It is through the data and interpretation that I attempted to develop a base of knowledge on the impact of technology and communication in the Grades 8 and 9 English classrooms. Furthermore, I discuss the results obtained from the schools that formed part of my study. The analysis was driven by the following question:

To what extent does the impact of technology in education influence learning and communication in the Grades 8 and 9 English classrooms?

4.2 Overview of the research process

Six English teachers from secondary schools around Gauteng, and one expert in the field of ICT were interviewed in this study. The teachers taught Grades 8 and 9, and they were asked about their experiences and challenges with regards to teaching using technology in the classroom. The interview protocol (see Appendix) consisted of 15 questions and the interviews took place after the observation of the lessons. The questions focused on the experience of utilising technological resources during their lessons, the challenges that they experienced, different methodologies that they used, and also their perceptions about ICT. The interviews took place in their classrooms and the interviews were recorded and then later transcribed.

Six lessons were observed in total; two from each school. I visited one Grade 8 and one Grade 9 class in each of the selected schools. The number of learners varied in each class and the minimum number of learners in the classes that I observed was 34 and the maximum was 57 learners. During the observation, notes were made and an observation template (see Appendix) was used to record what was witnessed. Questionnaires were completed only by the learners who submitted their signed consent forms. The parents/guardians and the learners had to sign consent forms first before my visit to the school. The questions focused mainly on the experiences of the learners and how they thought it influenced the way in which they learnt.

The expert was from a well-known university that has a fully equipped laboratory for training Mathematics and Science higher education students dealing with ICT. He had obtained specialist degrees in the field of ICT. The expert participant and I set up an appointment to meet and he was interviewed in his office. The interview protocol (see Appendix) consisted of 14 questions. The criteria for the questions were based on the participant's experience and expertise of ICT and modern technology. After the interview, the expert participant showed me the laboratory that had smartboards and science equipment. The laboratory had many ICT devices that I was unaware of and it was illuminating to see the advanced technology available.

In this study, the ethical considerations of the research process were adhered to as discussed in Chapter 3, and pseudonyms were used to protect the identities of the participants.

4.3 Introducing the participants

During the study, six teachers and one expert participated in the interviews. The teachers taught English to either Grade 8 or Grade 9 learners and also had experience and knowledge of ICT.

4.3.1 Expert participant

Expert 1 was a lecturer in the Computer Integrated Education Unit at one of the universities in Gauteng. He trained teachers and community members on how to optimally use ICT and demonstrates how to operate the different technological devices in their classrooms, such as smartboards, interactive whiteboards, and tablets. He was a researcher and also tested different kinds of technology for its application in education. He was working on a project that focused on technology acceptance and technology integration.

He worked with different stakeholders and institutions that had created programmes to make education more innovative. From the workshops that he had conducted, he had received mainly positive feedback from the teachers saying that ICT had made teaching and learning much easier. Some teachers stated that it was time consuming.

> *'Through conferences, there have been a few people who stated that their practice has improved or they have picked up something that they can now use. The feedback from the services was mainly positive.'*

His perception about ICT was that it played a supporting role in the classroom. He mentioned that technology is not there to work on its own but it is there to support pedagogy. His experience in ICT had taught him that technology will always find a way to 'bite' you. He had concerns about how the implementation of ICT has been glorified and yet not much had been done to improve the development of teachers in terms of ICT training.

> *'The first thing that you need to do as a facilitator or minister is to assure that wherever these ICT schools are, the schools remain functional firstly. So instead of pushing the ICT motivation the whole time, make sure that the school functions, and then get the ICT as a support.'*

The concern came as a result of ICT schools becoming dysfunctional a few years after the implementation of ICT due to a lack of proper maintenance. Lastly, expert 1 had this advice for students:

> *'I would say that you really need to be a patient person I think that's the one big thing. You also need to be a person who is fine with making mistakes because when you work with ICT, I think the biggest thing is to know when you make a mistake and to be absolutely fine with it.'*

4.3.2 Teacher 1

Teacher 1 was a Grade 8 teacher at one of the ICT schools in Tembisa. She studied for a secondary teacher's diploma and graduated at the Mokopane College of Education in 1997, majoring English FAL and Home Economics. Then in 2011, she studied for the ACE (Advanced Certificate in Education) with UNISA and majored in Life Orientation. She started working as a teacher in 2006 at private institutions and then moved to the township schools. She joined the current school in 2011 and taught Tourism, Life Orientation and English for Grade 8.

Teacher 1 connected her laptop to the screen to project power-point presentations during her lessons. Every learner had a laptop with pre-loaded textbooks and Teacher 1 used different methods during her classes.

> *'I play audio files and instead of reading the comprehension, I let the learners listen to the comprehension being read aloud. I use the LCD screen because I do not have a smartboard in my class.'*

The effectiveness of the models used in the classroom was questionable. I asked her if using the screen and laptops were effective for her lessons, and she took a while to respond and said the following:

> *'It is effective to a certain extent. The only time I find difficulty is when the school does not have a Wi-Fi connection or the signal is not strong enough. It affects me as a teacher because I connect the laptop to the screen via Wi-Fi and not cables.'*

Teacher 1 has faced many challenges with regards to using ICT, and some of the challenges make teaching and learning difficult.

> *'I once tried to use the cyber-schooling information that they gave us when we went for training. They showed us interesting things and how to access videos and audio files. When I tried it in my lesson, the technology did not work the way it was supposed to. Using technology comes with a lot of disappointments sometimes.'*

When Teacher 1 was asked to mention different ways in which she utilises technology to teach English, she said,

> *'To be honest, I do not have enough technological resources so I just assist learners during extra classes and I prefer the hard copy version of the textbooks.'*

Teachers have different perceptions regarding the use of ICT in schools, as was the case with Teacher 1. She mentioned that ICT had made life easier for her because documents come in soft copy format, making it easier to keep records. She also indicated that she perceived technology as more of a distraction than a help for some of the learners.

> *'The problem is with the learners. Some of them do not use the laptops for their academic benefit but as a form of entertainment. They become overwhelmed with the gadgets because for some of them, it is their first time using gadgets. So, technology is a distraction for the learners.'*

As stated earlier, Teacher 1 was an English teacher at the school and she found some of the concepts difficult for learners to understand.

> *'There are a number of challenges, but the major one for me has to be integrating the language skills. I remember I once attended a workshop where they taught us how*

to integrate skills when teaching (listening, speaking and writing). It is a challenge for me because I am still learning.'

4.3.3 Teacher 2

Teacher 2 was a Grade 9 teacher and she studied for a bachelor's degree in Education at the University of the Witwatersrand, graduating in 2015. She started teaching in 2014 at one of the secondary schools in Tembisa, and while she was doing her fourth year of study she taught History. In 2016, she moved to Pretoria. She taught English and Social Sciences. She then moved to the current school where she had been teaching for five years when the study was conducted.

Teacher 2 used an interactive whiteboard, smartboard and laptop in her class. She mentioned that the smartboard made it easier to display visuals and that it also saved time. She used slide-shows that helped learners to understand. It provided them with in-depth information, according to her. There were times when she used visual aids and audio devices so that it was easier for the learners to understand. There were also challenges that she faced as a teacher in an ICT school.

'Sometimes I come to class well prepared and I find that there is no electricity on that particular day. As a teacher, I always need to have a back-up plan to avoid such situations.'

She explained that teaching using ICT requires discipline since most of the learners see it as an opportunity to play games or listen to music. During lessons, the teachers had to monitor what the learners were doing. An aspect that she struggled with was the language structure.

'Yoh! I find it difficult to make learners understand the parts of speech. Most of the learners hardly use English as a way of communicating at home so that they find it difficult to understand.'

Berk (2006:354) states that language has different components; phonology, syntax, morphology and pragmatics, as explained in Chapter 2. These components contribute to the way in which learners communicate. The learners need to know the sound, structure, and the meaning of the words in order to construct a meaningful sentence. Warschauer (2002:472) states that technology is a useful tool in English Language learning as it is a 'medium of communication, research and knowledge production'.

Most technological devices come with instructions on how to operate them; hence it is crucial to be able to understand language in order to know how to engage with ICT. The way that learners 'assess their work will be more meaningful as they will be aware of the quality of the work that they produce' (Riasati, Allahyar & Tan, 2012:26).

Teacher 2 felt that it was interesting to use technology during English lessons because it saved time. She complained about attending smartboard training which was presented by private companies employed by the department. She mentioned that the smartboard training is time-consuming and it is not practical enough for teachers.

4.3.4 Teacher 3

Teacher 3 was a Grade 9 English teacher and she had been teaching for a period of 10 years. She taught English and Technology, as well as isiZulu. She used a smartboard, interactive whiteboard, and a laptop when presenting her lessons. Teacher 3 felt that these devices were effective and fast. She mentioned that there were pictures that she linked to the topics that she taught in every session.

Teacher 3 believed that the use and presence of technology enabled and extended opportunities for learners to explore, discover, and learn language without limits. She mentioned that the learners' attention was drawn to the illustrations. Despite the positive elements that come with technology, she stated that,

> *'It is quite a challenge to mark, especially when you are teaching languages where you have to mark essays. I wish the devices had options to minimise the marking for teachers.'*

There are various ways of dealing with differences in the classroom and Teacher 3 explained how she managed to reach out to most of the learners. The first thing that she did was to group the learners according to their needs and capabilities. The crucial part was to make sure that the learners used and understood English with the assistance of visual and audio devices. The unfortunate part, according to her, is that,

> *'Teachers are not given enough support to understand how digital technology can be utilised effectively in the ICT classroom. I believe that every teacher is a professional, unique individual who modifies teaching strategies by looking at learners' needs, capabilities and understanding.'*

The learner questionnaires reflected that 40% of learners were able to utilise the technological devices without difficulty during lessons. Some 60% of learners experienced challenges in the classroom. Some teachers had to pause during lessons to assist learners to catch up with the work by showing the learners how to access electronic textbooks on the tablets.

4.3.5 Teacher 4

Teacher 4 had been teaching for 17 years. He taught English, Economic Management Sciences, Economics and Accounting. Teacher 4 had an interrupted service, as after 14 years he left teaching and went into business. He came back to teaching three years ago. Teacher 4 had a BA degree, a post graduate degree in Education from Unisa, and a BEd Honours degree in Education Management and Law with the University of Pretoria.

Teacher 4 mentioned that he encountered problems on a daily basis during his English lessons. One of the reasons is that the learners do not bring their devices to school.

> *'When the learners decide to bring the gadgets to school, they usually erase the GDE content and add their own content, especially music.'*

Another challenge that Teacher 4 experienced was that the formal assessments could not be sent through the e-learning programme. He believed that the GDE needed to revisit the issue of assessments and make provision for online submissions.

> *'We still lack full integration in terms of assessments.'*

Teacher 4 had a smartboard, interactive whiteboard, and a laptop that was provided by the GDE. He believed that the models were effective because there was a gallery which concretised whichever topic a teacher wants to teach.

> *'If a teacher wants to teach learners about volcanoes, he/she can display pictures to make sure that the learners have a better understanding. There are also sound effects and 3D images that can be downloaded.'*

In every classroom, there are learners with learning barriers and it is important for teachers to be able to adapt their ways of teaching to accommodate such learners. Teacher 4 explained that he had a way of engaging with the learners:

'I design expanded opportunities for the learners who are struggling and also tap into their own space (environment). I use music to teach moods and rhyming words in poetry.'

He mentioned that the use of ICT had changed the way in which he taught and it had made his lessons more interesting for the learners. One of the issues that he identified was that most of the learners did not practice how to speak English and this contributed negatively to the way they learned the language; they preferred to use their home languages when communicating with their peers.

'The learners are reluctant to communicate in English with their peers at school'.

Teacher 4 believed that classroom rules are an essential part of classroom management in order to keep discipline. He had measures in place that helped maintain the required discipline.

'The learners have to line up outside the classroom before they enter and when they are inside, they have to wait for me to greet them and therefore instruct them to seat down.'

