

**Assessing the Implementation of E-Learning in Primary Schools:  
A Case Study of Harare Metropolitan Province**

by

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in the subject

**EDUCATION**

at the

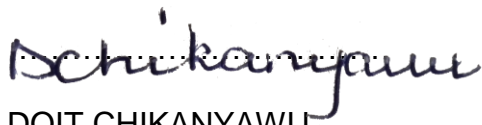
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## DECLARATION

I, DOIT CHIKANYAWU, Student Number 61264245, do hereby declare that this dissertation is a product of my own work, developed in strict observance of academic ethical considerations, including acknowledgement of sources of reference material I used in this dissertation.



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DATE

## **DEDICATION**

I dedicate the work to all teachers who have a passion for teaching with technology, and the will to make a difference in every learner's life. I also dedicate this thesis to my late mother Miriam Mafenya, nee Molani, my hero, friend, and confidante, for teaching me to be strong, to never stop believing and follow my dreams even if all odds are against me, hats off. I know she is in a better place, but I will forever cherish and be mindful of what she taught me.

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I recognise the role played by the staff of the schools that participated in this study, providing me with valuable information. I would like to single out the invaluable contribution of school heads of the three schools where this research was undertaken, who endured long periods of reflective conversations on e-learning and adoption of technology in education, from which I harvested golden nuggets of information and ideas to shape this thesis. Mr Thinkwell Chikanyawu and Mr Matseketsa whose technological support made life comfortable for me during the study, deserve special recognition too.

## ABSTRACT

The role of technology has become one of the most important issues in 21<sup>st</sup> century education. Electronic learning has revolutionised the way teaching and learning takes place at almost all levels of the education. The global corona virus disease 2019 (COVID-19) pandemic has challenged both learners and educators to rapidly transform and adopt modern, non-contact ways of education delivery, to fully exploit the potential affordances technology offers, e-learning has emerged as a core of this revolution. While e-learning is not a completely new phenomenon, with already generous coverage of its implementation particularly in high school and tertiary levels of education, the dearth of literature and studies on the adoption and implementation of e-learning in primary schools is conspicuous. This is particularly so in less resourced, developing countries like Zimbabwe. This is despite considerable effort being made towards the adoption and implementation of e-learning.

This study is an assessment of the implementation of e-learning in primary schools in Zimbabwe. Adopting a descriptive qualitative case study design, its focus was on schools in the Harare Metropolitan. Three schools were purposively selected to participate in the study, from which a sample of nine teachers and three school heads were selected. Data was collected through interviews, observations, and a review of documents. For analysis, data were examined and categorised, and recurring themes that emerged from the transcripts were identified. Findings revealed a lack of guidance on the specific models to follow for e-learning implementation; the need for continuing professional development of teachers and school leaders on the use of educational technology, as well as the need for resources to support the implementation of e-learning in schools. The role of a supportive and visionary school leadership is proposed as a key factor for success, coupled with availability of technical expertise and ICT coordinating structures in schools.

## KEYWORDS

E-Learning

Technology

Information and Communication Technology

School

Curriculum

Syllabus

Framework

## LIST OF ABBREVIATIONS

CAI	Computer Assisted Instruction
CAL	Computer Assisted Learning
CIET	Commission of Inquiry into Education and Training
CPD	Continuous Professional Development
CL	Collaborative Learning
CMI	Computer Managed Instruction
ECD	Early Childhood Development
E-Learning	Electronic Learning
ICT	Information Communication Technology
MoPSE	Ministry of Primary and Secondary Education
NCCA	National Council for Curriculum and Assessment
SDC	School Development Committee
TAM	Technology Acceptance Model
TPACK	Technological, Pedagogical, and Content Knowledge

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## CHAPTER 1: INTRODUCTION

*“The key to a successful learning in primary school education is the interaction and relationship between a learner and his or her teacher”* (Education Review Office, 2016)

### 1.1 INTRODUCTION

Education in the 21<sup>st</sup> century is all about acquisition of relevant skills. The use of strategies that enhance the ability to meet the challenges of the 21st century in teaching and learning is critical. Electronic learning (e-learning) has proved capable of providing the required response to this need (Laskaris, 2015). Apparently, the explosion of Information and Communication Technology (ICT) has brought about flexible learning (Das, 2019). Furthermore, the role of technology in teaching and learning is rapidly becoming one of the most important and widely discussed issues in contemporary education policy (Saxena, 2017). Due to the on-going enhancements of technology, people are now able to communicate and learn in a virtual environment with similar interaction as in the real world. However, at primary school level, the role of the teacher in supporting learners is still very important.

The purpose of this chapter is to contextualise the literature gap and introduce this study on the implementation of e-learning in primary schools in Zimbabwe. The background giving rise to the study is presented, followed by the statement of the problem, which should give direction to what needs to be researched upon. The aims and objectives of the study are presented, leading to the formulation of appropriate research questions. This is followed by a discussion on the methodology, which spells out how the research was carried out. It ends with the organisation of chapters and a summary of the chapter.

#### 1.1.1 E-learning: The concept

E-learning simply means electronic learning encompassing all forms of electronically supported teaching and learning (Encarnacion, Galang, & Hallar, 2019; Clark & Mayer,

2011). Concurring with this, Taurus, Gichoya and Muumbo (2015) define e-learning as learning that is facilitated and supported through the use of information and communication technology. Information and communication technology includes all technologies used for the manipulation and communication of information. These include radio, television, satellite, mobile phones, computers and the internet (Das, 2018). Gordon (2014) posits that learning through new information and communication technologies is also called e-learning, digital learning, technology-enhanced learning, and computer-mediated learning.

### **1.1.2 Personal involvement**

The importance of the study is that it provides empirical evidence of the factors impeding or enhancing the implementation of e-learning in the primary schools of Harare Metropolitan Province of Zimbabwe. While e-learning is a growing phenomenon, the motivation behind carrying out this research emanated from the launch of the Zimbabwe primary and secondary schools' competence-based curriculum in 2015. This was the driving force behind the use of information and communication technologies (ICTs), and subsequently, e-learning. Information and communication technology makes information easily accessible anywhere and anytime. As a classroom practitioner, when the competence-based updated curriculum was rolled out in 2015, the researcher felt compelled to make use of e-learning tools that the private companies were bringing into schools after getting approval from the Ministry of Primary and Secondary Education. Just like other fellow teachers, the researcher lacked skills in the manipulation and use of ICTs that were supposed to facilitate e-learning. However, the predicament faced by most teachers was the lack of support from school authorities.

### **1.1.3 Motivation of e-learning implementation research**

The motivation of the research emanated from the researcher's zeal to assist learners acquire 21<sup>st</sup> century skills (Blaschke, 2018). The 21<sup>st</sup> century skills are the main thrust of the current education system occasioned by the realisation that the previous curriculum was too academic and did not produce learners who were able to tackle problems currently faced in the country (MoPSE, 2015). To deliver such an education, there is a need to acquaint learners with the requisite skills. Teaching and learning processes

require dissemination of a wide range of knowledge to learners, and the regular school hours alone would not suffice for the content load. This necessitates embracing of ICTs and e-learning (MoPSE, 2015). The researcher was motivated to undertake an assessment of the implementation of e-learning teaching and learning.

## **1.2 BACKGROUND TO THE STUDY ON IMPLEMENTATION OF E-LEARNING IN PRIMARY SCHOOLS**

The introduction highlighted the gap and motivation for the research. The assessment of e-learning was primarily triggered by the introduction of a competence-based curriculum in all public schools in Zimbabwe. Many private companies in Harare, the capital city of Zimbabwe, produce e-learning packages, and with the permission of the Ministry of Primary and Secondary Education, the packages are used in schools. A brief explanation of the key driver of the use of ICTs and e-learning in the 2015 to 2022 competence-based curriculum is given in the next section.

### **1.2.1 An overview of curriculum review in Zimbabwe**

Over the last two decades, conversations in government, education management, non-governmental organisations, the business world, and other social bodies in Zimbabwe, focused on the nature of the educational system in Zimbabwe. The discussions focused on the education system's shortfalls, and on what could be changed or improved. These improvements were aimed at producing individuals who are able to contribute meaningfully and add value to the development of the country economically and socially, in light of the emerging socio-economic challenges bedeviling the country and the world at large. In 1998, the government of Zimbabwe set up the Presidential Inquiry into Education and Training (CIET), which produced a report in 1999 that revealed that, since the colonial era, education in Zimbabwe had remained too academic in nature without catering for the majority of learners (Mamvuto, 2019).

The CIET, also known as the Nziramasanga Commission, advocated the need for a detailed review of the school curriculum in order to address the identified needs of the learners and the nation. In 2010, the National Education Advisory Board (NEAB) under the Ministry of Education, Sports, Arts and Culture, undertook an analysis of the

curriculum needs of the country, and proposed that a more comprehensive review of the curriculum be undertaken, pointing out that the recommendations by the Nziramasanga Report had only been partially fulfilled (MoPSE, 2015).

The review objectives were to: (i) compile findings on significant developments that had occurred since the 1999 Nziramasanga Report, which had had a noticeable effect on the curriculum review; (ii) include stakeholder contributions into the desired content of curriculum for infant, junior and secondary school education in Zimbabwe; (iii) enlist stakeholders' ideas on implementation strategies to achieve the intended results, and desired impact on national development; (iv) match the new curriculum emanating from the review with the development needs of the country as advocated in the country's economic blueprint on economic recovery (ZIMASSET, 2013-2018); and (v) develop a framework for curriculum that reflected the Zimbabwean context, while remaining consistent with international trends and standards (MoPSE, 2018). Marume (2016) reports that public consultations commenced in November 2014, and concerned stakeholders were afforded an opportunity to contribute their views on the nature of the curriculum they wanted to see developed and implemented in the school system. To ensure inclusivity, the consultations were held in all the 5 683 primary schools, 2 424 secondary schools, at 72 district centres, in 10 provincial centres, and at a national centre located in Harare, the capital of Zimbabwe. Further consultations were held with targeted groups in government, universities, commerce and industry, churches, and professional associations. The media was also tasked with spreading information and gathering contributions from the public (MoPSE, 2015).

According to a document produced by the ministry (MoPSE, 2015), the current curriculum takes into consideration the impact of ICTs in an information-driven economy, and warrants a set of new skills to enable citizens to live and work competitively in the global village (Marume, 2016). The researcher's view is that the introduction of ICTs and the implementation of e-learning are vital if world-class education standards are to be achieved. School curriculum renewal should result in curricula that are relevant to learners' lives and address learners' needs, 21st century skills, and relevant knowledge using technology (Saavedra & Opfer, 2012). E-learning is one way of using ICTs to facilitate the acquisition of required skills and competences for Zimbabwean learners to attain competitive levels globally.

### **1.2.2 The rationale for e-learning implementation**

The implementation of e-learning and ICTs is associated with the effective delivery of educational content. Several authors concur that the role of technology in teaching and learning is becoming one of the most important and widely discussed issues in 21<sup>st</sup> century education (Saxena, 2017; Adeoye, Oluwole, & Blessing, 2013). Teachers can make a permanent impact on their learners' lives through incorporation of technology when delivering educational content, especially to learners at primary school. School experiences influence how children view themselves inside and outside school, since school education has the potential to last a lifetime and determine learners' future decisions. The attitudes and competencies towards ICTs include being a genuine, caring and kind teacher; willingness to share responsibility; being sincere in accepting diversity in learners' creativity; and having the motivation to provide meaningful learning experiences through e-teaching.

E-learning has revolutionised the educational landscape and made learning more interesting by providing opportunities for learners to learn on their own while the teacher directs them. Research has shown that teaching and learning activities are gradually moving away from content-centred curricula to competency-based curricula, a step associated with a change from teacher-centred instruction to student-centred forms (Adeoye, Oluwole, & Blessing, 2013). In this study, the researcher argues that e-learning can improve the quality of instruction and encourage a host of other benefits like collaborative learning.

Chirume and Ofori-Attah (2016) assert that the Millennium Development Goals (MDGs) put in place by the United Nations in 2000 highlighted the importance of Information and Communication Technology (ICT) in the global development agenda. The last of the MDGs, goal number eight, advocates the need to ensure that the benefits of new technologies, especially ICTs, are made accessible to all for sustainable development. ICTs make e-learning environments possible, among other components of e-learning environments. Salehi, Sholaei and Satter (2015) are of the view that advances in information dissemination and knowledge consumption are increasing, and ICT serves as a transmission belt in the generation, dissemination and sharing of knowledge in the form of e-learning. The education sector plays a key role in information and knowledge

management, hence the need to ensure that all teachers and learners are using ICTs in their teaching and learning.

Teachers in Zimbabwe, a developing nation, cannot be excluded from this development trend of e-learning integration into the education system. Many learners and teachers are not competitive in the global village due to lack of technological skills and; thus, fail to secure lucrative ICT positions (Johnson, Jacovina, Russell, & Soto, 2016; Mandoga, Matswetu, & Mhishi, 2013). Konyana and Konyana (2013) aver that it is through the realisation of the importance of ICTs that schools in Zimbabwe are now striving to seize the opportunity to exploit the benefits of ICT for the purpose of teaching and learning. Their efforts are informed by the understanding that the use of e-learning in education is a significant or key driver for learner achievement through enhanced access to information and knowledge. Muchochomi (2016) notes that the effective implementation of e-learning in schools has the potential to enhance academic achievement among learners through greater collaboration, improved communication, and wider opportunities to share information.

As mentioned earlier, there are a number of documents and policies focused on the Zimbabwean education system and e-learning, even at primary school level. Arguably, the Presidential Commission of Inquiry into Education and Training (CIET) (1999) also known as the Nziramasanga Commission, produced the lead document from which the rest derive the need for ICT and e-learning in education in Zimbabwe. The other documents are the Ministry of Primary and Secondary Education Strategic Plan 2016-2020; the Curriculum Framework for Primary and Secondary Education 2015-2022; The Education Amendment Act 2019; the Departmental Integrated Performance Agreement handbook (2017); and the Zimbabwe National Policy for Information and Communication Technology (ICT). To further give an indication of the need for e-learning, the Zimbabwe National Policy for ICT (2016) provides the following as one of its objectives with regards to e-learning in schools: "To promote e-learning and use of e-learning materials throughout Zimbabwe" (Government of Zimbabwe, 2015). The common feature among all these documents is how they mandate government institutions and schools to adopt and implement e-learning. It is evident that the background to this study is founded on the actual implementation of e-learning to enhance effective curriculum delivery in primary schools.