Collaborative learning is more effective when individuals share a 'common cognitive frame of reference or common ground' (Beers, Kirschner, Boshuizen & Gijselaers, 2007:535). This common ground can be achieved when classroom rules are set by both the learners and teachers. The lining up of learners outside the classrooms was not properly planned as it did not meet the desired outcome of the teachers in all the schools that I observed.

I stood outside before every lesson and observed as the learners came into class and I realised that there is a need for disciplinary measures in some schools. Learners do not respect teachers and it is a major concern because it influences the way teaching and learning occurs. Teachers need to 'organise the learning spaces and to guide learners towards the achievement of significant learning objectives' (Hepp, Hinostroza, Laval & Rehbein, 2004:3). It is also a method of maintaining order in the classroom. It is crucial for learners to follow instructions, especially in an ICT classroom.

I asked a question as to whether the school received support or resources from the Gauteng Department of Education and Teacher 4 responded,

'At the beginning of every year, the school receives laptops with new software and updates. There is also a dedicated IT unit in their school and this is where the technicians are found to assist the teachers and the learners.'

Despite the assistance that teachers received, Teacher 4 said that some teachers were reluctant because of their lack of knowledge and skills. They were not interested in learning about ICT and some complained about not having enough time. Teacher 4 said if a teacher continually tapped into the world of ICT, they would discover that it made life easier. ICT had played a major role in his profession, especially as an English teacher.

4.3.6 Teacher 5

Teacher 5 was a Grade 8 teacher and she had been teaching for nine years. She had experienced challenges with learners who could not read or write. Teacher 5 mentioned that it was important to make time for learners who needed special attention.

Teacher 5 had a smartboard and an interactive whiteboard installed in her classroom. She believed that these technological devices were helpful sometimes, but that they got sometimes got stuck during the lessons. She admitted that she struggled to use the technology in her class and sometimes the learners had to come to her rescue.

'The whiteboard enables me to write notes and magnify them so that the learners can be able to see.'

For her intervention, she usually used magazines and played videos for learners to understand. She mentioned that English is a difficult subject for learners, so teachers need to explain further by making use of visual aids.

'You teach them today, and tomorrow they have forgotten what they have learnt.'

In her class, there were classroom rules and she constantly had to remind the learners about the importance of adhering to the rules. Teacher 5 said that it was important to have control over the class because it affected their performance in that particular subject.

4.3.7 Teacher 6

Teacher 6 specialised in English FAL in the school, and he had been a teacher for six years. He identified a few challenges that he faced on daily basis;

> *'Most of the learners in the school come from rural areas and came to the urban area to get better education. The learners find it difficult to adjust to the different ways of teaching. The majority of them do not understand English as this is the first time they are taught in English.'*

Due to the challenges of using ICT, Teacher 6 had to make sure that the learners understood. Thus, he made use of videos and pictures during his lessons. Teacher 6 believed that learners learn better when they see and experience things.

> *'When I teach advertisements and I mention billboards, some of the learners have no idea what I am referring to so it becomes easier when I show them what am talking about.'*

Using technology for Teacher 6 was frustrating sometimes and he mentioned that it was time consuming. The other challenge he experienced was the weak internet signal which kept interrupting the lessons.

As a teacher who specialised in English, he found teaching direct and indirect speech difficult because the learners did not easily understand. As a result, he ended up spending most of the time teaching only one concept and this affected the annual teaching plan.

4.4 Classroom observations

Observations took place at different intervals and I observed three English lessons from three different schools. At each school I attended two English lessons, one Grade 8 and one Grade 9, where the educators taught using different ICT models such as smartboards, tablets, and interactive whiteboards. I utilised an observation template (see Appendix) to record the information that I observed in every lesson. The information below is a summary of the findings collected during the classroom observations, which lasted for 60 minutes.

4.4.1 School A

School A was situated in Tembisa and it is one of the ICT schools. It was not a big school and had been in existence for more than 25 years. The school consisted of large mobile classrooms.

4.4.1.1 First observation: School A: Grade 8

Table 4-1: Observations: Teacher 1

Situation	Participants	Actions observed	Reflection
• Every learner had a laptop. • Books were loaded onto the laptops (Platinum). • Two learners were seated at each table. • No smartboard or interactive whiteboard. • An LCD screen was installed in the class.	• 57 learners • 1 teacher	• Interaction occurred in 3 ways (teacher-learner-laptop). • Learners were glued to their laptops (interested). • The writing was done in the learner's workbooks. • Some learners were playing games while the teacher was teaching.	All the learners had laptops in the class to refer to. A big LCD screen was installed and used as projector so that learners could see. There was no smartboard or interactive whiteboard in some classes. The learners fiddled with stationery while the teacher was teaching.

4.4.1.2 Second observation: School A: Grade: 9

Table 4-2: Observations: Teacher 2

Situation	Participants	Actions observed	Reflection
• 34 learners in the class. • Smartboard and interactive white board installed. • Teacher used the smartboard for power-point presentations. • A lot of broken chairs and desks pilled at the back.	• 34 learners • 1 teacher	• Learners read a dialogue displayed on the smartboard. • The words are not big enough for learners seated at the back. • No use of laptops. • Writing is done in learner's books. • Some learners use hard copy textbooks. • Homework found in both textbooks and laptops.	Not all the learners had laptops in the class. Some learners used textbooks to refer to. The smartboard was used as a display for power-point presentations. The interactive whiteboard was not used during the lesson but it is functional. The space in the smart classroom was not sufficient for learners to move around because of the broken furniture at the back of the classroom.

Teacher 1 had 57 learners in her class and the furniture of the learners was insufficient. Half the learners had to share tables and chairs, and some of the learners had to share tablets during the lesson. The teacher had to shout to get the learners' attention at the back of the class. Teacher 2 had fewer learners compared with the Grade 9s. There were 34 learners but the space was insufficient. The environment was not conducive to teaching as there were many dangerous items in the classroom such as broken chairs and desks. Some

cables were also not properly attached to the walls and they were hanging above the learners' heads.

4.4.2 School B

School B was also situated in Tembisa and it was one of the fully equipped ICT schools in the area. It was a feeder school from most primary schools. It was a brick and mortar school and it had an ICT building that catered for the teachers' and learners' ICT needs. It was a big school and there were many learners in the school. The classrooms had burglar doors and they were kept locked when the teachers were not around. As I entered the school premises, I saw members of the local community sitting alongside the school fence to access the free Wi-Fi connection.

4.4.2.1 Third observation: School B: Grade: 9

Table 4-3: Observations: Teacher 3

Situation	Participants	Actions observed	Reflection
• 40 learners in the class. • Two smartboards were installed and they were used simultaneously.	• 40 learners • 1 teacher	• Not all the learners had laptops but the work was displayed on the smartboard. • Learners were requested to Google and they did so in seconds. • Writing was done in the learner's workbooks.	Learners were requested to search the internet. It took a few seconds for all the learners to find the information. When using two smartboards simultaneously, a lot of work gets displayed to save time. The boards do not require the teacher to keep changing slides on his\her laptop. The presentation of the teacher went smoothly and she was able to complete her work on time. The learners analysed pictures that were displayed on the smartboard.

4.4.2.2 Fourth observation: School B: Grade: 8

Table 4-4: Observations: Teacher 4

Situation	Participants	Actions observed	Reflection
• 48 learners in the class. • There was a smartboard	• 48 learners • 1 teacher	• Interactive whiteboard used for writing examples. • Smartboard was used as a projector to display	The teacher taught by using a lot of examples and he played a video and the learners were glued to the

Situation	Participants	Actions observed	Reflection
and an interactive whiteboard installed. • Some learners have laptops and some use textbooks (hardcopy).		information. • Teacher played a video on the smartboard that related to the topic that he taught. • The speaker was not loud enough to reach the learners at the back. • Teacher's laptop was connected to the smartboard via Bluetooth.	electronic boards. The learners participated well. The teacher kept calling out the learners' names and asked questions. The video complemented the lesson well.

Teacher 4 had an interactive lesson that involved the learners. During the lesson, the learners were afforded the opportunity to log in with their laptops and search for information. Some of the learners did not have laptops and they had to share and take turns. Teacher 4 had a lesson planned and it was based on addressing the learners' visual and audio skills. He played a video and instructed the learners to look at the pictures displayed, and to listen to the sound of the music and the words being spoken. Teacher 4 made use of the components of language development, as stated by Berk (2006), Otto (2014) and Löbner, 2013) as discussed in Chapter 2.

The sound from the smartboard was not loud enough as learners could not hear at the back. About 80% of the learners participated well by answering questions that the teacher asked. The learners did not use their laptops during this lesson as the video was displayed on the smartboard and the notes were written on the interactive whiteboard.

4.4.3 School C

School C was situated in Olievenhoutbosch; a township in Centurion, Gauteng. This school had been in existence for less than 10 years and the Gauteng Department had recently built them a new building. It was a brick and mortar school with functional infrastructure. Previously they had used mobile classrooms.

The new classrooms were not built to accommodate many learners as they were overcrowded. The classrooms had ICT furniture which consisted of tables and chairs that had a unique design forming a puzzle. This was the first school during my study that I saw ICT furniture in the classrooms.

4.4.3.1 Fifth observation: School C: Grade 8

Table 4-5: Observations: Teacher 5

Situation	Participants	Actions observed	Reflection
• 45 learners in the class. • Smartboard and interactive white board installed. • Teacher used the smartboard for power-point presentations.	• 45 learners • 1 teacher	• Before the lesson could start, the smartboard already had jamming problems. • The learners assisted the teacher to operate the smartboard. • The learners participated by taking turns to write on the interactive whiteboard. • The learners were noisy in the classroom. • The teacher did not seem to have knowledge of operating the smartboard.	The teacher was not able to teach using a smartboard. She kept on asking the learners how to move the cursor on the smartboard during the lesson. She depended on what the learners were telling her to do to do such as scrolling and dragging. The lesson could not be completed as the time ran out.

4.4.3.2 Sixth observation: School C: Grade: 9

Table 4-6: Observations: Teacher 6

Situation	Participants	Actions observed	Reflection
• 50 learners in the class. • There was a smartboard and interactive whiteboard installed. • Learners used tablets as their textbook. • There was ICT furniture in the class. • Not enough space to move around the classroom. • There was a problem with the internet connection. • Learners' participation was excellent, and the	• 50 learners • 1 teacher	• Teacher used the smartboard as a projector and writing board. • Teacher played a video to test the learners' listening and visual skills. • Teacher seemed knowledgeable with regards to ICT. •	The teacher played a video of an advertisement. The learners watched as it played and there was a lot of laughter from the learners. Three learners from the back of the class complained that they could not hear the sound coming from the smartboard properly.

Situation	Participants	Actions observed	Reflection
topic was interesting. • Workbooks used for writing their work.			

Teacher 6 experienced technical problems that delayed her lesson by 20 minutes. The smartboard kept switching on and off and jammed every time she wanted to load slides. Before the lesson, she told me that she does not usually use the smartboard because she found it difficult to operate. This difficulty was seen and experienced during the observation. The learners had an opportunity to shout the answers out and this led to a lot of disruption. Teacher 6 could not complete the lesson as there was too much noise.

Teacher 6 had more learners compared with Teacher 5 but his lesson was structured and controlled. The smartboard and interactive whiteboard were utilised by Teacher 6 and learners participated by answering questions. The learners laughed as they watched the video and they kept their eyes on the smartboard. From the way the learners reacted to the lesson, they seem to have enjoyed the lesson.