In this study, e-learning is defined as learning that is facilitated by the use of ICTs. It is the application of modern technology for curriculum delivery in the classroom. Several researchers focus on educational outcomes and numerous benefits to be accrued from the incorporation of modern technologies in teaching and learning (Saxena, 2017; Adeoye et al., 2013) Even though e-learning has mainly been considered in higher institutions of learning, it can also be implemented at primary school level. The teacher and the school system play a pivotal role in enabling learners to learn using ICTs. The assessment of the implementation of e-learning in primary schools should lead to e-learning insights and experiences, as well as the improvement of programme delivery and quality of education for learners.

Despite what appears to be an overwhelmingly positive view of e-learning adoption and implementation in the schools, there are also some hurdles and challenges to be navigated. Reporting on e-learning implementation at Botswana University, Moakofhi, Leteane, Phiri, Pholle and Sebalatheng (2017) indicated that implementation of e-learning is riddled with many challenges, ranging from government policies, infrastructural and computer proficiencies of lecturers. Similarly, in primary school education, even though the government has endorsed the implementation of e-learning at all education levels in Zimbabwe, there are challenges that need to be addressed. E-learning on its own will not necessarily have positive outcomes on learners, especially those at primary school. One of the negative features is that these learners are too young to determine what they need to learn. It is against such challenges that this study assessed the implementation of e-learning in primary schools in Zimbabwe. According to Chimururi (2017):

*“It is exactly nine months since the introduction of the e-learning based updated curriculum by the Ministry of Primary and Secondary Education. Despite this introduction advocating for the adoption of technologies in virtually every aspect of infant, junior and senior education, significant challenges are preventing widespread effective implementation. Though some of these challenges are economic and some related to the scarcity of the technologies, teachers and education leaders share the blame as well. The beneficiaries of the new dispensation, which are learners have*

*nothing to show for it. Most are still computer illiterate, they have not come across the benefits of audio-visual learning and chances are high the pass rates will not improve as promised. Most students still lack of knowledge on what e-learning is all about and the different types of media used and how to use them in classroom situation”* (Chimururi, *The Herald*, 7 October, 2017).

It is against this background that this study aimed to assess the implementation of e-learning by teachers in primary schools.

### **1.3 THE THEORETICAL FRAMEWORK**

A theoretical framework guided the researcher’s intentions in the study, and helped the researcher to view, analyse and interpret facts (Kivunja, 2018). The study adopted the technological, pedagogical and content knowledge (TPACK) model (Mishra & Koehler, 2006) as the guiding framework in assessing the teachers’ capacity to integrate and implement technology in their teaching. The model shows the various combinations of knowledge a teacher must possess for effective implementation of e-learning. The various combinations and the rationale for adopting the TPACK model as a theoretical framework for assessing the implementation of e-learning in primary schools in Zimbabwe are discussed in Chapter 3 of the study.

### **1.4 PROBLEM STATEMENT**

Evidence shows that the utilisation of e-learning as a learning tool at the primary school level is a challenge in many schools in Harare Metropolitan area (Chimururi, 2017), despite claims by school heads that e-learning is flourishing. However, many schools in Harare Metropolitan have computing equipment or the parents have acquired hardware for the children to participate in e-learning. In other cases, access to e-learning has been used as a marketing tool for enrolment in Early Childhood Development (ECD) classes, presenting a picture that e-learning is being implemented. The government has called for having a computer per every child. The former President of Zimbabwe, Mr Robert Mugabe had personal interest in the investment of computing power and e-learning in schools (The Zimbabwe Mail, 2017; Majoni & Majoni, 2015).

There has been political will in government for e-learning, even though national budgets do not seem to prioritise that critical investment (The Government of Zimbabwe, 2018). For instance, the Ministry of Primary and Secondary Education (2016) produced a draft ICT, e-learning and communication strategy that forms the basis of the introduction of ICT across the foundation levels of the education system in Zimbabwe, but that strategy does not have a specific budget allocation. The competence-based Zimbabwean education curriculum encourages effective implementation of e-learning. However, there are reports that ICT equipment issued for e-learning in some schools is lying idle, a sign that computer use as an aid for teaching and learning is not manifest in all schools across the country (The Zimbabwe Mail, 2018).

The utilisation of computers by the targeted end users continues to face challenges as a high percentage of educators and stakeholders are averse to the use of ICT gadgets. Both Konyana and Konyana (2013) and Muchochomi (2016) note that the regular use of e-learning technologies by most teachers and learners within public schools is still not a common occurrence. There seems to be two groups of people within the education system. The first group sees the use of e-learning as another pendulum swing that would eventually fade away. Some authors have named them immigrant digital teachers because they say these teachers are stuck to traditional teaching methods, while the learners they teach are Y-generation or techno savvy learners (Mukhari, 2016). The other group is for the use of technology in teaching and learning. Even when some teachers are against e-learning, the learners use technology anyway. Today's learners are independent problem solvers, critical thinkers, and are able to manipulate e-learning hardware with ease (MoPSE, 2015).

Even when the hardware is available, it has been observed that e-learning investment is not growing very fast in Zimbabwe. This is because a stock-take of the government donated equipment shows that the equipment is either underutilised, derelict or stolen (The Zimbabwe Mail, 2018). This is the anti-thesis to the government mantra of pushing for innovation in science, technology, engineering and mathematics (STEM). This thesis assesses the penetration of e-learning in Harare Metropolitan primary schools, and argues that, despite what school heads claim in their reports to government (ED46), effective e-learning implementation is still far off.

## **1.5 AIM AND OBJECTIVES**

The aim of this research was to assess the implementation of e-learning in the primary schools of Harare Metropolitan Province of Zimbabwe. In order to achieve this aim, the research was driven by the following objectives:

- i) To identify the models used for the implementation of e-learning in Harare metropolitan primary schools.
- ii) To examine ways in which school systems support the implementation of e-learning.
- iii) To establish the level of personnel competences required for an effective e-learning implementation in primary schools.

### **1.5.1 Research questions**

#### **1.5.1.1 *Main research question***

What are the determinants of e-learning implementation in primary schools?

#### **1.5.1.2 *Sub-questions***

- 1) What models are teachers using in the implementation of e-learning in Harare Metropolitan primary schools?
- 2) How is the school system affecting the teacher implementation of e-learning in primary schools?
- 3) What teacher competencies are required for an effective implementation of e-learning in primary schools?

## **1.6 SIGNIFICANCE OF THE STUDY**

The purpose of this study was to assess e-learning implementation in primary schools through investigating, describing and analysing the determinants of e-learning implementation. The research is of particular significance to educators, policy makers, academics and researchers with a particular interest in the adoption and integration of

modern technologies in teaching and learning. While the subject of e-learning has already enjoyed extensive coverage in literature, very little has yet been written on e-learning in primary schools. For this reason, it was hoped that the present study would contribute to the body of knowledge on the subject, bringing new insights, illuminating opportunities for potential further studies, and contributing to current debate on education and technology

## **1.7 E-LEARNING IMPLEMENTATION RESEARCH METHODOLOGY**

The purpose of the research methodology is to give a description of how the research was executed, embracing all the activities and procedures that were undertaken during the study. A research methodology includes the philosophy or the general principle that guides one's research (Dawson, 2009, p. 23). It is a systematic way to solve a problem. Aspects that are discussed in the research methodology include the research philosophy, research approach, research paradigm, research design, research type/ strategy, research methods, and the ethical consideration for the study (Mohajan, 2018; Creswell, 2014).

### **1.7.1 E-learning implementation research design**

The conceptual blueprint within which research is conducted is called a research design (Akhtar, 2016). It indicates the strategies or actions that the researcher performs when conducting research (McMillan & Schumacher, 2010). It is a plan that presents all the activities that were done in order to answer the research question. A research design can be likened to a situation whereby one intends to construct a house. The sort of house to be built has to be known before ordering material or setting dates for completion. This then can lead to sketching a plan, obtaining permits, working out a work schedule, or ordering materials (Frenz, Nielson, & Walters, 2014). Similarly, social research needs a design or structure before either data collection or analysis can commence. This research used the interpretive-descriptive research design.

A descriptive research design is generally structured and designed specifically to measure the features described in the research questions (Hair, Celsi, Money, Samouel, & Page, 2015). Given the nature and demands of this study, the selected research design

was a descriptive and interpretive case study analysed through qualitative methods. The descriptive and interpretive research design was selected because it provided accurate and valid representation of factors that pertain or are relevant to the research question. This section therefore articulates the research design employed to assess e-learning implementation under the following headings: the research approach, research paradigm, and the research strategy.

### **1.7.2 E-learning implementation research paradigm**

Creswell (2014) notes that a paradigm is a worldview of something. Paradigms are sets of beliefs that guide action. McMillan and Schumacher (2010) identify three research paradigms. These are the critical theory, post-positivism and the interpretivist paradigms. The three are discussed in detail in Chapter 4. In this study, the researcher used the interpretivist paradigm because of the nature of the study, which was largely qualitative. The interpretivist paradigm provides flexibility and allows simultaneous generation and analysis of data. It is underpinned by observation and interpretation. To observe is to generate information about events, while to interpret is to make meaning of that information by drawing inferences or judging the match between the information and some abstract pattern. The interpretivist paradigm comprises three elements, namely ontology, epistemology, and methodology. This allowed the researcher to assess e-learning implementation in primary schools. The paradigm and the three elements are discussed in depth in Chapter 4.

### **1.7.3 E-learning implementation research approach**

For this research, the qualitative approach was adopted. The researcher mingled with teachers and school heads in Harare schools in order to assess the implementation of e-learning in the primary schools. The choice of a qualitative approach allowed the researcher to have close contact with participants in their teaching process (natural setting) to understand the phenomenon under investigation, and make sense of the participants' experiences as they implemented e-learning (Mohajan, 2018). A qualitative approach is one in which the inquirer makes knowledge claims based primarily on constructivist perspectives (Huttunen & Kakkori, 2020; Arokiasamy, Kwaider, & Balaraman, 2019). The social constructivist worldview (Vygotsky, 1978) is an approach

to qualitative research (Lincoln, Lynham, & Guba, 2011; Mertens, 2010). The research relied as much as possible on the participants' views of the situation, in this case, the implementation of e-learning in primary schools. The researcher collected open-ended data with the primary intention of developing themes from the data.

This study used the qualitative research approach. This is because a distinguishing characteristic of qualitative research is that behaviour is studied as it occurs naturally. The teachers, using e-learning technologies to deliver curriculum content, exhibited the behaviour the research sought to assess. There is no manipulation or control of the behaviour, nor are there any externally imposed constraints (McMillan & Schumacher, 2010). Qualitative research insists on the interpretation of meanings that participants bring into a social context. This highlights its practical nature as well as its flexibility (Qu & Dumay, 2011).

#### **1.7.4 E-learning implementation research strategy**

The researcher employed the case study because it allowed for the collection of detailed information using a variety of data collection procedures over a sustained period of time (Yin, 2012). Saunders, Lewis and Thornhill (2009) describe a research strategy as a general plan that helps the researcher in answering the research questions in a systematic way. The strategy was guided by the research questions and objectives, the extent of existing knowledge, the amount of time and other resources available. A descriptive-interpretive case study was used with qualitative evaluation methods.

### **1.8 RESEARCH METHODS**

In this section, the procedures, tools and techniques for gathering and analysing data are explained briefly together with how the researcher employed them during the research process. It is in this section that the selection of participants/ sampling, data collection techniques, and how data was analysed, are explained. The section also considers issues of trustworthiness and ethics that guided the study.

## **1.8.1 Selection of participants**

In the selection of participants, the researcher identified the respondents from the universal or target population from which the sample was drawn.

### **1.8.1.1 Population**

A population refers to all the individuals or a unit of interest within a study (Casteel & Bridger, 2021). It is the entire pool from which a sample is drawn (Rudhumbu, 2014). Casteel and Bridger (2021) describe population as the summation of all the possible participants of a research study grouped by a shared feature. The population for this study was all teachers in the three selected primary schools in Harare Metropolitan.

### **1.8.1.2 Sampling**

A sample is a smaller, manageable version of a larger group selected to represent the population of interest (Gravetter & Wallnau, 2017). It has the characteristics of the entire population. The observations and conclusions made against the sample data are attributed to the population (Patton, 2015). Since this is a qualitative study, the data provided about the sample was analysed and the results transferred to the population of interest (Casteel & Bridger, 2021). A list of schools in each of the seven districts of Harare Province was obtained from the provincial offices' planning department. Advice was sought from the District School Inspectors on which districts were mostly likely to be characterised by wide computer use. Three districts were identified, from which three schools were purposively selected. The teachers in the three schools became the target population and purposive sampling was employed to come up with a sizeable sample for the study. Purposive sampling was appropriate for this study the researcher adopted a qualitative design (Patton, 2015; Palinkas et al., 2015).

The significance of e-learning resources to the teacher, as a curriculum implementer in today's digital age, cannot be over-emphasised. Pangajamorn, Suanmai, Kohda, Chogphaisal, and Supnithi (2018) posit that the primary aim of e-learning is to modify the traditional procedures and approaches to curriculum implementation. Teachers are central participants in the process of e-learning's adoption in educational institutions, and



their refusal and objections to the adoption process prevents adoption and implementation of e-learning in schools (Pangajamorn, Suanmai, Kohda, Chogphaisal, & Supnithi, 2018). Teachers were purposively selected according to the levels that they taught in the primary school. Purposive sampling is the intentional selection of participants of the characteristics and qualities the individual has (Etikan & Bala, 2017). Heads of the three school automatically became part of the participant because each school has only one head. Teachers were selected because three of them were teaching computer lessons in the school and therefore one from each school was deemed to be able to provide relevant informant in order to answer the research question. The other levels of the primary school which were considered besides the leadership were the infant level and the junior level. From each school these levels were represented and the final selection depended on their knowledge of the topic under study. The school heads informed the researcher about the qualifications of these teachers. The willingness to participate in the research process was another criterion considered. The sample for this study was made up of nine teachers from three primary schools, and three school heads of the selected schools, to make a total sample of twelve participants. Literature supports this number of participants (Kim, Sefcik, & Bradway, 2017). Kim, Sefcik, and Bradway (2017) point out that most descriptive design studies include fewer participants, especially when interviews are the primary source of data collection.