4.5 Emergent themes

In this chapter, the information was scrutinised thoroughly to identify themes. The raw data were then transcribed, coded and later used to identify different themes as discussed in the methodology chapter, Chapter 3. The themes emerged from the teachers' interviews, observation lessons, and the learners' questionnaires. The themes are a reflection of the participants' experiences of utilising ICT. The themes are as follows:

Table 4-7: Summary of themes

Expert	Teachers	Learners
Teacher training	Teacher training	Perceptions & experiences
Challenges	Challenges	Challenges
	Policy	Resources
	Technological resources	Technological resources

The themes had to be consolidated because some were similar, and the final themes after analysis were as follows:

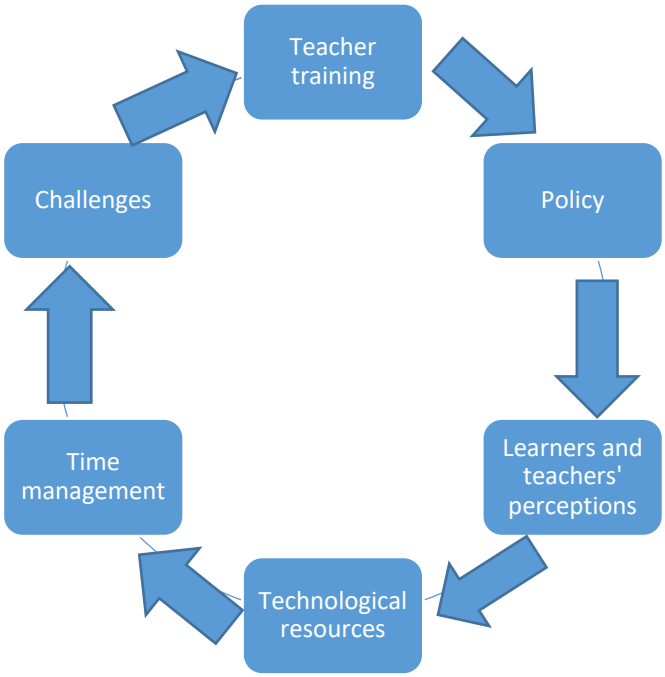


Figure 4-1: Themes from this study representing the impact of technology in Language lessons

4.5.1 Teacher training

Teacher training plays an important role in the development of a teacher. In this study I focused on the TPACK (Technological Pedagogical Content Knowledge) model that provides a 'basis for understanding teacher knowledge that supports successful technology integration into classroom learning environments' (Abbitt, 2011:136). This model focuses on the different methodologies and skills that teachers need to learn and apply to effectively execute their daily duties in the classroom.

Expert 1 conducts workshops for in-practice teachers.

> *'My team and I invite teachers to the centre and we show them how to operate the devices but we sometimes go out to schools to conduct workshops on few occasions only if they want us to help them or courses that go through enterprises at the university. We also encourage teachers to continuously train themselves as well.'*

This is an annual event to train and motivate teachers to be well equipped in teaching using ICT during the English lessons.

'Getting technology is one thing; training the teachers is another thing but it's almost like 'what came first between the chicken and the egg' because you need to train the teachers before they get the technology but they need the technology to practice what they were taught.'

Teacher 1 once attended a workshop on cyber schooling information and she was taught how to make use of online activities.

'They showed us interesting things and showed us how to access videos and audio files. When I tried using it in my lesson, the technology did not work the way it was supposed to.'

According to Teacher 1, some of the information that is taught at the teacher training workshops is not adequate as they need to be reminded about how to use technology. She further mentioned that training should not be a once off event. Teacher 4 felt that workshops help teachers to upgrade their knowledge and be life-long learners. Some teachers do not attend these workshops.

'I do not like going for smartboard training because it is time consuming and they repeat the same information every year.'

From the data collected, it can be seen that not all teachers are satisfied with receiving training on ICT. The older teachers who were interviewed in the study felt intimidated because they had started teaching before the introduction of technology. The implementation of the TPACK framework was to assist in closing the knowledge gap among the teachers. This seems, according to the data collected, not to be entirely successful.

The TPACK framework has assisted teachers in planning unique lessons so that they are able to simplify their lessons. The teachers are also able to integrate their technological skills into the curriculum, such as using videos to teach pronunciation. This framework also supports teachers in developing themselves and their careers. During the TPACK training, teachers are taught about gaining and teaching the relevant information (content knowledge), being able to teach using different methods and styles (pedagogy knowledge), and being able to utilise technology during their lesson presentations (technological knowledge).

The TPACK framework provides a 'basis for understanding teacher knowledge and supports successful technology integration into classroom learning environments' (Abbitt, 2011:136). The ability of teachers to utilise different teaching methods supports the notion of creativity in ICT learning and teaching. During the observation lessons, teachers used video clips, music, and images to enhance learning for those learners who learn best through visuals. The TPACK framework assists teachers in accommodating the different learning styles in the classroom.

4.5.2 Policy

Policy guides the content that teachers have to teach. The policy that guides the curriculum regarding ICT in schools at the moment in South Africa is the e-education policy which focuses on bringing change in the way in which learning occurs and also helps people to be able to function in the globalised society (Vandeyar, 2010:4).

The information that was collected from the teacher interviews and learner questionnaires indicates that teaching and learning is improving in a sense that learners have devices such as tablets as aids to assist them both at school and at home.

> *Teacher 1- 'The Department of Education provides teachers with laptops that come with soft copies of lesson plans and textbooks, tablets and notebooks for learners'.*

The policy covers the necessary work as stipulated by the CAPS curriculum in conjunction with the ICT policy. The teachers at the schools taught according to the ATPs (Annual Teaching Plans) and the lesson planning was done before the lessons were presented.

> *Teacher 3- 'Planning in accordance, integrating research and linking the curriculum with what you need to teach and making sure that you get a positive outcome. I use Google and search related pictures and content. I then link them with the ATP that needs to be delivered to enhance learner participation and attention'.*

The study also looked at the SITES project which was aimed at identifying the effectiveness of ICT (Information Computer Technology) in education, as stated by Ainley, Eveleigh, Freeman and O'Malley (2010:2). This project focused on improving learners' academic performance through the use of ICT. It had similar views as the TPACK framework, whereby the teachers need to be knowledgeable in what they do and make use of different methods in order improve the learners' academic performance.

The teachers expressed how they view the effectiveness of ICT in their lessons and also how they utilise technology for the benefit of the learners:

> *Teacher 4- 'It is effective because there is a gallery which concretises which ever topic that the teacher wants to teach. For every theme, there are pictures in the gallery. For example, if a teacher wants to teach learners about volcanoes, he/she can display pictures to make sure that learners have a better understanding. There are also sound effects and 3D images that can be downloaded. They also have a dictionary at their finger-tips and they can always search the net and download music'.*

> *Teacher 6- 'I would say eight out of 10 if I may say so because it makes learners to easily remember'.*

This shows that some teaches are adapting the ways of ICT learning and it works for them. However, there are teachers who still do not understand the purpose of ICT learning:

> *Teacher 5 - 'As for me, I just go with the flow. Everything is just too confusing for me. I do not think the curriculum supports the use of ICT.'*

The conceptual framework for the SITES project was explained in Chapter 2 of the study, Figure 2.6.

4.6 Learners' perceptions of ICT usage

The learners were given questionnaires to complete during the study and the questions focused on their perception of using ICT during their English lessons. Some 274 questionnaires were distributed to the learners. The learner questionnaires (see Appendix) indicated that 27% perceive that ICT improves learning in English.

Figure 4.2 below shows that of the 274 learners who participated, 227 learners (83%) have a positive perception towards ICT. Questions one to five (see Appendix) were used to measure the learners' perceptions towards ICT use during their English lessons. The figure is subdivided into five sections that indicate the total number of responses in each section.

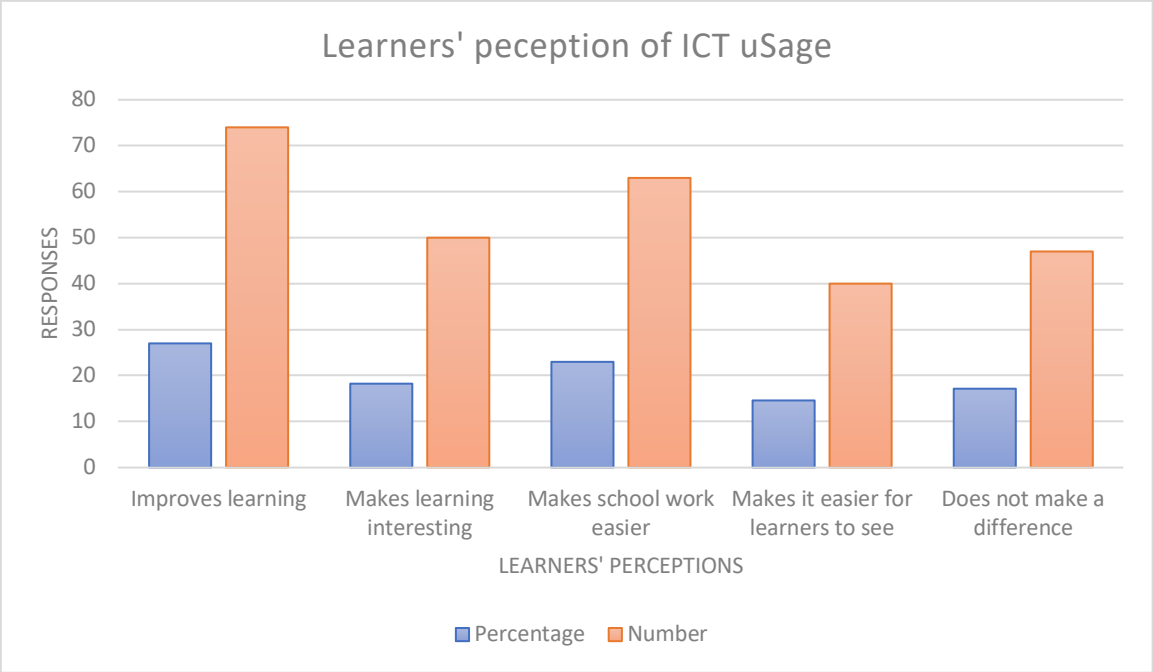


Figure 4-2: Learners' perception of ICT

Figure 4.2 presents the different categories obtained from the learners' questionnaires. Some 27% believed that ICT improves learning in the classroom. The learners mentioned that it helps them understand English better through the use of pictures, audio devices, and videos that teachers use.

Only 18% of the learners indicated that ICT makes learning more interesting, and they mentioned that the smartboards use different colours and fonts that make the work look colourful. The use of colour draws their attention more than reading from a textbook. The colours and different fonts can be enlarged, making the work visible for the learners who sit at the back of the class. Regarding the visibility of the work on the smartboard, 15% responded positively. This number makes one wonder whether the eyesight of the learners may have an impact on learning.

Some 23% of the learners mentioned that the use of ICT makes their school work easier. This includes carrying tablets and laptops to school instead of heavy textbooks. The learners strongly believed that life is so much easier for them because they have a device that has all the subjects installed and they have easy access to their work at any time.

Lastly, 17% of the learners perceived ICT as a waste of time and money. The learners mentioned that the use of ICT in class did not bring about any change and they preferred using hard copy textbooks rather than laptops and tablets.

It can be deduced from Figure 4.2 that the majority of the learners had a strong perception that ICT usage helped improve the way they learn. The majority of the learners mentioned that they are familiar with technology as they had access to cellphones at home. According to Bloom's taxonomy, ICT has proven to 'positively impact learner achievement' (Poon, 2013:273). As stated in Chapter 2, the use of ICT stimulates the leaners' perceptual skills that enable recognition and discrimination; and it enables communication to take place through multiple media platforms, such as using images instead of only written words (Shams & Seitz, 2008:415). ICT has brought about a positive change in teaching and learning as alternative ways of teaching are made available for learners.