The use of correct sampling methods allowed the researcher to minimise research costs, conduct research more efficiently (speed), and have greater accuracy. The study adopted the non-probability sampling method. As explained in the foregoing paragraph, the non-probability sampling techniques used in this study was purposive sampling. Purposive sampling is a non-probability sampling procedure whereby sampling units are selected according to the purpose (Etikan & Bala, 2017; Singh & Masuku, 2014). Singh and Masuku (2014) criticise it when employed in quantitative research because it provides a biased estimate and is not statistically recognised. In this qualitative study, it was the technique of choice because it can be used only for some specific purposes, in this case, to select participants knowledgeable about e-learning in sites where e-learning was being implemented (Etikan & Bala, 2017).

### **1.8.2 Data collection**

Data collection focuses on the different ways that information is solicited from the sample. Literature indicates that a great diversity of approaches can be used to collect data (Bryman, 2012). Data was collected from relevant Ministry of Primary and Secondary and school documents, interviews, non-participant observation of lessons delivered through e-learning, observation of behaviour patterns, and watching visual recorded material. After collecting the data, the researcher made own impression and feelings about the subject under study. The qualitative researchers collect data themselves through “examining documents, observing behaviour, and interviewing participants” (Creswell, 2013, p. 20). The researcher collected data mainly from teachers and a few heads of schools who are the implementers of e-learning in the school system.

The qualitative researcher cannot fix data collection methods at the planning stage of a study (Dawson, 2009). Interviews, observation and document analysis were considered appropriate instruments and techniques in line with the nature of data that needed to be collected. Interviews were saved in files in the researcher’s computer, a diary was kept for observations, and data from documents was recorded in a notepad. Data collection was done during school terms which are January to March (1<sup>st</sup> Term), May to July (2<sup>nd</sup> Term) and September to November (3<sup>rd</sup> Term).

Three instruments were employed for data collection in this study. This is because a case study highly recommends the use of multiple additional sources to corroborate the data; hence, reliance upon the interview as the sole source of data is not required (Casteel & Bridger, 2021) The number of interview participants can be lower as an accommodation between the need for extensive interview data and the use of additional sources of data to seek saturation. Casteel and Bridger (2021) recommend including 12-15 participants to provide multiple perspectives of the case phenomenon while using additional sources of data to support the findings. This study had 12 participants and, apart from interviews, document analysis and observation were employed to corroborate evidence as recommended by Casteel and Bridger (2021).

### **1.8.3 Data analysis**

The manual content analysis using the thematic approach was used to analyse data. The purpose of data analysis was to obtain constructive information from raw data. It involved making sense out of unprocessed data gathered during data collection. Soon after interviews, tapes were played repeatedly to transcribe the data into text. The texts were read assigning codes to the data. Categories were generated from the data and quotations from participants became a source of the categories (Mhlanga & Ncube, 2012). Categories of data were labelled according to emerging themes on the implementation of e-learning in primary schools, and analytic notes for each category were written in order to identify questions that needed to be answered. More data were collected and analysed to refine the categories (Creswell, 2014).

## **1.9 TRUSTWORTHINESS IN THE ASSESSMENT OF E-LEARNING**

The trustworthiness of this research was ensured by applying the four criteria of credibility, transferability dependability and confirmability. These are discussed in detail in section 4.6 of chapter 4.

## **1.10 ETHICAL CONSIDERATIONS**

Since educational research focuses mainly on people, the researcher is ethically responsible for protecting the rights and welfare of the participants in the study (McMillan & Schumacher, 2010). To add to this, ethical consideration in research means that researchers have a moral responsibility to conduct the study in an accurate and honest manner. Daniel (2016) states that ethics is about professional regulations and codes of conduct that guide the researcher in dealing with participants. Ethics are critical to the success or failure of an educational research (Daniel, 2016). The researcher observed ethical guidelines as described in section 4.7 of Chapter 4.

## **1.11 THE RESEARCHER'S ASSUMPTIONS**

The study and the purposive sampling of participants was informed and based on the following assumptions:

- i) Public schools in Harare were implementing the Ministry of Primary and Secondary Education's National ICT policy and competence-based curriculum as key drivers to e-learning implementation.
- ii) Teachers faced challenges in e-learning implementation.
- iii) School systems influenced teacher implementation of e-learning at primary school level.
- iv) Teachers were computer literate and were able to integrate ICTs with their teaching strategies.
- v) School authorities in the form of School Development Committees (SDCs) availed the funds to install e-learning packages in the schools' computers.
- vi) Learners were familiar with, and capable of using a variety of technological tools.
- vii) Heads of schools were role models in the implementation of e-learning technologies.

## **1.12 DELIMITATION AND LIMITATIONS OF THE STUDY**

Delimitation refers to the setting of limits or boundaries within which the study is to be conducted (Dimitrios & Antigoni, 2019; Ndawi & Maravanyika, 2011).

### **1.12.1 Delimitation**

This study took place within Harare Metropolitan of Zimbabwe. The study targeted only public primary schools in the seven districts that constitute Harare Province. The study used primary schools and their heads as well as teachers who implemented the competence-based curriculum, a key driver to the use of ICTs and e-learning implementation. Heads of schools were included to recruit participants but the actual implementers were the teachers. This was a strategy for recruiting participants in qualitative research by using gatekeepers (Andoh-Aurthur, 2019). Three heads of the three schools were purposively selected for interviews and observation. Nine teachers from these schools were interviewed, and lessons they conducted observed. These were the participants who played an important role in implementing MoPSE policies in the classroom. The participants were suitable for the study as they were involved in the day-to-day interactions in the schools, and so could provide first-hand information.

The goal of this qualitative analysis was not to generalise, but to provide a richly contextualised assessment of e-learning implementation in the research sample. Based on the findings of this research, the next step was to find out the extent to which these findings could be extrapolated and extended to other Zimbabwean well-resourced schools that have e-learning facilities for teaching and learning.

### **1.12.2 Limitations**

Limitations relate to the potential weakness or limitations of methods and procedures used to achieve expected results. These are factors beyond the control of the study (Magwa & Magwa, 2015). The limitation of this study was the comprehension of the topic itself. When the researcher shared the research topic and scope with participants, most of them could not differentiate e-learning and the use of the ICTs in teaching and learning. This is also because the term e-learning has not been conclusively defined. Its definition depends on the writer's view and purpose for the study. This is dealt with in Chapter 2. The researcher acknowledges that a thin line exists between the two subject matters, as one cannot be implemented without the other. For e-learning to take place, ICTs have to be used. The mitigatory measure taken against this pitfall was that the researcher triangulated data collection techniques. This resulted in the researcher obtaining data from interviews, document analysis, and non-participant observations, which helped to address the purpose of the study.

## **1.13 CHAPTER DIVISION**

This thesis has seven chapters that are arranged as follows:

### **1.13.1 Chapter 1: Orientation**

This chapter introduces the research project and the overall argument why the study was undertaken. The background information highlights the benefits or value of e-learning in education systems in order to improve the quality of teaching and learning and realise acquisition of skills is presented. The problem statement and sub-questions covered the need to conduct this study. This was followed by the formulation of the aim and objectives of the study and a discussion of the research methodology used to answer the research

questions and achieve the research aim. The chapter concludes with an outline of the thesis and a summary of the main points from the chapter.

### **1.13.2 Chapter 2: E-Learning in teaching and learning**

This chapter is a review of literature on e-learning. It starts with an overview of Zimbabwe's education system, and highlights the context within which the programme being assessed is implemented. The chapter proceeds to unpack the concept of e-learning, starting with its definition and the various types of e-learning. The theories of e-learning are discussed, paving the way for a review of models for e-learning implementation. The next section of the chapter draws lessons from experiences of the implementation of e-learning from various countries such as the United States of America, Turkey, Australia, Malaysia, Kenya, Zambia, and Zimbabwe.

### **1.13.3 Chapter 3: The Theoretical framework**

This chapter presents the theoretical framework guiding the study. It starts by discussing the purpose of a theoretical framework, which provides guidance at all levels in the choices the researcher makes from the statement of the problem, to crafting of research questions, all the way to the research design and methodology, data collection, analysis and interpretation. The theoretical framework informs the philosophical standpoint and the view of the world thereby helping the researcher to understand, not only the decisions made in the research process, but also why they are made. The theoretical framework guiding this study was based on the interpretivist paradigm. This is largely due to the predominantly qualitative nature of the study. The TPACK model was adopted as the theoretical framework guiding this study.

### **1.13.4 Chapter 4: Research design and methodology**

This chapter discusses the plan for carrying out the study, and reveals information on how to go about examining the implementation of e-learning. The rationale for empirical investigation is presented, then the research paradigm to address the research question. The research design for this study is an exploratory and qualitative case study analysed through qualitative methods. The qualitative descriptive case study approach was

adopted in order to competitively address the demands of the research question. Methods for carrying out this study are discussed and justified in Chapter 4. These include the selection of participants, data collection and analysis, and measures for ensuring trustworthiness in qualitative approaches. Procedural and situational ethical issues undertaken to make sure the findings are derived in an honest and truthful manner are also discussed in this chapter.

#### **1.13.5 Chapter 5: Presentation and analysis of data**

The aim of this chapter is to report on the findings of the assessment of e-learning implementation in primary schools. Findings from document reviews, observations and interviews with teachers and school heads as the implementers of e-learning, are presented in this chapter. These responded to the key research questions on the determinants of e-learning implementation and, in particular, the three questions on the models being used in the implementation of e-learning in the schools. They also indicated how the school system affected teacher implementation of e-learning, and the competences needed for effective implementation of e-learning.

#### **1.13.6 Chapter 6: Interpretation and discussion of findings**

Interpretation and discussion of data is done in this chapter. Repetitive themes allowed the researcher to organise the data thematically. Themes captured in interviews with nine teacher participants and three school principals, as well as the analysis of documents pertaining to e-learning usage in the schools, are considered.

#### **1.13.7 Chapter 7: Summary, conclusions and recommendations**

The chapter presents a summary of key empirical research findings. The chapter also provides answers to initial research questions, and gives research conclusions. Areas for further study are recommended in this chapter.

## **1.14 SUMMARY**

This chapter set out the background to the study by giving details on how the researcher identified the gap which needed to be researched. The problem underlying the study was identified, and the aim and objectives were presented. The research methodology was set out and briefly explained. The research instruments that the researcher used; the processes that were followed; the philosophical thinking behind the processes; and the logistical arrangements for data collection and capturing, and data analysis, were briefly discussed. Important considerations regarding ethical issues and the trustworthiness of findings were also discussed. These were followed by an outline of the chapters, with a brief explanation of what each chapter focuses on.

The next chapter is a review of literature related to e-learning implementation.



## **CHAPTER 2: LITERATURE REVIEW**

### **2.1 INTRODUCTION**

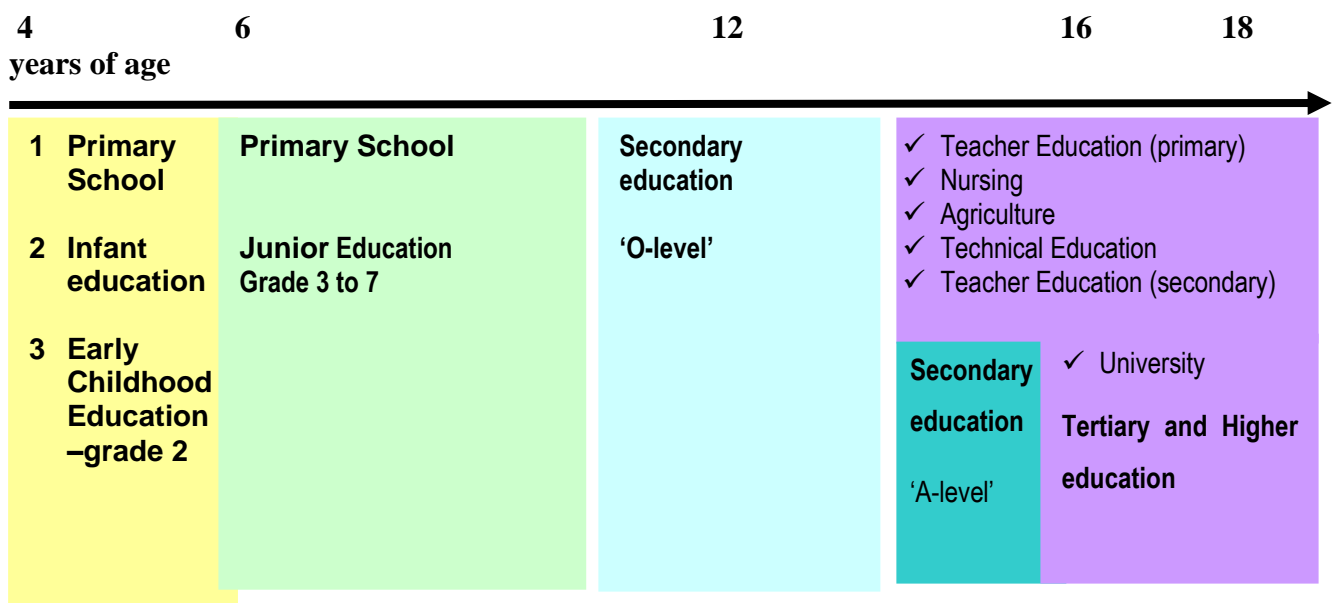
This chapter is a review of the literature on electronic learning (better known as e-learning) in education. The first part provides the context in which the research is undertaken; defines e-learning; and discusses the types, theories and approaches to e-learning implementation in an educational setting focusing on primary schools. In the second part, the researcher explores how some countries have implemented e-learning, with a view to learn from their experiences and identify gaps in both the implementation and literature on the subject. It is these gaps in literature that the researcher hopes to fill and advance knowledge on the implementation of e-learning in primary schools in Zimbabwe. Success factors for e-learning implementation in the school system are highlighted, and the researcher investigates the implementation of e-learning from as early as primary school. A summary of the main issues raised concludes the chapter.

### **2.2 CONTEXTUAL FRAMEWORK**

#### **2.2.1 An overview of Zimbabwe's education system**

Zimbabwe has many languages and diverse cultures, with English considered the official language of instruction in most learning areas in the primary schools. Sixteen indigenous languages are used from Early Childhood Development (ECD) to Grade 2 (infant education), depending on the most dominant indigenous language where the school is situated (Education Act, 2019). Education follows a 9-4-2-3/5 system, that is, nine years of primary school (ECD to Grade 7), four years of secondary, two years of advanced high school, and then three to five years of college or university (MoPSE, 2015).