4.7 Teachers' perceptions of ICT usage

Teachers from the selected schools were interviewed at school after the observation lessons. The interview protocol (see Appendix) consisted of 15 questions. Question 13 focused specifically on the teachers' perceptions regarding the use of ICT and different viewpoints were mentioned:

> *Teacher 1 - 'It makes teaching much easier for the teachers. Everything comes in soft copies, there is no need to have a big file with a lot of papers. The only problem is with the learners. Some of them do not use the laptops for their academic benefit but as a form of entertainment. They become overwhelmed with the gadgets because for some of them, it is their first time using the gadgets. So, technology for the learners is a distraction.'*
>
> *Teacher 2 - 'Using technology saves time but I do not like going for smartboard training because it is time consuming and they repeat the same information every year.'*
>
> *Teacher 3 - 'Some educators are very keen to grow, know more, learn and unfold the mystery in technological learning.'*
>
> *Teacher 4 - 'Teachers are reluctant because of the lack of knowledge and skills. As you continually tap into it, you discover that it makes your life easier. It also helps*

teachers to upgrade their knowledge. There is no way in which we can avoid it because it is the way to go in the 21st century.'

Teacher 5 - 'As for me, I struggle with technology because I am used to teaching using a chalkboard. I forget how to do some of the things and my learners always come to rescue. It is challenging for people that can not use it. The important thing is to learn how to use the smartboards and move with the times.'

Teacher 6 - 'Remember there are teachers that were born before technology. Obviously, they have negative thoughts about the use of ICT. The teachers that find technology interesting are the ones that are able to use it. We have different perceptions based on how we interact with it. We are lucky as a school because we have someone who works with us and she comes on Tuesdays. Having someone on site is a great idea.'

Anxieties were expressed by teachers as they were expected by the Department of Education to adopt the use of ICT in their daily teaching. The teachers' responses indicated some knowledge of computer skills. The teachers' perceptions of ICT in education 'are not only influenced by official documents and guidelines, but also by their experiences of using ICT for personal reasons in a social and professional context' (Loveless, 2003:95). The teachers' concerns were based on their daily experiences and the availability of resources at the schools. This study raises questions as to whether the teachers are consulted when changes to the policy are made since they are expected to be the front-runners of the changes.

4.8 Technological resources

During my study I had the opportunity to see the different technological devices that teachers had available in their classrooms. The expert participant mentioned that they use mobile devices, smartboards, and tablets to train teachers on how to use technology effectively. The aim was to use what teachers already had. Teacher 1 did not have a smartboard in her classroom but she had a computer that was connected to an LCD (Liquid Crystal Display) screen that projected power-point presentations. The screen had different functionalities compared with the smartboard in terms of connectivity.

The other five teachers had smartboards and interactive whiteboards installed in their classrooms that connected to the teachers' laptops. The learners used tablets and laptops, depending on the availability of stock from Gauteng Department of Education.

In some classrooms the learners did not have tablets or laptops and they were requested to use hardcover textbooks. This leads to a digital divide, as stated by the Department of Education (2004:10). A digital divide in a school occurs when some learners are excluded from utilising technology due to inadequate resources at the school. This was evident in schools A and B where the electronic tablets and laptops were not sufficient in number for all the learners. Some classrooms did not have smartboards and only made use of LCD screens and interactive whiteboards. There were inconsistencies in the various schools in terms of resources and this impacted on the way in which teaching and learning occurred.

In every classroom there are learners with different learning needs and that is why it is important for teachers to adopt different teaching strategies to accommodate their needs. During the school visits, I had conversations with teachers about the different strategies they used during the lessons. Teacher 1 mentioned that 40% of the learners in her class could not read or write, and thus when it came to comprehension they struggled.

> *'I let the learners listen to an audio clip that reads the comprehension aloud to the learners.'*

This was her way of accommodating learners with reading problems by making use of ICT. It became easier for them to answer questions when they understand and comprehend.

Teacher 2 made use of slide shows and pictures to accommodate visual learners. Whatever the textbook explained in words, Teacher 2 used pictures to summarise the information. Teacher 3 used a method of peer teaching during the lessons. What she did was group the learners according to their capabilities and let the learners teach each other.

Three of the six teachers that I interviewed used similar teaching strategies which ranged from playing videos, audio files, using pictures, and slideshows. The teachers believed that it was important to have visual aids when teaching using technology, especially when explaining concepts that learners struggled to understand. Learners are not the same and they learn differently, as mentioned in Chapter 2.

Singh (2003:52) states that 'leaners' preferences and their way of learning differ in every classroom'. Therefore, teachers need to be prepared and know how to deal with the learners' differences in the classroom.

Studies show that 'learners who have access to computers and utilise them show more interest in school and have more motivation than those who do not' (Mikre, 2011:111). This means that motivation and interests will not be the same in schools if the technological gap widens. It is understandable that some teachers are not interested in adapting to ICT as they feel that it is an unfair practice that is awarded to the privileged as ICT is expensive in 'implementing and running' (Floris, 2014:141). The aim of teacher development is to 'maintain a balance between developing effective teaching and learning strategies and increasing the knowledge and skills of teachers in the use of ICT' (DoE 2007:3). Therefore, ICT training should be offered to all teachers to enable increased skills and knowledge in schools.

The retrieval of tablets and laptops happens every year in the fourth term where the ICT committee counts the devices and records the number of damaged or lost devices.

4.9 Time management

The learners were asked to state the number of hours that they spent using tablets, laptops or computers per day. The table below shows the information that was collected from the learners' questionnaires.

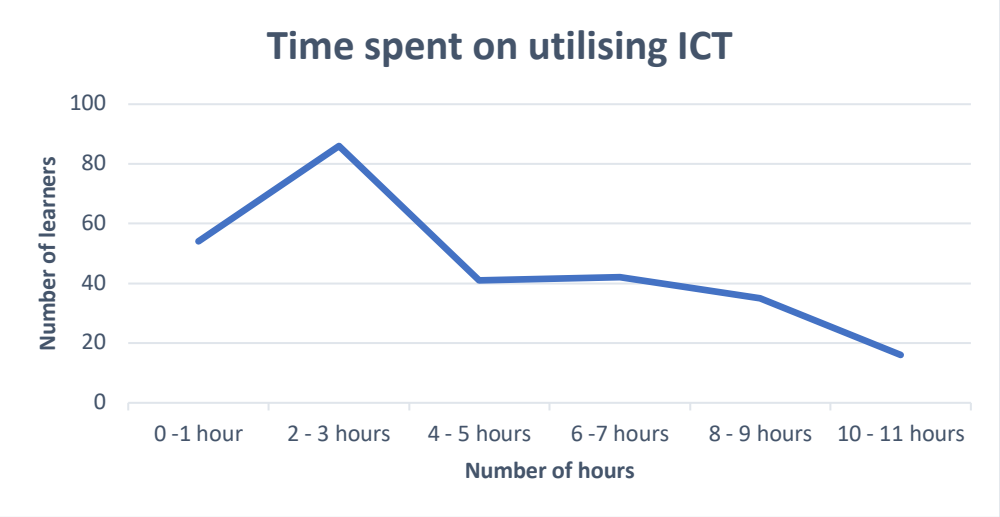


Figure 4-3: Time spent utilising ICT

Figure 4.3 shows the time, according to the learners' responses, that they spent using technology both at home and at school. The summary is as follows:

- Some 20% of learners spent less than an hour a day using ICT. Most of these learners mentioned that they do not have tablets or laptops, so they borrow from friends and that is the reason why they use ICT for only a short period of time. During the class observations, there were learners who were not given tablets or laptops because their schools had shortages. Learners who do not have tablets or laptops had to share with a friend or use a hard copy textbook. Limited access to resources becomes a disadvantage for learners that may lead to poor achievement in schools (Aduwa-Ogiegbaen & Iyamu 2005:108). The learners might also lose interest in the lesson as they do not get to experience and enjoy the applications made available to them to enhance learning.

- Some 31% of the learners spent two to three hours working on their devices every day. This is the most time spent on devices, from the data collected. The main reason as stipulated by the learners was that they had access to free Wi-Fi for these hours without supervision. This usually occurred during tea break, lunch and after school, and did not necessarily include teaching time.

- Some 15% spent four to seven hours using ICT.

- Some 13% spent eight to nine hours using ICT.

- Lastly, 6% spent 10 to 12 hours using ICT.

The time that learners spent on the internet was dominated by activities other than academic work. Young people between the ages of 15 and 19 use the internet for entertainment and play most of the time (Thulin & Vilhelmson 2004:482). Instead of using the internet mostly for academic use, they prefer to use it for playing games and internet-based social communication (Thulin & Vilhelmson 2004:485).

The internet-based social communication media platforms are those such as Facebook, Twitter and Instagram. The learners communicate with the people they know and this minimises physical contact with other people. For example, if a learner spends around 10 to 11 hours per day on the internet, they do not have enough time to be with family and friends. Their lives are consumed by the internet.

4.10 Technology challenges

The implementation of ICT in schools came with uncertainty for schools. Aduwa-Ogiegbaen and Iyamu (2005:108-109) mentions three impediments that they identify from participants who use ICT; cost, weak infrastructure, and a lack of skills.

The first impediment, cost, focuses on the installation of smartboards, interactive whiteboards, teachers' and learners' laptops, tablets, Wi-Fi connections, adequate security, and salaries for ICT personnel. Two of the schools where I conducted the study did not have enough laptops and tablets for learners. Some of the learners had to share the devices while others had to use hard copy textbooks. The internet connection was not strong enough as some learners could not connect to the internet due to a weak signal. During the school visits, the principals were concerned about the amount of money spent on ICT, and also the cost of the break-ins that happened in their schools.

One of the schools that I intended to use for my study experienced a break-in during the June holidays, just before I could start with the data collection. It is unfortunate that the schools no longer feel safe as a result of being targeted in the community. Teachers in the identified school were frustrated because most of the smartboards, interactive whiteboards, and tablets were stolen during the burglary. They were left stranded and had to resort to using hard copy textbooks, but there were not enough to give to all the learners.

The second impediment is weak infrastructure, and this refers to power outages, electronic devices getting damaged, and schools not having internet connections. The study conducted by Aduwa-Ogiegbaen and Iyamu (2005:108-109) supports the information that I collected from three different schools. Below are some of the challenges that were identified from the participants' transcripts:

> *Teacher 1 - 'I find it difficult to teach when the school does not have Wi-Fi connection or when the signal is not strong enough. It affects my lessons because it means I need to come up with another plan.'*
>
> *Teacher 2 - 'Sometimes you come to class well-prepared and you find that there is no electricity on that particular day.'*
>
> *Teacher 5 - 'Sometimes you find that as you play a video, it disappears and you cannot locate it. It becomes frustrating because it consumes a lot of time.'*

Teacher 6 - 'The smartboards get stuck a lot and this affects teaching and learning.'

These issues have a major impact on the way teaching and learning occurs in the classroom.

The last impediment is lack of skills, and this is evident in some of the transcripts. Training and workshops play a major role in teacher development, as mentioned earlier about teacher training. Teacher 1 from School A used technology in her lessons but still did not seem to agree with teacher training.

'Using technology saves time but I do not like going for smartboard training because it is time-consuming and the facilitators repeat the same information every year'.

However, Teachers 3 and 4 from School B had different views on ICT training;

Teacher 3 - 'Some teachers are very keen to grow, know more, learn and unfold the mystery in technological learning'.

She felt that ICT training is a prerequisite as it helps teachers to grow and develop in their careers, especially in ICT schools. Teacher 4, also from School B, added that he/she believes in the power of adapting to technological ways of teaching and also in teacher empowerment:

Teacher 4 - 'There is no way in which we can avoid it because it is the way to go in the 21st century.

Lastly, Teacher 6 from School C mentioned that their school was privileged to receive support from the Department of Education and other stakeholders from ICT institutions.'

'We are lucky as a school because we have someone who works with our school and she comes on Tuesdays. Having someone on site is a great idea'

Mukuna (2013:1) states that 'teachers can only integrate technology effectively in their instruction if they themselves are knowledgeable about technology'. This knowledge is obtained through workshops, training, practically using it, and also engaging with colleagues who are knowledgeable. Mukuna (2013:2) further mentions that technology is used as a medium of improving communication in the classroom between the teachers and the learners. Teachers also need to improve their professional development, and this is not only

about 'attending courses or receiving training, but it is about addressing not just ‘how’ to do it, but ‘why’ it should be done' (Tearle, 2003:461). Training shows teachers how to utilise technology, but teachers also need to know the reasoning and benefits of ICT use in schools.