The education system can be visualised as follows:



**Figure 2.1: Zimbabwe’s education system**

On Zimbabwe’s attainment of independence from Britain in 1980, primary education was made free and compulsory (Rudhumbu, 2014; Mupinga, Burnett, & Redmann, 2005). As part of government’s commitment to fulfil its obligation of every child’s access to education stipulated in the ruling party’s manifesto, private schools mushroomed throughout the country. Education became accessible to all, regardless of gender, socio-economic background, or geographical location. With the continued movement of people from rural to urban areas in search of employment, urban schools began to over enrol. Although the ideal teacher-learner ratio is 1:20; 1:25 and 1:40 for ECD, grade 1 and 2, and grade 3 to 7 respectively; some classes went up to 50 or 60 learners. Some schools in the low-density areas, where facilities were generally believed to be of a high standard, recorded enrolment figures above 60 learners per class. Both education quality and inclusion under those conditions became missed targets, over and above other challenges already bedevilling the education sector.

The last major inquiry into the education system was done through the Presidential Commission of Inquiry into Education and Training (CIET) of 1999 (commonly referred to as the Nziramasanga Commission). The major aim of the exercise was to restore quality, and align education and training with the constantly evolving needs of the country. The CIET report recommended far-reaching changes needed in the education system.

However, due to the economic crisis bedeviling the country for decades, the proposed reforms have had very little chance of being implemented thus far (Chirume & Ofori-Attah, 2016).

The CIET report recommended changes that were – and still remain – relevant to the needs of the country. First, it recommended nine years of compulsory basic education for all, instead of seven years (junior school). This phase was to be geared towards teaching life skills and entrepreneurial skills that lay the foundation for a higher education (vocational, technical or academic). Secondly, it proposed a review of curricula to a competence-based system with a clear framework of the relevant learning areas, and a better link to the needs of industry. Lastly, it proposed the use of computers for teaching and learning in all educational institutions, laying the foundation for the adoption and implementation of e-learning.

Despite the tardy adoption and implementation of the recommendations, attributed to the poor state of the economy and the constantly changing political priorities, Zimbabwe showed positive signs of taking up the recommendations by reviewing the primary and secondary school education curriculum. The reviewed curriculum was adopted and operationalised in 2015; nearly two decades later. Among the many changes to the education system, ICT was introduced as a subject from primary school level.

The national ICT policy developed by the Zimbabwean government, and adopted in 2005, came as a precursor to the new developments in education. According to Isaacs (2007), the policy was informed by a Harvard University-guided e-readiness survey, recommendations of the Nziramasanga Commission of 1999, the National Science and Technology Policy of 2002, and Vision 2020. Findings from the survey indicated that the country was not e-learning ready, and needed to invest in the development and use of ICTs across all economic sectors. In particular, the National ICT policy promoted the use of technology in education (Isaacs, 2007). The promotion of ICT in education marked the commencement of transformation of education through technology, with ICTs growing to become an important driver of e-learning and digitalisation (Tunmibi, Aregbesola, Adejobi, & Ibrahim, 2015).

The initiative by the Office of the President to provide schools with computer related equipment was embraced as part of the catalyst for the use of ICTs in education (The Zimbabwe Mail, 2017). The initiative targeted schools in the most remote areas of the country. Despite the good initiative, it resulted in the unequal provision of IT resources in the schools, nonetheless. In addition, the *Zimbabwe Mail* (2018) published that no evaluation was conducted to ascertain the extent to which the equipment was put to its intended use. Furthermore, reports from the media consistently suggest that much of the ICT equipment remains untouched and sealed in boxes, some two decades after it was donated, literally becoming obsolete before it was used (The Zimbabwe Mail, 2018).

## **2.2.2 MoPSE and school documents on e-learning implementation in primary schools**

### **2.2.2.1 *The Curriculum Framework for Primary and Secondary Education 2015-2022***

In the handbook, the national curriculum framework of Zimbabwe is articulated. E-learning implementation is also highlighted in the curriculum framework. The framework sets out the common aims and objectives of the education system, and the specific features of different education levels. It provides the basis for a transparent relationship between schools, parents, and local communities. It also provides guidance to schools and education administrators on the organisation, management and evaluation of the effectiveness of school activities.

This framework sets out what learners are expected to know, understand, value and do as a result of their learning experiences in schools. Its fundamental purpose is to provide a structure around which schools can build educational programmes that ensure learners achieve desired outcomes. It is intended to guide schools, teachers, and parents or guardians over the curriculum process in a rapidly changing environment (MoPSE, 2015)

### **2.2.2.2 *The Commission of Inquiry into Education and Training (1999)***

A team led by Professor Caiphas Nziramasanga conducted an inquiry and gave feedback to the government. The report gave recommendations on what could be improved in the

Zimbabwean education sector. A document analysis of the report helped me to understand the recommendation on e-learning to the education sector. The analysis is included in Chapter 5 and a discussion of the findings in Chapter 6 of this study.

### **2.2.2.3 *The Education Act***

The Education Act, as amended in 2019, was gazetted and came into force in 2020. Perusal of this document helped to grasp what the act stipulates in the promotion of the use of e-learning as a learning strategy in education at primary school level (The Government of Zimbabwe, 2020).

### **2.2.2.4 *Syllabus***

The syllabus articulates the learning objectives, the expected outcomes, learning content and the recommended teaching and learning approaches. It also includes assessment strategies in a body of knowledge and learning. It is an aspect of the curriculum, which itself is guided by the framework (MoPSE, 2015). There are a number of syllabi in the primary school according to learning areas taught at infant and junior levels of the primary school.

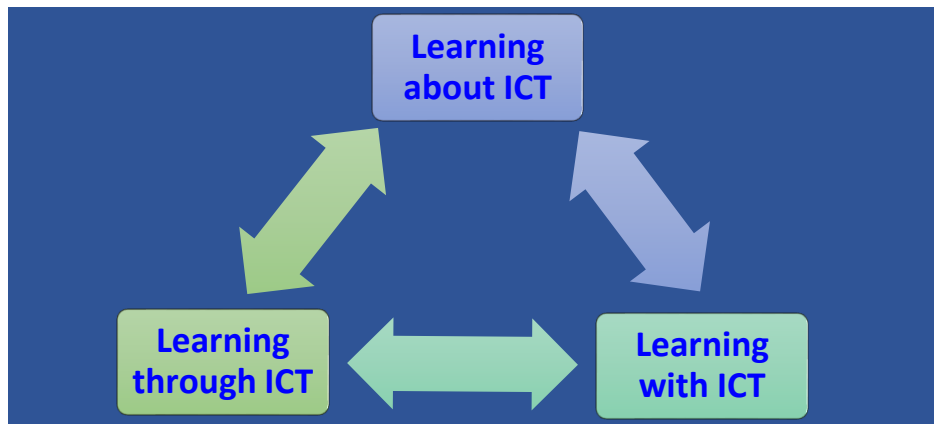
Having laid the foundation and situated e-learning within the education system of Zimbabwe, the following sections unpack the concept of e-learning, including definitions of e-learning, types of e-learning and models of e-learning implementation, among other areas. First, a framework for assessing the integration of ICTs in teaching and learning is discussed.

## **2.3 UNDERSTANDING E-LEARNING**

### **2.3.1 A framework for assessing the integration of ICTs in teaching and learning**

A point of departure in understanding e-learning is appreciating the three ways in which the use of ICT in teaching and learning may be approached. These three ways were propounded by the Irish National Council for Curriculum and Assessment (NCCA), as

learning about ICT; learning with ICT, and learning through ICT (NCCA, 2005). Figure 2.2 illustrates the 3 approaches:



**Figure 2.2: Approaches to using ICT in teaching and learning (NCCA, 2005)**

In learning about ICT, teachers and learners develop knowledge and skills on the potential uses of ICT to support learning (NCCA, 2005). This is arguably the first stage towards the integration of ICTs in the school curriculum. It takes the form of the theoretical lessons about ICTs, though with a bit of practical exposure subject to resource availability. Learners are taken through processes of knowing the computer, both the hardware and software components. The result is that learners know the functions of a computer and are able to identify the different components, if assigned to do so. Depending on the depth of content covered at this stage, both the learner and the teacher begin to see potential opportunities to transform the teaching and learning environment. However, the researcher was of the view that teaching and learning about ICTs, particularly in rural schools, is still abstract; going only as far as merely appreciating ICTs.

According to the NCCA (2005), 'learning with ICTs' involves bringing ICT resources into the classroom to transform the teaching and learning environment. This is a massive transition towards the integration of ICTs in the curriculum. Both learners and teachers access and use the ICTs in the processes of teaching and learning (NCCA, 2005). The researcher considers this an advanced stage of using ICTs for teaching and learning closest to the implementation of e-learning in the school curriculum. It is the opinion of the researcher, subject to inquiry, that the majority of primary schools, particularly those

in rural areas in Zimbabwe, are yet to advance to this level of integration of ICTs in teaching and learning.

Learning through ICT is the use of ICT resources to transform the process of learning in new ways (NCCA, 2005). Logically, this is the most advanced level in the integration of ICT in teaching and learning, in which learners and teachers can be physically separated. However, they connect through the internet, with instructional material transmitted through the internet as well.

It is important to note that the use of ICTs in teaching and learning in such ways does not follow a continuum: there can never be marked points indicating learning about ICTs starts from here and ends there; or that learning with ICTs takes over and so no. The three levels tend to be inter-related and mutually supportive (Vertiz-Osores, Perez-Saavedra, Faustino-Sanchez, Vertiz-Osores, & Alain, 2019). For instance, learning about ICTs is foundational to advancing to the level of learning through ICTs. Both teachers and learners need basic knowledge of computer hardware and software to derive the maximum benefit from the gadgets when they are brought into the classroom to support the teaching and learning processes. The researcher contends that it is learning through ICT, which best fits the description of e-learning; a concept which shall be unpacked in the next subsection.

The researcher believes that understanding these three levels of using ICTs in teaching and learning provides a framework for assessing a country or school's level of progress in the implementation of e-learning. It is the researcher's view that declaring that a school is not yet implementing e-learning but has advanced to the level of learning with ICTs, would provide a different analysis to simply asserting that no e-learning is taking place in the school.

The next section provides an operational definition of e-learning as applied in this study.

### 2.3.2 Defining e-learning

Electronic learning, or e-learning refers to teaching and learning using modern methods of communication such as the computer and its networks, various audio-visual materials, search engines, electronic libraries, and websites, whether accomplished in the classroom or at a distance (Gul, 2015). E-learning is arguably one of the most popular and innovative teaching approaches currently used in many schools globally. The e-learning approach revolutionised the processes of teaching and learning (Gul, 2015). Scholars and researchers from diverse backgrounds have provided several definitions of e-learning. Coman, Tîru, Mesessan-Schmitz, Stanciu and Bularca (2020) attribute the multiplicity of definitions of e-learning to the complexity of the concept. The scholars propose that e-learning simply means using information and computer technologies and systems to build and design learning experiences (Coman, Tiru, Mesessan-Schmitz, Stanciu, & Bularca, 2020). Bilal (2015) offers a similar view of e-learning, describing it as a concept that uses electronic media represented through internet, compact discs (CDs), mobile phones, or even television; to provide distance teaching and learning.

Other views say that e-learning is formalised teaching that is necessitated by electronic resources. While teaching can be based in or out of the classrooms, the use of computers and the Internet forms the major component of e-learning (Rodrigues, Almeida, Figueiredo, & Lopes, 2019). Simply put, e-learning is the delivery of education through electronic media. This definition is similar to that of Ngwu (2015), who e-learning as learning that takes place using computer technology. Together, definitions proposed by Rodrigues et al. (2019), Ngwu (2015) and Bilal (2015) demonstrate the fact that that the delivery of learning material in e-learning takes places through electronic means. Examples for such media include television, radio, the internet, compact discs read-only memory (CD-ROMs), digital versatile discs (DVDs), and online video streaming. Some established researchers who share the same perspective about e-learning are of the view that, through e-learning, learners acquire new knowledge and skills as information and learning is delivered electronically, anytime and from any place (Al-Zoubi, Salam, & Suashini, 2016).

Machumu (2016) provides an elaborate and extensive definition of e-learning. The scholar refers to the HOW, WHAT and WHY of e-learning. He asserts that the “e” in e-learning



refers to “HOW” the course is digitalised so that it can be stored in electronic form. The “learning” in e-learning refers to “WHAT” the course includes. This means the content and ways to help people learn it. The “WHY” refers to the purpose, which is to help individuals to achieve their educational goals. Machumu’s definition appeals to the researcher to consider e-learning as a gradual transformation of ways in which teachers deliver knowledge, and how learners acquire this knowledge. As both the learner and the teacher have access to information, e-learning requires teachers and learners to transform their relationship, expecting them to work together as partners in search for knowledge and learning (Machumu, 2016).

Clark and Mayer (2011) refer to e-learning as the lectures and practical activities delivered by instructors to learners through any technological mode for the purpose of promoting learning. Similarly, Nichols (2003) defines e-learning as learning accessible strictly using technological tools that are web-based, web-distributed, or web-capable. Common in these two definitions is the observation that in e-learning, learning is facilitated using technological gadgets with internet connectivity. This is congruent with the view of Arkorful and Abaidoo (2015), whose definition intimates that e-learning is internet-enabled or computer-enhanced learning. Solangi, Shahrani and Pandhani (2018) reinforce this position through their assertion that e-learning is facilitated using digital tools supporting the use of a wide set of applications such as interactive learning packages, web-based learning environments, communication applications such as e-mail, discussion rooms, chats, and video conferencing. Arkoful and Abaidoo’s (2015) definition posits that the internet should be available and accessible for e-learning to occur.

In contrast with the views of Arkoful and Abaidoo (2015), that e-learning requires internet connectivity, Tonui and Korossi (2016) opine that e-learning is not a term unique to online learning or online education. For example, in a study conducted in Zambia, Phiri and Mbobola (2018) attest that Grade 6 learners used tablets to learn mathematics. The study took place in rural Zambia where there was no connectivity to allow web-based learning or online learning. The researcher notes that even though the tablets were used offline with installed software, this is still considered as e-learning. Learners could still access the learning resources and activities through some electronic gadget, without necessarily being connected to the internet. This is in line with the expanded definitions of e-learning

offered by Bilal (2015), Ngwu (2015), and Rodrigues et al. (2019), which consider electronic media not necessarily connected to the internet. Emerging from this is the argument that the term 'e-learning' cannot, therefore, be restricted to 'web-enabled', 'web-based', 'internet-based', or 'internet-enabled' mediums, although these are most widely used for e-learning.