Skilled workers are required to install software programmes and equip the IT buildings at schools and this requires a capital outlay. The cost of workshops is also putting a strain on the Department of Education.

The learners were requested to answer the following question regarding technological challenges experienced in the classroom: What challenges do you encounter when using technology in your classroom? Some of the learners’ responses are shown in the table below.

Table 4-8: Summary of the challenges of ICT obtained from learner questionnaires

Participant	Responses
49	Sometimes the laptop goes blank while using it. It just stops opening files, calculators and textbooks.
208	Sometimes the smartboards get stuck.
211	My challenge is that I am not used to using technology so there are things that I struggle with.
212	Some technological gadgets can glitch and learners may be held accountable
136	There are times when there is no electricity.
204	Sometimes we get confused when we see new things on our tablets and some of the whiteboards have technical problems.
257	When the smartboard freezes or when it takes time to load files.
90	When the teacher does not know how to use the smartboard because he was not trained.
88	Other learners do not use the tablets for school work and end up disturbing us with the sound from games or video clips during class time.
91	When my tablet gives me problems, it makes me lose focus.
120	Sometimes I get confused on what is happening.
123	Sometimes I get distracted and I do not focus when the teacher is teaching.
125	The Wi-Fi does not connect very well on some days.

Participant	Responses
160	We cannot use the smartboard when there is no electricity or when the smartboard does not work.
209	Sometimes the smartboard does not show textbooks and it takes time for GDE files to open or load on the smartboard.

The responses in the table above show some of the learners' challenges that they encountered in their classrooms on a daily basis with regards to ICT.

Three main challenges emerged from the data collected and they are as follows:

- Power outages: Power outage was mentioned by 120 learners, which formed 44% of the results from the three schools in my study. The learners mentioned that a lack of electricity delays both the teachers and the learners because the work has to be postponed for a later stage.

- Jamming of smartboards and lack of ICT skills: Jamming of the smartboards was another challenge, and 29% of the learners stated that it affected the way in which they learnt and it consumed a lot of time. In one of the lessons I observed, I got to experience the frustrations that the learners were experiencing. The lesson was one hour long and the teacher spent 20 minutes trying to restart the smartboard because it was not loading documents.

  The generational gap among teachers seemed to have an impact on ICT usage in schools. Prensky (2001:1) mentions that young teachers are known as 'digital natives', compared with their older colleagues who are 'digital immigrants'. The difference between the two groups is that digital immigrants have little 'appreciation for the new skills that the digital natives have acquired through years of training and practice' (Prensky, 2001:2). The young teachers are able to adapt quickly because their lives are dominated by technology. Most of them use social media platforms, shop online, use internet banking, and also make applications online.

  The learners also explained their frustration towards the school because they believed that most of their teachers did not have enough knowledge of ICT. Their concern was that the technology in their classrooms did not seem to be user-friendly for some teachers; hence they struggled with operating the devices. The learners strongly

believed that more training is required for teachers, especially those do not use technology frequently at home.

- Lack of knowledge – Schmidt, Baran, Thompson, Mishra, Koehler and Shin (2009:125) state that teachers need to have knowledge of teaching 'specific content-based' material using different technological tools. This is crucial because knowledge impacts on the learners' performance in the classroom.

  Some 27% of the learners mentioned the issue of not having enough knowledge on how to operate the technological devices in their classrooms. Five learners stated that it is frustrating when a teacher does not know how to make use of the smartboards and interactive whiteboards and they start asking learners to assist them. According to participant 242,

  '… *when our teacher does not know how to use the technology in the classroom, it affects us because we end up confused.*'

From the information above, it is evident that technology plays a major role in teaching and learning. Bloom's taxonomy's ICT model (Carleton University, 2019) explains the six different levels that are crucial for a conducive ICT environment (Figure 2.3). I will discuss the first two levels as they are relevant to this section. The first level is creating, and this stipulates that the teacher needs to be creative and come up with exciting ways of teaching, such as incorporating music and visuals in the lesson. The most important aspect of being is teacher is being creative. If a teacher plans a lesson on the smartboard and the electricity goes off, they should be able to come up with alternative means of teaching the lesson without smartboards.

The second level is evaluating, which focuses on teacher development where the teacher takes part in online tests to acquire valid information. ICT training for the benefit of teacher development 'should not just encompass ICT skills but rather a full understanding and complete mastery of ICT as pedagogical tools' (Punie, Zinnbauer & Cabrera, 2006:13). The teacher needs to be knowledgeable about the use of technology before they present it to the learners.

Wedlock and Growe (2017:28) state that 'the primary purpose of technology is to act as an educational aid to help teachers facilitate learning, which in turn is the ultimate purpose of education'. Teachers have a role to fulfil in bridging the gap where learners have

opportunities and resources to achieve their academic goals. Bloom's taxonomy does not only focus on using technology in teaching and learning, but also on improving the academic performance of learners (Global Aviation Training, 2016:18).

4.11 Conclusion

This chapter presented the findings and interpretation of the data collected based on the research questions and the literature reviewed. The findings confirm that ICT has mainly impacted schools positively by bringing a remarkable change in the academic performance of the learners.

However, there are still challenges that have to be taken into consideration with regards to teacher training and the provision of adequate technological resources for both teachers and learners. In spite of the challenges, teachers and learners were in agreement that ICT has improved teaching and learning; especially in the English lessons. In Chapter 5 I will discuss the findings, conclusion, and the recommendations of the study.

CHAPTER 5: FINDINGS, CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

This final chapter provides an overview of the results of this study and addresses the research questions and the link they have with the relevant literature. A summary was made by analysing interview schedules, questionnaires, and observation templates (see the following figure). Furthermore, I discuss the recommendations for further research within the context of ICT and Language learning.

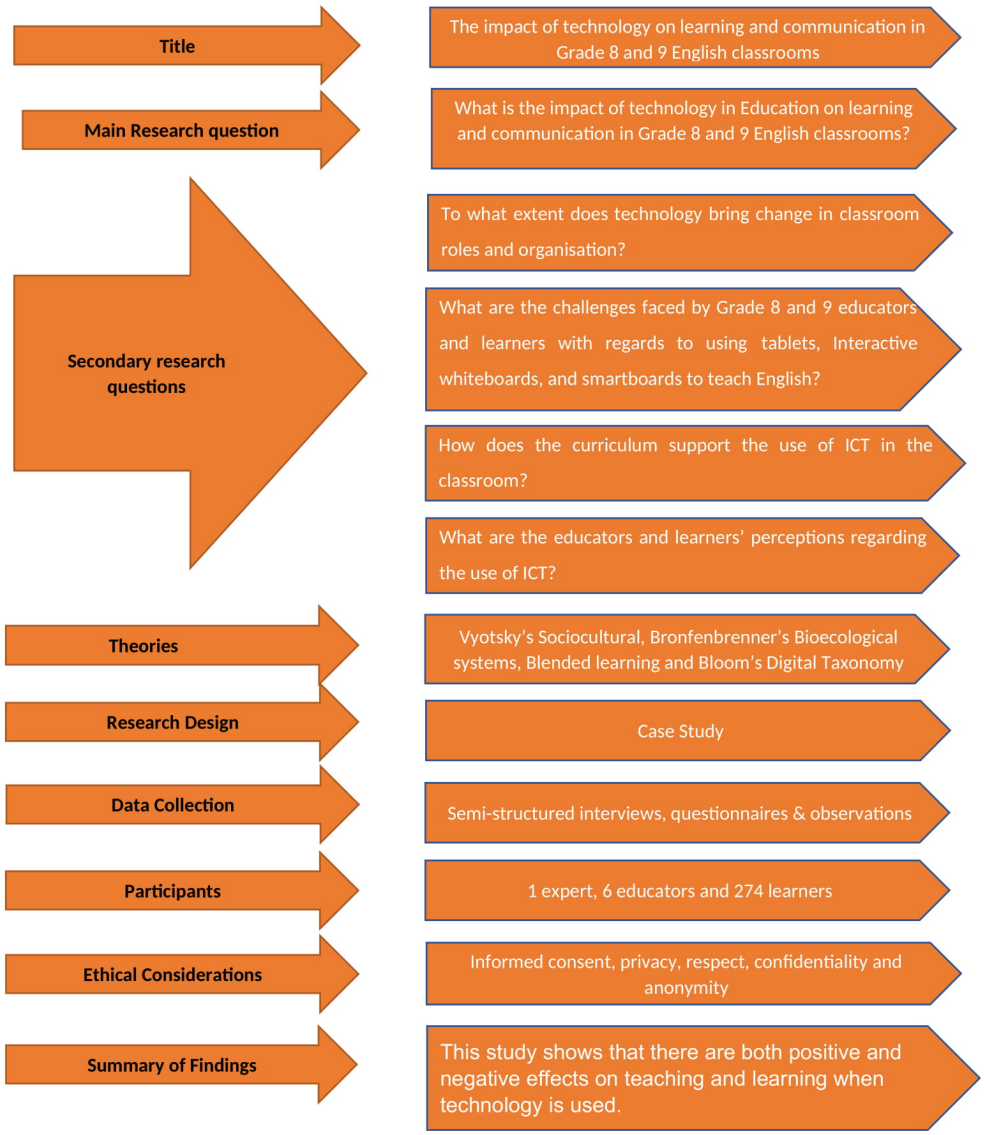


Figure 5-1: Summary of findings

5.2 Summary

The purpose of the study was to investigate the effectiveness of technology in improving the learners' English language skills and therefore also their communication skills. The study was guided by the following questions:

The primary research question of the study was:

- What is the impact of technology in Education on learning and communication in Grade 8 and 9 English classrooms?

The secondary research questions were:

- To what extent does technology bring change in classroom roles and organisation?
- What are the challenges faced by Grades 8 and 9 educators and learners with regards to using tablets, interactive whiteboards and smartboards to teach English Language?
- How does the curriculum support the use of ICT in the classroom?
- What are the educators' and learners' perceptions regarding the use of ICT in the classroom?

The study commenced by writing a summary of the literature available on the use of ICT (see Chapter 2). The methodology used in the study was also described and defined. The data collection instruments were discussed thoroughly and also used to portray their effectiveness.

Data were collected by using interview schedules, observation templates, and questionnaires. The data analysis was conducted, and a summary of the findings was presented by interpreting the data collected from the transcripts (see Chapter 4).

The information was transcribed and then later sub-divided into codes and themes to identify the most important elements of the study. Tables and diagrams were used to present the summary of the results in both narrative and graphic format.

5.3 Research design and methodology

As described in Chapter 3, the study was a case study design which used a qualitative research method. Data were collected from three ICT schools in Gauteng and six teachers were observed during their ICT English lesson presentations and interviewed at the schools.

An expert was also interviewed at the university where he worked. Notes were written on the observation templates during the English lessons and an audio recorder with permission from the participants was used to capture the information from the interviews.

A questionnaire was provided to the Grades 8 and 9 learners. The questionnaire was too complex for some of the learners as it was written in English. The learners were not native speakers of English; hence they encountered difficulty in understanding some of the questions. I counteracted this problem by explaining and translating some questions to the learners who did not understand. Some 80% of the learners managed to complete the questionnaire and 20% left some questions unanswered.

5.4 Findings

The research questions were addressed individually and the literature was integrated to support the data collected and analysed.

5.4.1 To what extent does technology bring change in classroom roles and organisation?

As discussed in Chapter 2, technology plays a major role in the way in which teaching and learning occurs. The literature states that technology is there to assist the teacher in supporting the learners to take ownership of their learning process (Condie & Livingston, 2007:339).