The definitions above clearly point to lack of consensus among researchers and scholars on what e-learning is exactly. This is largely because the field of e-learning is not only diverse, but also still relatively in its infancy. This is a potential area for further scientific inquiry, with its operations taking different routes from one geographical space to another. This will be shown in the various case studies of e-learning implementation from different countries, discussed later in this review. What remains clear, however, is that all forms of e-learning, whether applications, programmes, objects and websites, provide a platform through which teaching and learning is transmitted for the benefit of the recipients (Moore, Dickson-Deane, & Gaylen, 2011).

In their observation and analysis of the ways in which e-learning is implemented, Mutua and Ng'eno (2016) bring an interesting dimension to the understanding of the concept of e-learning. The scholars purport that e-learning can be implemented in two ways. First, teaching material is delivered without resorting to face-to-face interaction with the teacher. Secondly, it can be implemented using a combination of technology and the traditional face-to-face teaching. This analysis evinces that the concept of e-learning is nebulous, multi-dimensional and, therefore, it would be irrational to expect a single, standard definition of this learning approach. The term e-learning is often defined based on what an individual intends to achieve.

Summing up, the researcher observes that e-learning uses different types of electronic media such as computers, radios, televisions, cell phones, tablets or iPads. However, for all these to function well for effective transmission and delivery of learning material, internet connection plays a vital role. It acts as a conduit between the source of the learning material and the recipient (the learner). It is however important to note that this type of teaching and learning can be facilitated either online or offline and/or remotely. For the purpose of this study, the researcher defines e-learning as an instructional teaching and learning strategy that is delivered using a wide range of electronic media.

The next section explores the various types of e-learning to deepen the understanding of e-learning beyond just its definition.

## **2.4 TYPES OF E-LEARNING**

Alghathani (2011) avers that there are two types of e-learning, namely computer-based e-learning and internet-based e-learning. Each type is discussed in the subsequent sections.

### **2.4.1 Computer-based e-learning**

Computer-based learning is described as any kind of learning that uses computers. Computer-based e-learning has an instructional paradigm, which uses computer technology to deliver training or educational materials to users (Machumu, 2016). This means it takes the form of a set of instructions programmed in the computer, which guide learners on the learning activities they will engage in as they interact with the computer. According to Machumu (2016), this type of e-learning takes advantage of the interactive elements of computer software, along with the computer's ability to present many kinds of media. It is however the researcher's view that what determines the effective implementation of computer-based e-learning is the availability of infrastructure and power supply. The source of power and the necessary software to run applications on the computer should be made available. This becomes a challenge to operationalise computer-based e-learning in remote rural areas where power supplies are invariably a perennial challenge as confirmed in a study by Horton (2011).

In a study on the implementation of e-learning in Tanzanian schools, Horton (2011) found that most of the rural schools had a shortage or a total lack of computers, ICT literate personnel, telephone infrastructure, and sources of electrical power. All these are the key components of computer-based e-learning. The lack of infrastructure, equipment, power supply and, most importantly, internet connection, are the known challenges facing rural areas (Horton, 2011).

Phiri and Mbobola (2018) presented a different case study to computer-based e-learning in rural areas. This was a 4-year longitudinal study aimed at establishing the impact of e-

learning emerging technologies on pupils' academic performance, focusing on grade six (6) learners from rural schools of Zambia. The study employed a case study research design, and a correlation analysis to establish the relationship and its magnitude between the use of emerging technologies in the teaching and learning processes and pupil's academic performance. Fifty-eight (58) participants (pupils) formed the 'experimental group', while forty-two (42) pupils from the same school formed a 'control group'.

Although the school was purposively selected, participants in both the experimental group and control group were randomly selected. The experimental group received tablets uploaded with teaching and learning resources that could be accessed offline. The tablets were solar-powered, which was considered an innovative approach to address the challenges associated with power supply in most rural areas. Data were collected using observations of practical mathematics lessons in classrooms supplemented by semi-structured interviews and content analysis. Thematic analysis and SPSS were used to analyse qualitative and quantitative data respectively. In their findings, Phiri and Mbobola (2018) reported a significant improvement in academic performance of learners in the treatment group, which they attributed to the blended teaching and learning environment, pupil-centred approach, as well as interactive and engaging lessons provided by e-learning and ICTs.

Based on the above discussion, the researcher is of the view that, notwithstanding the implementation challenges associated with computer-based e-learning, such as availability of requisite computer infrastructure and sources of power, computer-based e-learning has the potential to transform the learning environment, as demonstrated in a Zambian case study (Phiri & Mbobola, 2018). It is helpful if the implementation takes into account the common challenges of computer-based e-learning, and offer solutions to power shortages and internet unavailability, as was done in the Zambian case.

Computer-based e-learning is associated with two concepts, namely computer-managed instruction (CMI) and computer-assisted instruction (CAI). These are discussed in detail below.

### **2.4.1.1 Computer-managed instruction (CMI)**

According to Abaidoo and Arkorful (2014), computer-managed instruction (CMI) is an instructional approach whereby the computer is used to provide learning objectives, learning resources, and assessment of learner performance. This means the management of the teaching and learning process, and all instruction, is done by the computer. Computer-managed instruction helps the instructor to manage instruction without physically teaching. Computers are employed to store and retrieve information, to aid and manage education (Abaidoo & Arkorful, 2014). Al-Atabi and Al-Noori (2020) add that, in a CMI, computers are used to manage and assess learning processes. Computer-managed learning systems operate through information databases. These databases contain bits of information the student has to learn, together with a number of ranking parameters, which enable the system to be individualised according to the preferences of each student (Al-Atabi & Al-Noori, 2020).

Based on the above discussion, the researcher observes that, even under computer-managed instruction, the role of the teacher is still relevant in the teaching and learning process. Information or instruction is designed and entered in the computer systems by the teacher, to manage all kinds of educational activities. While the computer is a useful aid to the teacher, it does not completely replace the teacher.

The next section presents literature associated with computer-assisted learning.

### **2.4.1.2 Computer-assisted learning (CAL)**

Computer-assisted learning (CAL) – also known as computer-assisted instruction (CAI) – uses electronic devices such as computers to provide educational instruction to support learning (Al-Zoubi, Salam, & Suashini, 2016). According to A-Atabi and A-Noori (2020), CAI is another type of e-learning that uses computers together with traditional teaching. Bhalla (2013) asserts that CAI is an interactive instructional technique that uses computers to present instructional material and monitor learning. The primary value of CAI, as noted by Al-Atabi and Al-Noori (2020), is interactivity. By utilising various methods such as quizzes and other computer-assisted teaching and testing mechanisms, CAI allows students to become active learners instead of passive learners. Computer-

assisted training methods use a combination of multimedia such as text, graphics, sound, and video in order to enhance learning. Most schools, both online and traditional, use different variations of computer-assisted learning to facilitate the development of skills and knowledge in their students (Al-Atabi & Al-Noori, 2020).

The researcher observes that computers have become assistants to the teacher in delivering learning material. An assistant, takes over some of the tasks of the one he/she is assisting. As an assistant to the teacher, it provides feedback to the learner and keeps track of their performance through the available software (Voogt & Knezek, 2008).

In Nigeria, Ngwu (2015) used a quasi-experimental design to examine the effect of e-learning on learners' interest in basic statistics. Three schools that participated in the research were purposively selected, with learners randomly selected to participate in two groups: the experimental and control groups. The experimental groups used computer-assisted instruction to learn while the control groups followed the conventional way. The results revealed that the experimental group had higher mean interest than the control group. The study recommended that teachers be exposed to e-learning in teaching and learning, and training of the e-learning innovation should be continuous (Ngwu, 2015).

Ural and Ercan (2015) are of the opinion that teachers and learners' skills of using computers should be developed so that both acquire skills required to utilise computer-assisted instructional material in the teaching and learning process. However, it is critical to also consider factors affecting the implementation of e-learning at any level of schooling, as it is critical that teachers acquire competent skills and are also competent to use ICT in their teaching (Ural & Ercan, 2015).

In another study, Chang, Sung and Lin (2006) investigated a computer-assisted system named MathCAL. The study was designed based on a problem solving model characterised by the following stages: making a plan, executing the plan, and reviewing the solution. The researchers used a sample of 100 grade 5 learners at primary school level. The learners completed a range of elementary school mathematical problems. Findings indicated that MathCAL was effective in improving the performance of learners with lower problem solving ability (Chang, Sung, & Lin, 2006).

Based on the discussion above, the researcher opines that the implementation of e-learning from primary school could be helpful. E-learning may encourage learners to develop life-long learning skills and advanced capabilities to learn on their own as they progress to secondary and higher institutions of learning. Literature seems to favour the implementation of e-learning in high schools, as the paucity of literature covering primary schools is evident. Most researchers have explored the implementation of e-learning in secondary schools or institutions of higher learning (Ghimiray, 2017; Moakofhi, Leteane, Phiri, Pholle, & Sebalatheng, 2017; Al-Azaurel, Parslow, & Lundquist, 2016; Arkorful & Abaidoo, 2015; Adeoye, Oluwole, & Blessing, 2013; Alghathani, 2011). This is despite the argument by Hwang, Yang and Kim (2013) that e-learning was first adopted in primary schools well before higher institutions. In the next section, the researcher explores the second type of e-learning, namely the internet-based learning.

#### **2.4.2 The internet-based learning**

In this type of e-learning, teaching and learning content is made available through the internet. The mode of learning through the internet may either be fully online learning or a blended approach. Dhull and Arora (2017) observe that online learning encompasses a range of technologies such as the worldwide web, email, chat, new groups and texts, audio and video conferencing delivered over computer networks. Siemens (2005) and Harasim (2012) posit that moving teaching and learning to the internet and large scale networked education is beneficial. Some of the benefits of internet-based learning include overcoming barriers of distance and time, economies of scale, and novel instructional methods (Dickenson, Hall, & Courduff, 2016).

Online mode of teaching and learning applies two techniques to deliver material as discussed below.

##### **2.4.2.1 Synchronous e-learning**

Synchronous e-learning is teaching and learning that occur at the same time, but not in the same place (Tabak & Rampal, 2014). Kokoulina (2020) simply describes it as any learning activity in which all learners participate simultaneously but are not in the same place. All learners are online at the same time and engaged in the learning at the same

time with the instructor (Piskurich, 2006). Salmon (2013) contends that the learning environments in synchronous e-learning provide real time interaction, which can be collaborative in nature, incorporating e-activities.

Synchronous e-learning employs various forms of televisual, digital, and online learning in which learners learn from teachers, colleagues, or peers in real time, but not in person. Learners are not physically in one place, but are connected through computers, phones and other gadgets that allow for video and sound recording, transmitted through the internet. Msila and Sethako (2012) note that in synchronous learning, learners use chat rooms when they all are logged in at the same time.

Fortunately, synchronous online learning provides a perfect response to the challenge of physical separation of learners, as learners connect and can work collaboratively on an assignment together in real time, irrespective of the distance separating them. The connection among learners and their involvement in collaborative work bode well with the connectivist theory, which is discussed in section 2.5.2.

#### **a) The benefits of synchronous e-learning**

Synchronous online learning has been credited with a myriad of benefits. According to literature, synchronous learning gives students the opportunity to participate in meaningful face-to-face online interactions (Harris, Mishra, & Koehler, 2009; Hrastinki, 2008). It allows learners to ask and teachers to answer questions instantly, and learners to interact with fellow students and instructors, rather than learning in isolation (Hrastinski, 2008). Synchronous e-learning takes place through lectures, discussions and online tutorials. Different ways of interaction, sharing and collaboration, flexibility and personalised learning opportunities in real time online are offered (Higley, 2013). However, it requires setting aside a specific time slot in participants' busy schedule in order to be virtually present (Hrastinki, 2008).

Tabak and Rampal (2014) point out that the approach allows learners to work in groups, even for a short time, to coordinate and organise their group efforts. That way, synchronous online conferencing can be very valuable for collaborative projects that learners can be assigned. For example, grade 7 learners can collaborate on a given



continuous assessment learning activity during school holidays in partial fulfilment of the requirements of their summative assessment. Continuous assessment learning activities (CALAs) are projects given to each learner in every primary school subject after learning a concept or topic to reinforce what has been taught, and to allow learners to apply what they would have learned theoretically to real life situations. This is a way of nurturing critical thinkers and problem solvers for the upcoming generation to address the challenges bedevilling modern societies in all facets of life.

Chauhan (2017) notes that synchronous e-learning commonly supported by media, such as video-conferencing and chat, has the potential to support e-learners in the development of learning communities. This is perhaps not applicable to learners in primary schools as learning communities require a higher level of maturity, self-organisation and commitment. Chauhan (2017) further asserts that learners and teachers experience synchronous e-learning as more of a social activity, and avoid frustration by asking and answering questions in real time. Furthermore, Chauhan (2017) adds that synchronous sessions help e-learners feel like active participants rather than isolated and passive participants. Isolation can be overcome by more continued contact, particularly synchronously, and by becoming aware of themselves as members of a learning community, rather than as isolated individuals communicating with the computer (Dorsah & Alhassan, 2021; Chauhan, 2017).

Another benefit of synchronous e-learning is that, as learners work online, they become more disciplined as they log in on time for scheduled meeting and classes. Online synchronous learning is credited with overcoming the limitations of space, time and distance for collaborative activities (Tabak & Rampal, 2014). A further suggestion by Tabak and Rampal (2014) is that online synchronous conferencing can be used to complement traditional classroom teaching and learning techniques.

## **b) Limitations of synchronous e-learning**

Papadima-Sophocleous and Loizides (2016) identify two limitations of online synchronous e-learning that account for its low uptake by instructors. The first one is that of large enrolments in online programmes reducing the chance for effective online interactions. The second one is about instructors who believe that asynchronous forms

of communication, such as access to course material by simply clicking on course website links, are not enough for communication provision.