During the classroom observations, the teachers demonstrated the importance of having teaching aids that learners can relate to. Technological devices such as laptops and tablets have an important impact on learners with visual problems. Teacher 6, for example, indicated the different audio and visual files that accompany every lesson plan. The activities had test questions that were given to the learners to test whether the learners had understood the lesson. These activities are a form of intervention for learners who required additional support. The aim of these teaching resources was to accommodate the different leaning needs.

During the process of teaching and learning, the role of the teacher in an ICT classroom changes. The diagram by Sheninger (2017) in Chapter 2 summarises the differences between a traditional teacher and a teacher in an ICT classroom. The role of a teacher differs according to the kind of environment that they find themselves working in.

Firstly, the traditional teachers use textbooks as their main source of information and they rely on the minimum requirements of the CAPS document for curriculum coverage. Development for such teachers is somewhat limited because they do not always react positively to change. An example of this was evident in some of the lessons that were observed and showed a lack of teacher development in terms of ICT usage. A teacher with ICT opportunities has more resources to choose from to prepare for classes. ICT provides more learning opportunities, especially in schools where there are fewer resources, such as only hardcopy textbooks for each learner. Some learners may also be disinterested in their schoolwork as they prefer in many instances to have electronic textbooks downloaded on their tablets.

Secondly, the teachers in an ICT classroom observed in this study integrated the different technological teaching devices such as smartboards, interactive whiteboards, tablets and laptops in their classrooms. Therefore, learning in an ICT classroom gives the learner the opportunity to conduct some self-study and to construct their own knowledge. Teachers used Google as one of the intervention methods to teach the learners how to discover new information; i.e. where learners were asked to search for a speech that was presented by a former South African president Thabo Mbeki entitled 'I am an African'.

In this lesson, learners gained knowledge about searching, listening, reading and writing skills, and these skills are fundamental in language learning. The learners had to search for the information on their tablets and laptops with the assistance of the free Wi-Fi installed in their classroom. A teacher in an ICT classroom uses interactive learning as a way of eliciting different ideas from learners. ICT thus provides teachers with additional support to teach language skills in an innovative manner that is more applicable to the Generation-Z learners. The multitude of ICT options provides innovative classroom techniques and supports self-learning.

5.4.2 What are the challenges faced by Grades 8 and 9 educators and learners with regards to using tablets, interactive whiteboards, and smartboards to teach English language?

From this study, it was established that teachers understood the curriculum changes of ICT in schools as necessary and important. However, they indicated that ICT training is crucial in addressing the age and technology gaps between them and the learners. The older teachers who had never been exposed to technology during their early years of teaching experienced difficulties in using technology in their lessons, while the majority of the younger teachers enjoyed the integration of ICT.

During the observation lessons, teachers could not operate some of the smartboards. The first reason was that teachers were not skilled in navigating through the icons on the screen. This could be because of inadequate ICT training or the teacher's uneasiness with the use of ICT. Another reason was technical problems associated with the faulty smartboards. Maintenance and the installation of software and updates on the devices had not been done frequently and hence some of the smartboards in the observed classes were not functional.

There were also electricity and Wi-Fi connectivity problems at the selected schools in this study. Power outages disrupt teaching and learning in an ICT school because the electronic devices require electricity to function. Teachers shared their experiences of disrupted lessons due to power outages. Wi-Fi connectivity seemed to be a problem in all the schools that I visited. The signal was weak and learners could not connect in some classes. These factors result in time being wasted as the teacher has to come up with an alternative lesson that does not require the use of electricity.

The teachers felt that ICT integration comes with an added workload which caused dissatisfaction. They further mentioned that the Curriculum Policy and Assessment Policy do not provide enough time to test the effectiveness of ICT before a class commenced. The teachers felt helpless as they believed that the Department of Education did not support them.

The analysis of the results that were obtained from the learner questionnaires and teacher interviews showed that the majority of educators were battling to keep up with technology in their classrooms. The teachers also felt discouraged as the resources were insufficient for them to teach effectively. The issue of time was a major concern because it determines the coverage of the curriculum and that influenced the learners' academic results.

Most of the teachers did not have the motivation to implement the ICT integration successfully because they felt that the Department of Basic Education was neglecting them. Furthermore, some of the teachers mentioned that the decision making regarding the use of ICT was frustrating as they, as the end-users, were not consulted when changes were made to the policies.

Some 65% percent of the learners were sceptical of using technology in the classroom and they mentioned that smartboards had jamming problems. The learners also mentioned that the Wi-Fi connection was inadequate, which led to them not being able to complete their assignments on time.

A further finding showed that 75% of the learners from the three schools that formed part of the research study did not receive a solid foundation in English, making it difficult for teachers to revise work that was taught in previous Grades due to time constraints. If the technology is not working, it further delays the learning process. The literature, though, mentions that language development is enhanced by the social interactions around the child (Keenan & Evans, 2014:44). The learners' language development is thus influenced by who they come across and the type of interaction they have.

With the use of technology, the learners are given the opportunity to listen to audio clips and that provides the possibility of enhancing their vocabulary skills and pronunciation. The learners also have additional opportunities to view visuals from the gallery to enhance their comprehension of text. They are able to revisit sites if they need to revise or if they do not understand a concept.

However, in some classes there was a shortage of technological resources, such as smartboards and tablets. These shortages lead to unequal opportunities of learning. If learners are taught differently, it disadvantages the visual learners who do not have access to resources such as smartboards and tablets in their classrooms. There were also learners who struggled with technology because they had little exposure to it. These learners barely used their tablets at home because they still had challenges with operating some of the applications installed on the devices. Such issues might affect the way in which learners learn and it might eventually lead to some of the learners losing interest in their school work.

5.5 How does the curriculum support the use of ICT in the classroom?

The curriculum has integrated an ICT education policy that aims at transforming the process of teaching and learning in schools, and it also accelerate the achievement of national goals (DoE, 2004:10). The ICT policy has to be aligned with the Curriculum and Assessment Policy Statement (CAPS) as this is the guideline as to what to teach and how to teach. The data collected in this study indicated that the content of the ICT policy is not fully understood by teachers as they deviated from what is expected of them. This study enabled me to identify the Curriculum and Assessment Policy that teachers adhered to and the ICT policy that governed ICT integration at schools. Some teachers had mastered the art of teaching with ICT but there are still a few that require more training.

The Department of Basic Education provides schools with lesson plans that enable teachers to integrate ICT during their lessons. The planning comes with practical digital activities that enhance learning. Training is also provided to teachers annually to reinforce teacher development. However, the CAPS does not fully support ICT integration in terms of time allocation, according to the teachers interviewed in this study. Teachers are given annual teaching plans that do not accommodate the practicality of utilising smartboards.

Most of the teachers felt that the curriculum does not afford them enough time to be creative in their lessons, which leads to the unwillingness of teachers to comply with the requirements of ICT integration. The teachers were despondent and did not want to put in the extra effort in creating conducive lesson plans because they work under a lot of pressure. With the limited time provided to them, they are unable to teach to the best of their abilities.

5.6 What are the educators and learners' perceptions regarding the use of ICT in the classroom?

A third of the teachers that participated in this study believed that the laptops and tablets that the learners were provided with were a distraction for the learners. The teachers realised that the learners did not use the devices as per the recommended use by the Gauteng Department of Education. The intention was good, as quoted by Teacher 3, as he believed that it made teaching English fun and exciting for the learners. The majority of the educators were excited about the ICT implementation; however, they required support from their district offices on how to balance their curriculum coverage. Their main concern was the workload that had to be covered in a specified period of time.

The learners were mostly excited about using ICT because technology is regarded as an important part of their upbringing. Lehart, Arafeh, Smith and Macgill (2008:8) attest to that statement as they mention that 'technology is dominating the lives of teenagers'.

In Chapter 4 (Figure 4.2), there is a summary of the learners' perceptions of ICT, and 50% of the learners believed that technology had changed the way they performed in class and also that it had improved their vocabulary, thus making it easier to communicate with people around them. The results showed that half the learners perceived ICT usage as a remarkable implementation. The amount of time spent on ICT, as indicated by the data collected, was many hours a day, and further demonstrated the impact it has had on their lives. Some 23% of learners indicated that ICT learning saves time as all the textbooks were saved in one tablet and the learners had access to the information all the time. However, 17% of learners perceived ICT as a waste of resources and indicated that it did not contribute towards the way they learnt.

Some of the teachers raised concerns about the anxieties that result from ICT integration in schools. These teachers were worried about the decision that the Department of Basic Education took to implement ICT policies before consulting them as teachers are the front runners of transferring knowledge to the learners. The anxiety brought forth problems of dissatisfaction and unhappiness in some teachers and this had a major impact on teaching and learning. When teachers are frustrated, schools struggle with absenteeism, which will eventually result in a decline of the academic results. Teaching and learning then are not effective anymore.

The jamming of the technological resources was mentioned by 27% of learners, and they stated that smartboards jam a lot, and as a result it consumes much of their learning time. Instead of the teacher teaching, he/she has to figure out what the problem is and that affects their teaching plan. Lastly, 27% of learners perceived their teachers as not knowledgeable when it came to operating smartboards and laptops. They mentioned that their teachers should receive more training as it was embarrassing when they were not skilled enough to correct the technical problems. This led to the embarrassment of the teachers, and it might lead to discipline problems where learners do as they please.

5.7 Discussion of findings

In this study, various theories were analysed and discussed in relation to ICT and language learning in Grades 8 and Grade 9 classrooms. Theories of child and cognitive development

focus on the growth or changes that occur on children's way to adulthood, according to Charlesworth (2008:13). As mentioned in Chapter 2, children go through various developmental stages where they learn new skills. The learners' cognitive skills develop as they mature.

This study showed that teaching and learning occurs successfully when teachers and learners are fully competent and knowledgeable about their subject content. During one of the lessons, learners were instructed to use their knowledge of search engines by conducting research on the speech by the former president Thabo Mbeki entitled 'I am an African'. As the learners were searching for the information, they were exposed to a plethora of information and they had to be selective by analysing the information provided by the Google search engine. Knowledge becomes a powerful tool when it is shared among the teachers and learners. Applying Bloom's taxonomy enhances the knowledge of both the teacher and the learner by creating a practical platform. This approach enabled the teachers to be creative in planning and presenting their lessons. The results of the study revealed that the learners learn as a result of the interactions with the people around them, and also when they are provided a platform to participate freely.

The learners in this study were in the formal operational stage, according to Piaget's cognitive development stages (as cited by Snowman & McCown, 2013). Children in the formal operational stage are 11 years and older, and they are able to reason and engage in 'mental manipulations' (Snowman & McCown, 2013:25). The majority of Grades 8 and 9 learners were between the ages of 14 and 16, and at a stage where they learn through interaction. The learners questioned the use of ICT as they felt that it was not used effectively. Vygotsky also believes that it is important to educate a child so that they can be knowledgeable and able to question conventions (as cited by Verenikina, 2010).

Verenikina (2010:16) defines Vygotsky's sociocultural theory as a 'profound understanding of teaching and learning that reflect the complexity of social and cultural contexts in the modern learner'. Vygotsky believes in the impact of culture and interaction in the successful upbringing of the child (as cited by Verenikina, 2010). The intellectual ability of a child is a result of the child's physical, social, and linguistic environment (Nuurenbern, 2001:1108). The more children are exposed to an environment where they interact with people, the more they learn the basics of using language by asking questions and being inquisitive. The same aspect applies in ICT learning where learners are exposed to technology in their schools and they eventually learn how to utilise electronic devices by using them during lessons.

The learners learn new skills, as some of the learners who participated in this study did not have any knowledge of the use of laptops or tablets before their school implemented ICT use. In one of the English lessons, the teacher used peer teaching as a teaching strategy in the class. The learners sat in groups and assisted each other on how to use the tablets and laptops. Approximately 60% of the Grades 8 and 9 learners who were part of this study did not own a digital device at home. However, the schools played a major role in training them on how to interact with technology and the knowledge was sufficient for the learners to apply in their English lessons.