Chauhan (2017) asserts that synchronous e-learning is strictly technology-based. This means a lack of technical knowledge, poor computer skills, inability to handle the various technologies involved in synchronous learning would greatly frustrate and discourage online learners, leading to high dropout rates. In addition, synchronous e-learning demands high speed internet connection. Synchronous learning requires a good bandwidth, and this could be an issue with the generally unreliable internet bandwidth strengths in Zimbabwe. The challenge can even get worse when trying to provide synchronous instruction to people residing in different parts of the world via collaborative learning technologies, as different bandwidth capabilities may create serious problems (Dorsah & Alhassan, 2021)

Another challenge with synchronous e-learning is in local time barriers. As noted by Moser and Smith (2015), synchronous learning eliminates barriers of distance, but not barriers of time. Different time zones can create communication challenges as a synchronous learning course requires both learners and teachers to be online at the same time. This is, however, not a challenge for most Zimbabwean learners and teachers as they are normally in the same country almost always.

Both Moser and Smith (2015) and Chauhan (2017) are of the view that synchronous e-learning requires careful planning. It requires that schedules be carefully managed to avoid conflict. Coordination of schedules is necessary, but sometimes not possible. To ensure participation in a synchronous learning programme, one needs to carefully plan meetings. However, different time zones can lead to very limited timeframes.

This discussion about synchronous e-learning indicates that all things being equal, e-learning can be an effective substitute to face-to-face teaching, particularly in this disruptive time of the COVID-19 pandemic. Teachers and learners will not experience the feeling of distance that separates them. The real time experience of exchanging communication makes both the teacher and learners feel that they are together in the same virtual space, despite being physically apart. Some examples of synchronous e-learning tools are Zoom, Google Classroom, Microsoft Teams, and webinars. These

allow the teacher to monitor the participation and involvement of all learners, including maintaining discipline as learning progresses. This characteristic is not available in asynchronous scenarios.

#### **2.4.2.2 Asynchronous e-learning**

Asynchronous e-learning is used mainly for content management systems, where users access information at different times without real time collaborations (Nichols & Anderson, 2005). When a learner has access to pre-packaged material, they can use it at their convenient time and location (Ghimiray, 2017; Nichols & Anderson, 2005). In this space, learners are not required to log in at the same time (Msila & Setlhako, 2012). There is no set time for learning to be occurring. Learners can learn from anywhere and can use their time to gain knowledge of what they want to know and when they need to know (Misbah, Fatima, Hussain, & Ayesha, 2017). Teachers and learners' interactions occur at different times and different locations. Asynchronous e-learning involves self-paced learning. It therefore offers links to reference materials in place of live instruction (Perveen, 2016).

Cube (2014) argues that asynchronous e-learning has progressed from one-to-one form of communication through media such as radio or television broadcasts to the current trend of diverse networks such as Facebook, Twitter, WhatsApp and Google. The teacher in the e-learning environment becomes a consultant, trainer, advisor and helper of the learner, moderator of discussions, knowledge assessor, and evaluator (Romi, 2017). The other role of the teacher in asynchronous e-learning is to upload content. However, teachers need to be conversant with the use of ICT devices, be competent in the use of ICTs, and have the ability to work on the devices, upload the content, as well so as to execute duties and facilitate learning.

##### **a) Benefits of asynchronous e-learning**

Chauhan (2017) argues that asynchronous learning respects factors affecting regular attendance of online training courses, and ensures that they are accessed and completed at different times for each learner, thereby improving learning outcomes. The above is echoed by Berry (2017) who notes that asynchronous students benefit from being able

to log into their course and complete work at a convenient time to them. It is much more flexible than the more rigid synchronous teaching and learning structure. Allowing learners to learn at their own pace, with the freedom to choose when and where they can learn, can be motivating. The researcher, however, cautions that this too, is dependent on the level of maturity of learners, and may not be the most suitable approach for those at primary school levels, unless they are under the care of an adult at home to motivate them to work.

Berry (2017) and Chauhan (2017) point out that asynchronous e-learning offers learners complete control over their learning. As already alluded to, in this method, everyone is allowed to decide how, when and where to learn. Furthermore, not only distance, but also time barrier is eliminated as interaction takes place according to personal schedules. Another related benefit of the approach is that it respects one's own learning preference. Asynchronous learning gives learners time to reflect on, or join online discussions. The asynchronous learning solution can benefit even learners with poor learning skills, by allowing them the ability to take their time to complete responses and even develop their critical thinking skills.

Asynchronous e-learning comes with convenience. It is the ideal learning solution as it does not require learners to be online at a specific day or time. Learners can communicate with their online teacher or virtual classmates at their own convenience, and instantly have access to information, online training for assignments and other online resources (Chauhan, 2017).

#### **b) *Limitations of asynchronous e-learning***

Hrastinski (2008) and Berry (2017) share the view that, if e-learners seldom meet face-to-face, and teachers mainly rely on asynchronous e-learning; learners might feel isolated and not part of learning communities, which would compromise collaboration and learning. Furthermore, when comparing the smaller to the larger class, it is difficult to get asynchronous discussions going with few participants, a finding supported by previous research (Berry, 2017).

Asynchronous e-learning lacks instant feedback. Feedback in e-learning is essential as it helps both learners and teachers address issues and misunderstandings related to any aspect of the learning programme and instruction. In an asynchronous learning system, instant feedback is impossible, as the online training course is not live, and learners may waste valuable time waiting for their questions to be answered by their teachers (Chauhan, 2017).

Moser and Smith (2015) argue that asynchronous e-learning lacks personal interaction. Personal interaction among participants is eliminated in the asynchronous learning system. According to Chauhan (2017), the lack of personal interaction can cause lack of motivation. Lack of live interaction can disengage and demotivate learners, who may need encouragement and stimulation in order to log in, read the material, and complete online assignments. In fact, procrastination is more likely to occur in an asynchronous learning environment.

Based on the above discussion, the researcher opines that the efficacy and applicability of this type of e-learning with primary school learners would be questionable and a challenge. This is due to the ages of the learners and level of maturity with regards their capacity to handle, adapt to, and focus on this type of learning. By its nature, with learners working and managing their own learning independent of the teacher's supervision, asynchronous e-learning requires a high level of learning management skills, competencies, focus and responsibility, which are not always evident in the young learners in primary schools.

In the next section, some theories of e-learning relevant to this study are introduced in order to understand e-learning and how learning occurs in e-learning environments.

## **2.5 THEORIES OF E-LEARNING**

Arguably the greatest scientist of all time, Albert Einstein (1879-1955) once said it is theory which decides what we can observe. In this study, it is theory which provides the basis for analysis and assessment of implementation of e-learning. In this section, the researcher briefly introduces three theories of e-learning relevant to this study, namely constructivism, connectivism and heutagogy.

### 2.5.1 Constructivism and e-learning

Rooted in learning theories advanced by Dewey (1916), Piaget (1972), Vygotsky (1978), and Bruner (1990), constructivism learning theory is defined as active construction of new knowledge based on learners' prior experience (Koohang, Riley, Smith, & Shreurs, 2009). Constructivism implies that learners demonstrate understanding and form meaning using a combination of their own existing knowledge base, their actions, and their individual experiences. In other words, newly acquired information builds upon previously obtained knowledge to construct broader understanding. Knowledge acquired by the learner is not therefore pre-specified, and evaluation of learning is more subjective, since it does not rely on explicit quantitative criteria (Duke, Harper, & Johnson, 2013).

Secore (2017) observes that constructivism acknowledges the learner's active role in the personal creation of knowledge, the importance of experience (both individual and collective) in this knowledge creation process, and the realisation that the knowledge created will vary in its degree of validity as an accurate representation of reality. This implies that learners should be at the centre of the teaching and learning process, and should be allowed room to think for themselves and contribute to the learning process. Nikolovska, Grizev and Iliev (2019) also concur that learners should be allowed to construct knowledge rather than to be given knowledge through instruction. The construction of knowledge includes the use of both physical and intellectual learning activities (Shah, 2019).

In a study on e-learning implementation in rural schools in Zambia, Phiri and Mbobola (2018) used constructivism as a guiding theory for their research. Their study identified two types of constructivism, that is, the individual based on personal self-concept, belief system and experience as proposed by Jean Piaget, and the other by Vygotsky (1978) based on social interaction, and focused on sharing views among peers. Phiri and Mbobola (2018) acknowledge that learner-centred education is core in the teaching and learning processes. According to the constructivist theory, each learner is unique. This means each learner is different in a special way and tends to understand the world around them differently. This implies that multiple realities exist in the learners' minds. Learning should therefore consider this and allow learners to explore and use their abilities to process information in order to create personalised knowledge, which makes more sense

to them. This can be done through the learners' interaction with peers and environment, based on their own experiences. Phiri and Mbobola (2018) further argue that learning is better defined as meaning making rather than others-imposed memorising. This sense-making can be facilitated by the inclusion of e-learning in education as a way to apply the underlying principles of constructivism (Phiri & Mbobola, 2018).

According to Kalpana (2014), the environment in a constructivist class is democratic and is centred on the learner, and the curriculum is negotiated and not imposed. Learners participate freely in the creation of new knowledge, either individually or through interaction with the peers or significant others (educational e-learning tablets) or even the environment, but based on their prior experiences. The teacher in this environment just facilitates the activities and guides the learners on their journey to discovery of new experiences. E-learning comes in constructivism as a medium to facilitate the learning-how-to learn process by eliciting learners' curiosity. This leads them into critical and analytical thinking, resulting in discovery (Kharade & Thakkar, 2012).

### **2.5.2 Connectivism and e-learning**

Siemens (2005), one of the early pioneers of Massive Open Online Courses (MOOC), is credited with developing the theory of connectivism. According to Siemens (2005), the theory of connectivism argues that effective learning occurs when individuals learn and work in a networked environment. Furthermore, Siemens (2005) asserts that including technology and connection-making as learning activities takes learning theories into the digital age. Individually, humans can no longer experience and acquire learning that is needed, but rather derive their competence from forming connections (Siemens, 2005). This means that the idea of connection and being in a network is central to connectivism. The author also notes that connectivism is driven by the dynamic of information flow. This means that the way information is passed from source to intended targets is key to connectivist learning.

Siemens (2005) acknowledges the dynamism of information and how it is constantly changing. This, according to him, is what drives connectivism; the understanding that decisions are based on rapidly altering foundations. New information is continually being acquired. The ability to draw distinctions between important and unimportant information

is vital. The ability to recognise when new information alters the landscape based on decisions made yesterday is also critical.

The researcher views the recognition of important and unimportant information as a possible challenge as it implies handling information with uttermost caution to avoid being misled. This points to the need for regulating e-learning environments, especially for young learners in primary school. These may not have the capacity to discern and separate right from wrong information. According to Banihashenm and Aliabadi (2017), in connectivism, there is a belief that learning environments are complex and chaotic, and cannot be divided into simplified parts, but should be viewed as a whole and live organism. This implies using a systems approach to understanding the learning environment, realising the complexity associated with the relationships that exist among learners, between learners and the teacher; and between teaching and learning material and everything that is part of the whole system. The key idea is connectedness of the individual elements of the entire system (Goldie, 2016).

### **2.5.3 Heutagogy and e-learning**

Heutagogy is a holistic approach that develops learner capabilities, with learning as an active and proactive process (Agonacs & Matos, 2019). Learners serve as “the major agent in their own learning, which occurs as a result of personal experiences” (Hase & Kenyon, 2007, p. 112). According to Hase and Kenyon (2016), heutagogy refers to the concept of ‘truly self-determined learning’, which they, interestingly enough, do not actually define. Jones, Penaluna and Penaluna (2019) aver that learning starts with the individual’s interests and motivation, which creates a focus area for new learning that is independent of an educator. One of the main features of heutagogy is its ability to offer new knowledge required in the interconnected world of today (Brown & Mbatl, 2015).

Heutagogy is undergirded by assumptions grounded in humanism and constructivism (Neelen & Kirschner, 2020). The fact that the learner is central to the learning process is a humanistic concept. Similarly, constructivism is based on the notion that people construct their own versions of reality using past experience, their own knowledge, and their current experience (Nikolovska, Grizev, & Iliev, 2019). Heutagogy echoes the same



tenet as constructivism and related learner centred theories, that learning is centred on the learner.

Hase and Kenyon (2007) believe that heutagogy is an appropriate learning approach which serves the needs of learners in the twenty-first century. In their view, people live in a world of abundance of readily available and easily accessible information. Thus, learners should be given the opportunity to research and source information themselves. This ought to reduce the load of work for teachers as they would be working and sharing knowledge with learners. Hase and Kenyon (2000) predict that discipline-based knowledge would no longer be appropriate for today's communities when they share and work closely with learners.

Learners must be allowed to determine, not only what they want to learn, but also how they will learn it, when they will learn, and sometimes even decide how they will be assessed. The researcher, however, notes that this is not possible with learners from primary schools, who require guidance and scaffolding due to their low maturity levels. Although Blaschke (2012) contends that the responsibility of learning lies with the learners, the question is whether the input provided by learners towards the curriculum and/or learning will be relevant to what should be learnt. Will learners at primary school level be self-determined to learn? Blaschke and Hase (2016) claim that successful *heutagogy* requires an environment that allows the students to wander and reflect about the content of learning, the learning process, its impact (double-loop reflection), and themselves as *learners* (triple-loop reflection) (Blaschke & Hase, 2016).

Heutagogy is a form of self-determined learning. Blaschke (2012) describes self-determined learning as a process in which learners take initiative for identifying learning needs, formulating learning goals, identifying learning resources, implementing problem-solving strategies, and reflecting upon the learning processes to challenge existing assumptions and increase learning capabilities. This learning requires engagement and social interactivity between students, as well as between students and teachers (Sethlako, 2021).

The concept of self-determined learning forms the core of heutagogy. It is the researcher's view that, generally, the direction being taken by education systems in the

21<sup>st</sup> century and beyond requires to be undergirded by the principles of heutagogy (Shuhidan, Hashim, Hakim, Shuhidan, & Mannan, 2021). It is pertinent to note that heutagogy has been attributed to higher learning institutions (Jezreel, 2016; Snowden & Halsall, 2016), but the basic concepts need nurturing from the very onset of learning. Hence, its relevance in this study (Snowden & Halsall, 2016).

Stoszkowski and McCarthy (2018) carried out a study that explored the perceptions of final year undergraduate students on the learner attributes required for (and resulting from) heutagogical learning. This was part of an 18-month long 'innovation in teaching and learning' project, funded by the Higher Education Funding Council for England. The study adopted a case study design in which data were collected at two UK universities using an online survey. The intention was to elicit students' perceptions and experiences of a module designed using heutagogical principles. Thirty-five students (9 females and 26 males) completed the survey. Results indicated that foundational knowledge, skills and attitude are a requirement for, and an outcome of heutagogical learning. This means as heutagogy is basically self-determined learning, learners must have the knowledge, skills and attitude to drive and manage their own learning. This raises a big question on the applicability of heutagogy to learners in primary schools, most of whom would not have reached sufficient levels of maturity to develop these skills and attitudes (Stoszkowki & McCarthy, 2018).

The next section presents some models of e-learning implementation in primary schools, highlighting their strengths and weaknesses and what previous research suggests about them.

## **2.6 APPROACHES TO E-LEARNING IMPLEMENTATION**

The researcher observes that the use of electronic media, technological tools or ICTs as a means through which both teaching and learning could be facilitated has arguably been trending now more than ever before, particularly following the effects of the global Covid-19 pandemic. The manner in which learning with and through technologies could be implemented comes in varying forms. This has prompted the need to explore the various approaches of implementing e-learning as part of this literature review. In an evaluation of e-learning effectiveness and experience in Saudi Arabia, Alghathani (2011) discovered

three distinct ways of using e-learning in education, namely the adjunct approach, the blended e-learning approach and the wholly online approach. The following section presents these three approaches of e-learning implementation.

### **2.6.1 The adjunct e-learning approach**

Ghavifekr and Rosdy (2015) describe the adjunct e-learning approach as a continuation of the traditional learning process where teachers and learners communicate beyond school hours. In other words, learners and teachers communicate with each other outside the walls of a classroom. The adjunct approach enriches and empowers the traditional learning processes with technological resources such as computers. Bhalla (2013) confirms that the model introduces learners to the use of computer communications media in the teaching and learning process. In this case, the barrier of physical distance is minimised. This approach plays the role of an assistant in the traditional/ conventional classroom (Arkoful & Abaidoo, 2014) and provides learners with relative independence (Alghathani, 2011).

In a study conducted by Chin, Tjahjono, Rutledge, Lambert and Deboever (2019) to evaluate the use of e-learning resources as an adjunct to teaching and learning, nineteen final year medical students participated. Participants were randomly allocated into the intervention group with additional e-learning resources (Group A) and control group (Group B) where no additional resources were allocated. The study followed the mixed methods approach and assessed learners' knowledge using objective structured examinations and standardised forms for objective scoring. A questionnaire was also used to assess learner feedback on the e-learning resources. Findings indicated that the use of e-learning resources to complement the traditional teaching and learning process was effective. While the majority of students in the control group failed, those in the intervention group were able to pass the assessment tests. This was attributed to a lack of supplementary learning resources in the control group, provided to learners in the intervention group (Chin, Tjahjoo, Raymond, Lambert, & Deboever, 2019).

The study concluded that learners with access to online e-learning resources performed better than those who were not afforded the learning resources. The results also

suggested that interactive online e-learning resources are valuable in supplementing teaching in schools. The findings affirm observations from a related study, where Lochner, Wieser, Waldboth, and Mischo-Kelling (2016) established that the use of e-learning adjunct model in traditional classes enhances learning experience, and increases learners' engagement with the content (Lochner, Wieser, Waldboth, & Mischo-Kelling, 2016; Babic, 2011).

### **2.6.2 The blended e-learning approach**

Blended learning is a combination of off or online learning with face-to-face instruction (Means, Toyama, Murphy, Bakia, & Jones, 2010). It is used interchangeably with terms such as 'hybrid', 'mixed', 'integrative', 'flipped classroom', and 'flexible' learning. Griffin (2014) opines that, due to the varied nature of blended learning understanding, there is a lack of a clear and common definition. Blended learning uses a combination of technology via internet and the traditional face-to-face teaching and learning (Bonk & Graham, 2006). The course materials and explanations are shared between traditional learning methods and the e-learning method in the classroom (Gul, 2015). In addition, Bonk and Graham (2006) argue that blended e-learning has been, and is still being used mainly in the higher education systems to improve the teaching and learning process. Thus, the blended e-learning model is not new in many institutions of higher learning though it seems it is used sparingly.

Alsaaty, Carter, Abrahams, and Alshameri (2016) conducted a comparative study aimed at comparing traditional teaching and online learning among minority business students at a university. The study employed a survey design as a method of study. The survey showed a high percentage of the students who claimed they assimilated more information in face-to-face classes than online. The students who participated in the study positively commended their overall online learning experience. Although, they claimed to have encountered some difficulties while using e-learning platforms, it was nonetheless an insightful learning undertaking (Alsaaty, Carter, Abrahams, & Alshameri, 2016).

In a quantitative study, Rovai and Jordan (2004) compared the fully online, the face-to-face, and blended learning approaches. It was observed that learners doing blended learning created the strongest sense of community, as evidenced by higher

connectedness and mean learning scores. This was due to the combined strength associated with blended teaching and learning, which draws from the positive attributes of both face-to-face and online elements (Rovai & Jordan, 2004).

Kintu, Zhu and Kagambe (2017) conducted a related study aimed at determining the effectiveness of blended teaching and learning. Findings from the study showed that the learners' characteristics, and design features were potentially important for an effective blended learning environment. Performance by gender showed a balance, with no significant differences between male and female. Other characteristics like self-regulation and a positive attitude towards blended learning, all accounted for the learner's success and attainment of better learning outcomes. Next to learner characteristics were design features, such as technology quality, online tools and face-to-face support, which emerged as key predictors of learner satisfaction (Kintu, Zhu, & Kagambe, 2017).

The observations from the two studies vindicate the claim by Griffin (2014) that blending the traditional teaching approaches with learning technologies is advantageous. It allows more interaction between the teacher and learners, and among learners, than in face-to-face classroom instruction (Griffin, 2014). Drawing from this, it is the researcher's opinion that teachers should identify learning areas that need face-to-face interaction, those that can be done online, and those that need both.

In the next section, the fully online model is discussed.

### **2.6.3 The fully online e-learning approach**

The fully online e-learning approach is learning that takes place using the internet (Nguyen, 2015). In this approach, interaction takes place through network communications such as the World Wide Web (www), a local area network (LAN), and the computer. This approach of e-learning is devoid of the traditional learning participation or the classroom participation. All teaching and learning activities are done online, as noted by Zeitoun (2008) and Algahtani (2011). This means it is not combined with any other supplementary approaches. In using this learning approach, learners experience 'total independence' working in their own preferred space, most likely at home (Algahtani, 2011).

Palmer and Holt (2009) cite a case in which the fully online e-learning experience was assessed based on the views of the learners concerned. Following the mandatory inclusion of at least one fully online unit of study in all undergraduate programmes at Deakin University, a large 'experiences of learning online' (ELO) survey was undertaken, to gauge learners' perceptions of studying using the fully online mode. A multivariate linear regression of all the questionnaire items was performed against an overall satisfaction item. Five items were found to significantly contribute to a model that explained approximately 70% of reported learner satisfaction. Factors that were found to positively influence learner satisfaction with studying a fully online unit primarily related to how confident they felt about their ability to communicate and learn online, having a clear understanding of what was required to succeed in the unit and how well they thought they were performing in the unit (Palmer & Holt, 2009).

Coman, Tîru, Mesessan-Schmitz, Stanciu and Bularca (2020) carried out a study to determine the preparedness of both learners and the education institution to implement fully online e-learning education. The study sought the perceptions of learners regarding the utilisation of fully online learning during the COVID-19 pandemic. It also inquired the learners' capacity to assimilate information, and the use of e-learning platforms. The study utilised an online survey based on a semi-structured questionnaire. Data were collected from 762 learners from two of the largest Romanian universities. The results of the research revealed that higher education institutions in Romania were not prepared for exclusively online learning. The hierarchy of online learning problems changed during the crisis caused by the COVID-19 pandemic. Technical issues were observed as the most important, followed by teachers' lack of technical skills and their teaching style not being appropriately adapted to the online environment. The last factor was a lack of interaction between students and teachers or poor communication between them (Coman, Tîru, Mesessan-Schmitz, Stanciu, & Bularca, 2020). The issue of lack of teaching skills were also articulated by researchers in other studies. Training is a crucial factor to determine e-learning implementation (Pushpanathan, 2012)

Zeitoun (2008) goes further to explain that the wholly online approach is divided into the individual and collaborative learning where the collaborative learning also consists of synchronous and asynchronous learning (Zeitoun, 2008). These are briefly discussed below.

### **2.6.3.1 Individual learning**

In this approach, learners are alone and cannot interact among themselves without the teacher (Zeitoun, 2008). When practising individual learning, learners study the learning materials on their own (individually), and they are expected to meet their learning goals on their own. This design shares the same similarities with heutagogical principles, discussed under e-learning theories. The approach places the responsibility for learning in the hands of the learner. The application of this approach to primary school learners is obviously questionable or rather untenable. Notwithstanding the researcher's strong conviction that these heutagogical principles should be nurtured from an early stage, many potential gains are lost in individualised learning. The researcher opined that individualised learning is not ideal for developing communication skills and teamwork abilities in learners. Individualised learning largely focuses on learners learning independently, without communicating with other learners. Communication is a key part of learning. Therefore, an approach that addresses communication skills and abilities is necessary.

### **2.6.3.2 Collaborative e-learning**

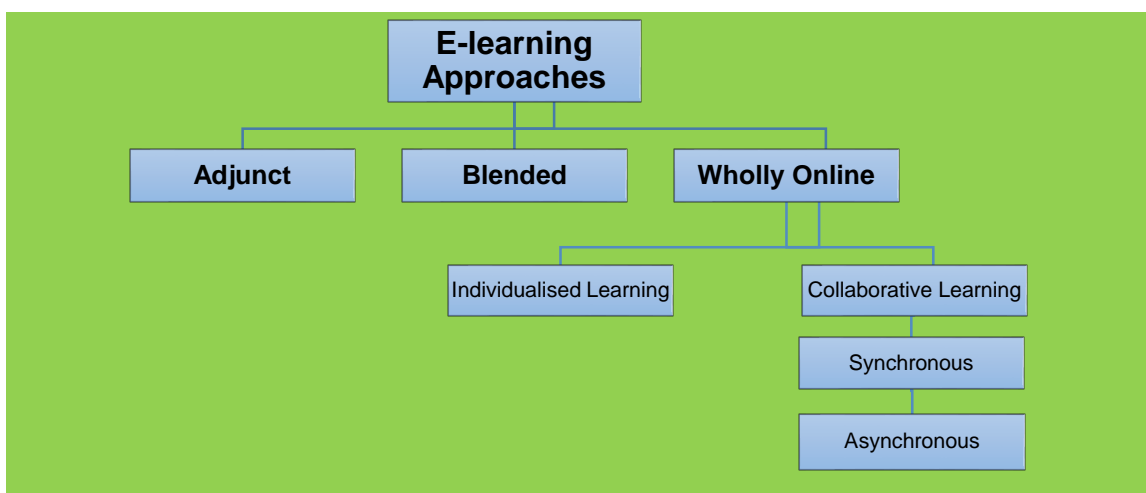
In collaborative e-learning, learners learn together as a group to achieve their common learning objectives (Zeitoun, 2008). Laal and Laal (2012) define collaborative learning (CL) as an educational approach to teaching and learning that involves groups of learners working together to solve a problem, complete a task, or create a product. Dhull and Arora (2018) concur with the above definition and defines collaborative learning as a method of teaching and learning in which students' team together to explore a significant question or to create a meaningful project. A group of learners discussing a lecture or learners from different schools working together over the Internet on a shared assignment are examples of collaborative learning (Apavoo, Suklon, & Gokhool, 2019).

A typical CL environment would be one in which learners are challenged both socially and emotionally as they listen to different perspectives, and are required to articulate and defend their ideas (Laal & Laal, 2012). This develops learners' ability to create their own understanding and conceptual models, rather than rely on an expert's framework. According to Srinivas (2011), learners in a CL environment have the opportunity to

converse with peers, present and defend ideas, exchange diverse beliefs, question other conceptual frameworks, and engage actively.

The researcher notes how important it is to stress how CL is often misunderstood and confused for just any form of interaction among learners. As noted by Laal and Laal (2012), the key idea in CL is that learners help each other to learn. It is not having students talk to each other, either face-to-face or in a computer conference, while they do their individual assignments. It is not having them do the task individually and then have those who finish first help those who have not yet finished. It is certainly not having one or a few students do all the work, while the others append their names to the report.

Summing up, the diagram below presents the models of e-learning as discussed in the section above.



**Figure 2.3: Approaches to e-learning implementation**

(Source: Alghathani, 2011)

The researcher observes that the three approaches discussed above focus on the use of e-learning, and how e-learning can be used and/or accessed. In particular, both the adjunct and the blended approaches are about how e-learning could be used – as an adjunct to enrich the traditional teaching and learning approach – in the first approach, and as a supplementary resource used alongside face-to-face interaction in blended learning. The approach is about how e-learning can be accessed by the learners fully online. Alghathani calls them models of e-learning. Arguably, a model that perhaps is



closest home in terms of assessing the implementation of e-learning is the technology acceptance model. This is presented in Chapter 3 as the researcher deliberates on a theoretical framework guiding this study.

From the discussion above, it is apparent that the different approaches offer different ways of using technology in teaching and learning. The researcher observes that, while the first three approaches (the adjunct, blended and fully online) describe the various ways in which technology can be used to support teaching and learning, addressing the “how” question of implementation – the technology acceptance model could be a useful tool for analysing and assessing the attitudes of both learners and teachers towards the adoption of e-learning. This leaves the researcher with a hanging question: Are attitudes of both teachers and learners a key determinant in the adoption and implementation of e-learning in primary schools in Zimbabwe?

The next section presents specific examples of the implementation of e-learning in developed and developing countries, including Zimbabwe.