Bronfenbrenner's bio-ecological systems model in an ICT environment 'explores the child's environment as regards quality and context; and how the surrounding environment assists or hinders the child's development' (as cited by Alkhawaldeh, Olimat & Al-Rousan, 2015:35). The child's development is influenced by the immediate environment and the socio-economic status of the setting. Some 60% of the learners in this study did not own a technological device, and as a result, they might not have had sufficient knowledge on how to use them. The bio-ecological systems model enhances growth and development through the process of socialisation (Berk, 2009:47). This is a phase where learners discover who they really are and how they fit into the environment. In the learning process, teachers play a major role in educating the learners as some of the learners live with their grandparents who are very old and unable to assist the children.

The microsystem focuses on the learner's exposure and also their understanding of their environment. Children learn by imitating what other people are doing around them. For example, a child who sees their parents playing games on the phone might eventually want to try and do the same thing. The teacher has a close relationship with the learner during lessons and this is where most of the new content is learnt. The way in which a learner interacts with the teacher determines their level of understanding.

The mesosystem explains how a child adapts to new technology, and helps the learners to cope better in classes where technology use is a prerequisite, thus making learning easier for them. The exosystem influences the way in which learning takes place. For example, when there is no power, learning is interrupted and the learners are affected as they might lose teaching and learning time. In the education system, policy is used as a guideline for teaching and learning. Therefore, ICT learning is guided by policy that is integrated with teaching and learning with the purpose of providing quality learning. The data in this study show that the ICT policy has not been fully integrated into the CAPS.

In the exosystem, teacher training is also an important aspect of implementation as teachers have to be trained and provided with the necessary skills on the use of technology in their classrooms. Time is a crucial factor in the chronosystem as it determines the progress and development of the learners. It is important to make sure that teaching and learning takes place optimally so that learners can have equal learning opportunities.

In this study, most of the learners were taught how to use tablets and laptops by their teachers, but most of the practice was done at home. Parents and guardians play an important role in ensuring that their children learn as much as they can when they are at home. The Department of Basic Education attained to a large extent their commitment of transforming learning from traditional to digital classrooms by providing learners with laptops and tablets.

Singh (2003:57) states that blended learning 'provides various benefits over using any single learning delivery medium alone as it limits the reach of a learning program or critical knowledge transfer in some form'. Blended learning enables teachers to be creative and employ different teaching styles. In this study, teachers had various teaching methods which they used to deliver their lessons.

The way in which teachers deliver their lessons differs according to their level of knowledge. Blended learning occurs when teachers are able to teach using different methods and also adapt technology in everyday teaching and learning. In this study, five teachers integrated ICT in their lessons, and one teacher was not interested in employing technology. For example, she did not know how to locate electronic textbooks on the smartboards.

Singh (2003:61) further states that blended learning has brought forth challenges associated with 'equal opportunities, cultural diversity and nationality' (Singh, 2003:61). For the duration of this study, I learnt that only a few schools have implemented ICT in Gauteng. In Tembisa, there were only two schools that had technological resources and had received some support from the Department of Basic Education with regards to maintenance and Wi-Fi coverage. This reveals the inequalities that learners and teachers experience on a daily basis where some schools have adequate resources while other schools do not have any resources at all.

Bloom’s taxonomy for ICT integration, according to Krathwohl (2002:212), focuses on the emphasis of teacher development in integrating ICT in the curriculum. He mentions six

levels of complexity that are required in ICT integration; creating, evaluating, analysing, applying, understanding, and remembering. When the teachers in this study used a smartboard during the lesson, the learners focused on the different steps being used and aimed to understand the operational procedures of accessing files and folders. Most of the learners seemed to be more knowledgeable than their teachers as they kept reminding them how to scroll up and down, and close icons on the screen of the whiteboard.

5.8 Language learning and development

The results of the study shed light on the importance of learning a language, which formed a major part of my study. For a learner to acquire a language, they need to be around people so that that can hear and imitate what they are hearing. Learning a language does not only occur in formal settings such as schools, but also at home or during play time. Children teach each other how to pronounce words as they play. Language has many different concepts and skills that teachers and learners need to master.

Teacher 1 was an English teacher and she found that some of the concepts were too difficult for learners to understand. She explained that teaching using ICT requires discipline since most of the learners see it an opportunity to play games or listen to music. During lessons, teachers have to monitor what the learners are doing. An aspect that she struggled with was the language structure.

Learning has an impact on the development of the child and the way in which they interact with the community. Teachers also need to be lifelong learners and educate themselves through workshops and by furthering their studies. All the teachers interviewed in this study had not studied for the past 10 years and curriculum changes were implemented frequently. This becomes a concern regarding the competency levels of our teachers in South Africa.

Rogoff (1990) states that learning promotes development and influences the behaviour of learners and teachers. This study discussed the key components of the generic model that enhances learning in the classroom. The first component was pedagogy, and this focused on the teaching methods and strategies that teachers used in their classrooms (Wang, 2008:412).

Teaching styles differ for various teachers, as they use what works best for them. Teaching is about trying out different methods and eventually choosing the style that supports the learners' academic success. There are various ways of dealing with differences in the

classroom, and Teacher 3 explained how she managed to reach out to most of the learners. The first thing that she did was to group the learners according to their needs and capabilities. The crucial part was to make sure that the learners used and understood English with the assistance of visual and audio devices.

According to Teacher 1, some of the information taught at teacher training workshops was not adequate as teachers needed to be reminded on how to use technology. She further mentioned that training should not be a once off event. Teacher 4 felt that workshops do help teachers to upgrade their knowledge to be life-long learners. However, some teachers do not attend these workshops.

During the lunch break, the learners sat in groups and communicated with each other. This contributes greatly to the development of their language skills, in addition to the use of ICT. The majority of the learners in this study had English as their third or fourth additional language, making it unlikely that they communicated in English. Some of the teachers used code-switching during lessons in order to explain the content for the learners who did not understand when the work was explained in English. They mostly used isiZulu in code-switching. Their confidence in answering questions was based on the ability to articulate the words. Some of the learners were perceived as shy, and the teacher only realised later that they had a language barrier. I witnessed learners with language barriers who were assisted by other learners to explain certain topics during the lesson.

5.9 Theories of learning

The study discussed three learning theories that are associated with language learning and development. The first theory was the behaviourist theory that occurs as a result of 'observation from how people live' (Harasim, 2012:10). The behaviourist theory focuses on the influence that the environment has on the child's development. For every reaction, there is a consequence. ICT integration becomes a great reward and motivation for learners in the classroom. The Grades 8 and 9 learners who participated in this study responded positively to the transition of electronic learning.

The behaviourist theory states that 'learning results from focusing on observable behaviours and discounting any mental activity' (Pritchard, 2009:6). The reaction and behaviour of the learner in class plays a major role in their academic achievement. A teacher participant mentioned that the school is battling with Grade 8 learners every year in terms of behaviour

and academics. The learners do not seem to realise that they are no longer in primary school.

The teacher also mentioned that it becomes a problem to have such learners left alone in class as they might vandalise the smartboards and interactive whiteboards. Teachers also had a concern regarding the supervision of ICT usage during lessons and also outside the classroom. Some 30% of learners spent two to three hours utilising their devices without supervision. Teachers can only supervise what happens during lessons as it is difficult to monitor the learners during their lunch time. It is important to mention that the teacher participant was able to reward her learners for good behaviour by complimenting them every time they answered a question correctly.

Ertmer and Newby (2013:51) perceive the cognitivist theory as a mental process where the mind of the learner is the main tool that is responsible for transforming the lives of the learners. In this theory, the mind of the child is at the forefront of their achievement. The use of ICT requires learners and teachers to use their intelligence in manipulating some of the applications installed on the technological devices. The learners were intrigued and excited about receiving tablets. The learners in this study were able to navigate and manipulate some of the applications on the electronic devices. When some teachers experienced difficulty with the jamming of smartboards, the learners were able to assist them.

Learners learn faster when they are provided with the opportunity to explore things on their own. With ICT learning, learners control how they learn by making use of the resources that are made available to them and it is of great importance to make sure that learners also look after their resources and the environment. Classroom rules were clearly displayed in every classroom, and before some of the lessons, the teachers emphasised the importance of adhering to the rules to avoid punishment.

Harasim (2012:12) mentions that children create their knowledge through their different experiences. In an ICT classroom, learners construct knowledge by discovering new ways of finding online books and browsing the internet. The learners in this study worked with enthusiasm and determination, and with the assistance of their teacher and peers. In language learning, constructivism becomes an important tool to assist the learners in sharing ideas and knowledge through the use of social interaction in the classroom (Pritchard, 2009:24). The learners exchanged ideas through discussions with the teacher and also

engaged in audio activities that required learners to respond with their voices. Knowledge that is shared leads to the intellectual development of the learners.

In language learning, Vygotsky's sociocultural theory explains that learning takes place during social interactions. As the learners communicate, they practice how to pronounce words and also learn how to construct sentences through learning new words. This is disconcerting as this study's finding is the opposite to that mentioned as necessary by Vygotsky to practice language skills.

5.10 Challenges of the study

Most of the schools in Gauteng have not fully implemented ICT learning, and this has led to constant changing of schools due to inadequate ICT resources. Most of the schools lack Wi-Fi connectivity and have dysfunctional smartboards and interactive whiteboards that have not been maintained in a while.

Some of the schools had experienced burglaries in the past and that led to most of the equipment being stolen and/or vandalised. During the study, some of the ICT schools that I chose experienced burglaries before I could conduct the research. Not all the teachers had access to smartboards and interactive whiteboards and this impacted negatively on the level of participation. In some schools, the principals were not willing to give consent for the research because they thought it would disrupt the academic activities. During the completion of the study, South Africa experienced the Covid 19 pandemic which had a major impact on access to library resources because my university had to close. Information had to be obtained online and that also limited the contact sessions between my supervisor and I.

5.11 Limitations of the study

During the process of writing my dissertation I identified possible limitations of my study. This study aimed at identifying the impact of technology in English classrooms. Advantages and disadvantages were highlighted by the participants, and the results reflected their experiences. However, this study was limited to six teachers, one expert, and three schools. The findings cannot be generalised to all teachers incorporating ICT in their classrooms.

The study was also limited to only conducting research in two grades; Grades 8 and 9 learners' in age ranging from 14 to 16 years old. Therefore, the study only presented a small portion of the possible population in its entirety.

5.12 Contribution of the study

The study was conducted to observe how English teachers utilise ICT in their pedagogy to improve the learners' knowledge of the subject. Technology plays a significant role in language learning as it transforms the way teaching and learning occurs. It has brought forth transformation in terms of instruction and exciting content that is taught in the English classes. The learning material has been developed to accommodate the learners' needs. Some of the activities utilise pictures for visual learners and audio for learners who do not have good eyesight. Technology enables the teachers to choose appropriate resources to tackle the different language skills that promote development and learner achievement.

The teachers emphasised the importance of teacher development in terms of ICT training and also managed to reflect on their teaching methods and shared ideas of creating a fun learning experience for the learners during the English language lessons. This study will contribute as a source of knowledge for schools that are in the process of implementing ICT and also the Department of Basic Education to address the issues of teacher training and the availability of ICT resources in schools.

5.13 Recommendations relating to this study

The body of literature has been used in this study to highlight various aspects of language use and ICT implementation in the school curriculum. However, there are certain aspects that still require attention in our education system. The following recommendations have been informed by the findings and experiences that were reflected in this study.

- The ICT policy does not seem to be understandable for teachers as the findings show that most of them are still confused on what to do in this area and how to do it. More dedicated ICT workshops should be provided for teachers.

- Training of teachers should be regarded as compulsory in schools and it should be conducted annually.

- The Gauteng Department of Education should have enough ICT resources, such as tablets and smartboards for teaching and learning to take place. There should be a task

team employed to audit shortages at schools and also to check whether schools are coping with maintaining the ICT resources they were provided with. These people should be the support structures for ICT schools.

- Proper safety measures should be in place to protect the staff and equipment at schools from burglaries.

5.14 Conclusion

In this chapter, it is evident from the findings that schools do not have adequate financial, physical, or human resources to support the integration of ICT in English lessons. The inequality and digital divide was evident in some schools as some had adequate teaching and learning resources and some schools did not have sufficient resources. In Chapter 4, the findings showed that teachers still lack knowledge and skills in terms of ICT implementation in schools. There is also a need to encourage teachers to change their perception and attitude towards the adaptation of ICT during their lessons.

The implementation of ICT in English lessons has positively transformed the way teaching is conducted and it has also simplified some of the aspects of language such as listening, speaking, and reading. Teachers are able to incorporate everyday activities into their lessons, such as using dance and music in poetry. Learners also learn to be active agents of learning by discovering ways of using tablets and connecting to the internet.

This study showed that there are mostly positive effects on teaching and learning of the English language when technology is used. Therefore, it is vital for teachers to acquire the necessary skills and knowledge in order to enjoy the benefits of ICT. The results have also revealed that teachers who use ICT frequently in their classrooms become motivated and excited about teaching. The experiences of the teachers and learners show that the more we incorporate ICT in English teaching and learning, the more advanced the teaching in South Africa will be in the future.

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APPENDICES

APPENDIX A: Interview protocol for teachers

Interview protocol for teachers

Appendix A

The impact of technology on learning and communication in Grade 8 and 9 English classrooms.

Time of interview:_____ Duration:_____

Date: _____

Place: _____

Interviewer: _____

Interviewee: _____ Pseudonym: _____

_____

Questions

1. Tell me about yourself and your profession.
2. What challenges do you face when teaching the learners English in your classroom?
3. What model of ICT (Information Computer Technology) do you currently use in the classroom to teach the learners English?
4. How effective is the model?
5. In what ways do you use technology to enable and extend learning for the learners?
6. With integrating ICT in language learning, what failures have you experienced and what did you learn from them?
7. As a Grade eight or nine teacher, how do you keep learners interested in learning English?
8. What did you find to be the most difficult aspect of teaching English?
9. How do you modify your teaching to meet the needs of the learners with learning barriers?
10. What is your classroom management plan?
11. How do you differentiate your teaching? Provide examples.
12. What technological support or resources do you receive from the Department of Education that assists you in providing a conducive learning environment for the learners?
13. What do you think are the teachers' perceptions regarding the use of technology in the school?
14. How does the curriculum (CAPS) support the use of technology in the classroom?
15. What are your criteria for choosing a suitable ICT lesson that links to the teaching plan for the learners?

Appendix B: Interview protocol for expert

Interview protocol for expert

Appendix B

The impact of technology on learning and communication in Grade 8 and 9 English classrooms.

Time of interview:_____ Duration:_____

Date: _____

Place: _____

Interviewer: _____

Interviewee: _____ Pseudonym: _____

Questions

1. Tell me about yourself and your profession.
2. What is your perception of the role of ICT (Information Computer Technology) in the classroom?
3. What programmes do your institutes/centres provide the teachers and learners with regard to using ICT in the classroom?
4. How does the exposure to and use of ICTs in school affect future employment according to your experience?
5. Are you working within a particular ICT framework or project? If so, what does it entail?
6. What are some of the biggest trends impacting the ICT industry and how do they affect your views?
7. What challenges have you had using Information computer technology and how did you overcome them?
8. What types of technology do you use to communicate with the learners/visitors in the centre/ institute?
9. What specific knowledge and skills have you developed through the use of ICT?
10. How can ICT be used to reach out to and teach illiterate youth?
11. Do you provide any type of training to develop ICT related skills for teachers? If so, what type of training?
12. How have your services impacted on businesses or schools in the past 5 years?
13. What recommendations can you give to the policy makers of e-Education at the Department of Education?
14. Do you have any advice for people that would like to enter the field of Science and Technology?

Appendix C: Observation template

Observation template

Appendix C

The impact of technology on learning and communication in Grade 8 and 9 English classrooms.

Time of observation:_____ Duration:_____

Date: _____

Place: _____

Observer: _____

Pseudonym: _____

Date and time	Situation	Participants	Actions observed	Reflection

Appendix D: Learner questionnaire

Participant nr. _____

Learner questionnaire

Appendix D

This questionnaire is about the use of ICT (Information Computer Technology) in the classroom. I would like to find out how you feel about being taught English using technology. Please take a few minutes to answer the following questions. Your honest opinions will be very helpful in our mission to identifying the most effective ways of teaching English language using technology in schools.

Questions

1. Do you enjoy lessons using the interactive whiteboards? Please give a reason for your answer.

   _____
   _____
   _____
   _____

2. In your opinion do you think using smart-boards helps you learn better? If your answer is yes, how does it help you learn better?

   _____
   _____
   _____
   _____

3. If your teacher asks you to come forward and control (click or drag objects) on the Interactive Whiteboard do you enjoy that, or don't you like it? Say why.

   _____
   _____
   _____

4. Which are your favourite lessons or programmes on the Interactive Whiteboard or internet?

5. How do you feel about using technology in the classrooms?

6. How much time do you spend per day on a computer or tablet?

7. What challenges do you encounter when using technology in the classroom?

8. Do your teachers make English learning more interesting by using smartboards, projectors and tablets during lessons? Why do you say so?

9. What would you like to see improve or change in your classroom with regards to using technology during the English lessons?

10. If you were an English teacher, how would you use technology to teach English to learners?

CONSENT FORMS

CONSENT FORM A: Introduction of researcher

The impact of technology on learning and communication in Grade 8 and 9 English classrooms.
Assent Letter Learner

Dear Learner

I am a student at the University of Pretoria and busy with a research project. As part of my study I am interested in finding out what learners think of using computers to study English and would like you to complete a short questionnaire. I have received permission from your parent/guardian and the school but will also need your permission. If you complete the questionnaire all the answers will be kept confidential as only my supervisor and I will have access to the information. If you agree to participate please sign at the bottom of this letter.

Regards

Ms Nthabiseng Temo
(Student)
nthabithu@gmail.com

Dr Michelle Finestone
(Supervisor)
michelle.finestone@up.ac.za

.....
.....
I agree / do not agree to complete the questionnaire.

I understand that I am not being forced to participate and can change my mind at any time.

Name

Signature

Date

CONSENT FORM B: Principal

The impact of technology on learning and communication in Grade 8 and 9 English classrooms.

Consent Letter Principal

Dear Principal

I am a student at the University of Pretoria and currently enrolled for my MEd in the Faculty of Education. The aim of my study is to identify the impact technology has on language learning and communication from the perspective of Grade 8 and 9 learners and teachers. The study will include observing an English lesson, asking learners to complete a questionnaire and interview teachers.

I therefore would like to obtain your permission to observe a lesson presented by Grade 8 and Grade 9 English teachers. The observation is not to judge their teaching skills but to gain insight on how technology has an impact on the lesson and learning outcomes. At the end of the lesson I would like the learners to complete a short 10-minute questionnaire. As part of the study I would also like to have a 30-minute interview with the teacher at the school whose lesson I observed at a time that will be convenient for the teacher. I will also need a copy of the lesson plan and time table. All the data collected will remain confidential and will only be used for academic purposes.

Should you require more information, please feel free to contact me or my supervisor on the email addresses provided below.

Ms Nthabiseng Temo
(Student)
nthabithu@gmail.com

Dr Michelle Finestone
(Supervisor)
michelle.finestone@up.ac.za

I hereby confirm that I give consent / do not give consent for Ms Nthabiseng Temo to observe a lesson. I understand that by giving consent I agree that she can interview the Grade 8 and Grade 9 teachers of the lessons observed and that the learners can complete a questionnaire at the end of the lesson for whom she has received permission. I understand the participation of the school is voluntary and can be withdrawn at any time during the study. By agreeing to participate I allow teachers to provide me with a copy of their lesson plan and time table.

Name and Signature of Principal

Date

Name of school/ School stamp

CONSENT FORM C: Teacher

The impact of technology on learning and communication in Grade 8 and 9 English classrooms.
Assent Letter Learner

Dear Learner

I am a student at the University of Pretoria and busy with a research project. As part of my study I am interested in finding out what learners think of using computers to study English and would like you to complete a short questionnaire. I have received permission from your parent/guardian and the school but will also need your permission. If you complete the questionnaire all the answers will be kept confidential as only my supervisor and I will have access to the information. If you agree to participate please sign at the bottom of this letter.

Regards

Ms Nthabiseng Temo
(Student)
nthabithu@gmail.com

Dr Michelle Finestone
(Supervisor)
michelle.finestone@up.ac.za

.....
.....
I agree / do not agree to complete the questionnaire.

I understand that I am not being forced to participate and can change my mind at any time.

Name

Signature

Date

CONSENT FORM D: Parent/guardian

The impact of technology on learning and communication in Grade 8 and 9 English classrooms.
Consent Letter to Parents/Guardians

Dear parent/guardian,

I hereby request permission for your child to participate in my study. Currently I am completing my MEd degree at the Faculty of Education at the University of Pretoria. As part of my study I will be observing an English lesson and will be asking learners to complete a short questionnaire on their experiences at the school on ICT (Information Computer Technology).

The learners will be asked to complete the questionnaire during their English lesson which will take approximately 10 minutes. To ensure confidentiality learners will be allocated an identification number. The collected data will be stored in a safe place as per the requirements of the University. If you agree to allow your child to participate in this study, please sign this letter.

Should you require more information, please feel free to contact me or my supervisor on the email addresses provided below.

Ms Nthabiseng Temo
(Student)
nthabithu@gmail.com

Dr Michelle Finestone
(Supervisor)
michelle.finestone@up.ac.za

I hereby confirm that I give consent / do not give consent for my child to take part in the study. I understand that by giving my consent learners will be observed during an English lesson and will be asked to complete a questionnaire in writing on the use of ITC. Participation in the study is voluntary and the identity of the students will remain confidential. The data collected will only be used for the purposes of this study.

Signature of parent/guardian

Date

Name of learner

Name of school

CONSENT FORM E: Learners (assent)

The impact of technology on learning and communication in Grade 8 and 9 English classrooms.
Assent Letter Learner

Dear Learner

I am a student at the University of Pretoria and busy with a research project. As part of my study I am interested in finding out what learners think of using computers to study English and would like you to complete a short questionnaire. I have received permission from your parent/guardian and the school but will also need your permission. If you complete the questionnaire all the answers will be kept confidential as only my supervisor and I will have access to the information. If you agree to participate please sign at the bottom of this letter.

Regards

Ms Nthabiseng Temo
(Student)
nthabithu@gmail.com

Dr Michelle Finestone
(Supervisor)
michelle.finestone@up.ac.za

.....
I agree / do not agree to complete the questionnaire.

I understand that I am not being forced to participate and can change my mind at any time.

Name

Signature

Date

CONSENT FORM F: Expert

The impact of technology on learning and communication in Grade 8 and 9 English classrooms.

Consent Letter Expert

Dear Sir/Madam

I am a student at the University of Pretoria and currently enrolled for my MEd in the Faculty of Education. The aim of my study is to identify the impact technology has on language learning and communication.

I therefore would like to obtain to interview you for my study. It will take approximately 30-minutes and will take place at a venue and time that will be convenient for you. All the data collected will remain confidential and will only be used for academic purposes.

Should you require more information, please feel free to contact me or my supervisor on the email addresses provided below.

Ms Nthabiseng Temo
(Student)
nthabithu@gmail.com

Dr Michelle Finestone
(Supervisor)
michelle.finestone@up.ac.za

.....

I hereby confirm that I give consent / do not give consent for Ms Nthabiseng Temo to observe to interview me. I understand that by giving consent my participation is voluntary and that I can withdraw at any time during the study. By agreeing to participate I agree that the interview can be audio-recorded.

Name

Signature

Date