## **2.7 E-LEARNING IMPLEMENTATION IN DIFFERENT COUNTRIES**

The global disruption of education due to COVID-19 induced lockdowns compelled many educational institutions to adopt and introduce e-learning as an alternative mode of teaching and learning. The adoption of such an initiative was seen as a way of transforming the culture of teaching and learning, as well as promoting equality in education by bridging the digital divide (Mukosa & Mweemba, 2019; Chalita & Erik, 2011). Arguably, the promotion of equality in education has always been a challenge in many third world countries. It is important to understand that the promotion of equality and the bridging of the digital divide may only be possible if economic injustices are seriously addressed. Nonetheless, e-learning is already an important factor in teaching and learning in many countries. This includes low income earning countries, traditionally deemed to be slow to adopt such innovations. The discussion below focuses on the implementation of e-learning in primary schools in different countries in order to learn from such cases and be guided accordingly as the researcher carried out the research. The choice of countries was based on literature that the researcher could access that assisted in informing this research and; secondly, the placement of the countries

according to economic development. The placement included low income earning countries and high income earning countries. It is highly likely that high income earning countries could have access to e-learning better than low income earning countries.

### **2.7.1 Implementation of e-Learning in the United States of America (USA)**

Gray, Thomas and Lewis (2010) carried out a survey aimed at ascertaining how USA public schools implemented e-learning in the classrooms. This was a national school-level survey administered in districts, schools, and among teachers. A broad range of issues relating to the integration and use of ICTs in the schools were covered. These included computer and internet access and use, as well as procedures to prevent learner access to inappropriate material on the internet. It also looked into issues of teacher professional development on technology use. The study also collected information on leadership and staff support for educational technology within districts and schools. Among other areas, the survey was used to determine the number of computers the schools had for instruction and administrative use, the type, mobility and location of learners. They went further to analyse factors that contributed to effective implementation of e-learning. These included factors such as the availability of technical skills to help fix or restore technical faults, as well as internet access and connectivity (Gray, Thomas, & Lewis, 2010).

Findings from the study revealed that all schools had computers, with at least one computer connected to the internet. The ratio of learner to instructional computer ranged from 3:1 to 1:1. Ninety-seven per cent of the schools had one or more instructional computers located in the classroom and fifty-eight per cent of the schools had laptops on trollies. It was also observed that ninety-one per cent of the computers were used for instructional purposes, and ninety-eight per cent of them had internet access. The operating systems was largely Windows XP (Gray, Thomas, & Lewis, 2010).

The need for teacher professional development in the integration of technology in teaching and learning was also highlighted and recommended by the study. It was generally observed that schools located in affluent communities had an advanced understanding and use of technology compared to schools located in communities that were less privileged economically. It was from this observation that the recommendation

for training of teachers as a crucial element in successful e-learning implementation was made (Gray, Thomas, & Lewis, 2010).

From the foregoing discussion, the researcher notes that appropriate structures should be in place for effective implementation of e-learning. It is important that key stakeholders share a common vision for the adoption and implementation of e-learning in the schools. It is imperative that requisite resources be made available to support the implementation. The key to the implementation of a new initiative is to ensure and assure its buy-in from all stakeholders, particularly from teachers as the agents of change.

### **2.7.2 Implementation of e-learning in Turkey**

In Turkey, e-learning in public primary schools was implemented as early as 2007. The Centre for Digital Education, which led the project, implemented it in phases. This started with a pilot at a school in Ankara district. Teachers were provided with hands-on training through an Intel teacher program. The teacher training program had the objective to prepare teachers to integrate technology in their teaching through educational online content. Schools gave their staff time to learn about technology integration.

According to Intel (2008), the project advanced in four stages. Stage 1 involved the provision of basic ICT training to teachers to enhance their capacity to integrate ICTs in their teaching activities. Teachers received training from the Intel Teach Program, as well as ongoing support in curriculum development and methods for using technology to enhance teaching and learning.

Stage 2 involved the provision of personal computers (PC) labs. Each student was given access to a Classmate PC, a new category of personal computers developed to facilitate teacher-guided and student-centred learning. The PCs were donated by Intel through the ICT for education program. The two pilot classrooms involved in the study were also outfitted with SMART Board interactive whiteboards, and classroom management software from SMART Technologies. A high-speed wireless network was established. Teachers accessed interactive, multimedia content. While students used Classmate PCs, teachers needed more powerful mobile computers to help them develop lesson plans and research curriculum resources, and to collaborate with colleagues. Each teacher in

the program received an Intel Core 2 duo-based laptop which they used for developing lessons and accessing information. They incorporated the technologies and content into some of their mathematics, social sciences, and English lessons.

Stage 3 focused on classroom e-learning, characterised by partial digital curriculum integration, and project-based learning, with wireless internet connectivity in the classrooms. Learner to computer ratio was reduced from the 15:1 in stage 2, to 5:1, with mobile computers on trollies reaching more learners and teachers.

Stage 4 constituted a fully-fledged 1:1 e-learning. This means learner to computer ratio came down to 1:1 where each learner had their own laptop connected to a broad, fast Wi-Fi for internet access. Teaching was more learner-centred and there was complete digital integration in the curriculum. This means that every part of the curriculum was in soft copy, and could be accessed through the computer and internet by both learners and teachers.

Phase 1 of the project was piloted at one school where an environment for e-learning implementation was created. The team conducted baseline assessments of qualitative and quantitative metrics, to evaluate phase 1 of the project. The second phase extended to 16 additional classrooms at three more schools. The project involved 1165 learners and 26 teachers in 18 fourth and fifth grade classrooms (Intel Corporation, 2008).

Findings established significant differences in student learning. Learners with own laptops had more interest in their studies compared to those who had no computers at the school. On sample tests, the pilot classes scored higher than comparable classes in subjects where technologies were used. The e-learning initiative created a positive synergy among the school's staff. Both teachers and learners were enthusiastic, finding that e-learning technologies made teaching and learning easier. Learners, teachers, and school administrators were pleased with the benefits of the 1:1 e-learning project.

The researcher observes the huge support and investment in technology and teacher capacity development initiatives by Intel and partners, as a key success factor in the implementation of e-learning. The multi-stakeholder approach (Intel, SMART Technologies, the Ministry of National Education, schools and others) also accounted for

the success. This project show two determinants of e-learning which are training and resource available. Other studies have also indicated the same (Ouma, Awour, & Kyambo, 2013)

### **2.7.3 Implementation of e-learning in Australia**

In a case study involving three schools, Broadley (2007) explored the e-learning practices in Western Australia. The purpose of the study was to ascertain how educators were using an e-learning environment and what factors affected the successful implementation of e-learning in a secondary school environment. In her background to the study, Broadley (2007, p.1) notes the rapid evolution of technology and advises that, "it is imperative that educational institutions equip students with technological skills that are essential for coping in the wider community. These skills are most effectively gained by learning with technology, rather than about technology". The definition of e-learning applied in the study was simply technology-enhanced learning. The components of resources, pedagogies and delivery are integral to the transformation of teachers' teaching and students' learning (Broadley, 2007).

This study was carried out at a time when the three bodies responsible for education in Australia (government, independent and Catholic schools) were planning to implement strategies to provide e-learning solutions to their schools. As part of the e-learning implementation arrangements, each school employed an ICT management level person who was responsible for the ICT strategic planning and implementation within the school. Although these positions possessed significantly different titles, the incumbents appeared to hold similar responsibilities. The ICT co-ordination level was the second tier of the structure. At Schools A and B, both roles were held by a teacher employed within the school, who performed the ICT co-ordinator duties on a part-time basis. The ICT facilitation level included the teachers who were at the coalface of teaching within the e-learning environment (Broadley, 2007).

A qualitative research approach was used in this interpretive study to investigate e-learning practices in three case study schools. Data were collected through observation and interviews conducted with the teachers and the ICT co-ordinators, to establish their perceptions and experiences of the e-learning environment. The findings of the study

established that successful implementation of an e-learning environment was dependent on four key factors: ICT infrastructure, ICT leadership, ICT capacity of teachers, and the support and training initiatives implemented. These four factors are not hierarchical in nature, but are equally important (Broadley, 2007).

The issue of training was also raised by Kirkwood and Price (2014) in their study in Australia. Although their case was on e-learning implementation in Australia, its focus was on higher education. In the absence of a specific case on primary schools, it is injudicious to conclude that the same factors raised as accounting for successful implementation of an e-learning environment also apply to the primary schools. This opens the door for further studies, specifically those focusing on primary schools.

The next section discusses the case of e-learning implementation in Malaysia, an Asian country. This would assist to get some insight from a different continent.

#### **2.7.4 Implementation of e-learning in Malaysia**

Ghavifekr and Rosdy (2015) carried out a study to assess the effectiveness of ICT integration in Malaysian schools. In Malaysia, the integration of ICT in teaching and learning started in the early 1970's. The country valued technology literacy, which they believed produces a critical thinking workforce to face and involve the country in the global economy. Accordingly, many schools were upgraded with computer labs, internet connection, smart white boards, liquid crystal display (LCD), and other ICT tools and equipment. Despite all these, the problem faced was the teachers' lack of skills and the right aptitude, poor technical support, and instability of the system to implement the policy successfully (Ghavifekr & Rosdy, 2015). A prior assessment of the need for high educational performance by the Malaysian Education Authority raised the incompetence of teachers and inadequateness of hardware and software as critical issues in need of urgent attention. It indicated that the ICT culture in schools needed to be improved with training in the use of ICT among teachers. However, the Malaysian government has continued with its effort to improve and upgrade the ICT systems.

The Ministry of Education launched a comprehensive review of the education system in Malaysia in October 2011. As a response to raise the standards of education in the

country, the government developed a new national education blueprint. The latest one is the Education Blueprint 2013-2025. This blueprint provides a plan for the sustainable transformation of the Malaysian education system until 2025 (Ministry of Education, 2012). This document also includes a plan to raise the role of ICT in the whole education system. In order to complete the transformation mission, the blueprint proposes 11 strategic and operational shifts. ICT has been mentioned on the 7th shift, which requires scaling up quality learning in Malaysia by providing internet access and virtual learning environments via 1BestariNet for all schools by 2013 (Ministry of Education, 2012). It ensures possibilities for maximising the implementation of ICT for self-guided learning (Ghavifekr & Rosdy, 2015).

Against this background, this study sought to analyse the perceptions of teachers on the effectiveness of ICT integration in supporting teaching and learning in the classroom. Two theories, namely diffusion of innovations by Rogers (2003) and technology acceptance model (TAM) by Davis (2004), were identified and adapted to the research setting, as the conceptual framework for the study. The study followed a quantitative research approach in which a survey questionnaire was distributed randomly to teachers from 10 public secondary schools in Kuala Lumpur, Malaysia. The results indicated that ICT integration had been effective for both teachers and the learners. Findings indicated that adequately equipping teachers with ICT tools and facilities were among the main factors in the success of technology-based teaching and learning. It was also found that professional development training programmes for teachers played a key role in enhancing students' quality learning.

The case of Malaysia reflects the importance of political will and government commitment as key factors in successful implementation of e-learning in the schools. The researcher observes that, although this study was based on secondary schools, the policy measures taken by the government were meant for implementation across the entire education system of the country, including primary schools. From the systematic review of the education system to strategic planning for the integration of ICTs in the education system, government was evidently taking the lead in all processes. The researcher also notes the challenges encountered in the implementation of the programme were mainly to do with teacher competences. These were appropriately addressed through relevant teacher professional development interventions.

The next section discusses e-learning in African countries. These countries have generally identical challenges when it comes to e-learning. The countries to be discussed are Kenya, Zambia and Zimbabwe. The case of Zambia has already been presented earlier under the section on computer-based e-learning and shall only be referred to in subsequent discussions.

### **2.7.5 Implementation of e-learning in Kenya**

Maloba, Cheluke and Wesonga (2015) conducted a comparative study on the implementation of e-learning in two areas in Kenya. Kisumu is an urban area while Muhoroni is rural. The study followed a descriptive survey design to establish the level of readiness to implement e-learning in the schools. The target population comprised ten public secondary schools in Rachuonyo districts, which received ICT infrastructure funding from the government. The questionnaires formed the basis for the study analysis, with discussions focusing on the level of readiness in the implementation of e-learning.

In ascertaining the level of awareness regarding their knowledge of ICT devices and whether they owned one or not, participating learners, teachers, and head teachers reported that they were aware and owned different ICT devices. Learners in the schools under study were found to have used ICT facilities for learning, and their sensitivity to e-learning environments helped them build up concepts through their interaction with the ICT devices (Tonui & Korossi, 2016). The main e-learning devices that were available at home and in schools were desktop computers, digital cameras, radios, laptops, and mobile phones, and these were more in the urban areas than in rural areas.

The study also established that, although the exposure to devices for learners in rural settings was low, it did not affect their academic performance. Socio-economic background of parents, the location of the school (urban or rural), the school infrastructure, and personal characteristics of both the teacher and the learners, affected ownership of ICT devices for e-learning (Maloba, Chelule, & Wesonga, 2015). The researcher believes that exposure to ICT devices has a relationship with socio-economic background.



It was also observed that teachers had the necessary technical skills required for e-learning adoption but improvements were required in equipping them with ICT skills for successful e-learning implementation. The study, therefore, recommended that the government and relevant education stakeholders organise ICT training opportunities to enable practicing teachers to develop their technical skills for e-learning adoption in schools.

The case of Kenya highlighted the set of technical competences needed by both the teacher and the learner for effective implementation of e-learning in the schools. Again, the case was not of a primary school, leaving a gap in knowledge on the level of competences needed in learners in primary school for effective implementation of e-learning. While the study alluded to learner competence as a success factor in the implementation of e-learning, it did not break this down to show whether age and learner maturity were factors affecting learner competences. The factor raised was the learner's prior exposure to e-learning technologies, a factor that is not affected by one's age. The other factor raised on the learner was attitude towards e-learning, which is, arguably, not about the age of the learner.

In a different case altogether, Wangari (2016) carried out a study aimed at assessing the readiness of teachers for the implementation of e-learning in schools in Kenya. The study focused on the case of a selected primary school that had received tablets from a law firm in the country as part of the latter's corporate social responsibility. Specifically, the study sought to examine the readiness of teachers for e-learning implementation in primary schools through the use of tablets, and the implications of its adoption. Part of the background to the study was that, most often, evaluators tended to blame teachers for the failure of ICT integration in education, which contributed to the resistance by teachers to change in education (Wangari, 2016). Effective use of tablets by teachers, teacher training on use of tablets, motivation to use the tablets, integration of tablets in the curriculum, sustainability of tablet use, usefulness of tablets, and the ease of use of the tablets were the variables used to measure the e-learning readiness of teachers.

The major finding of the study was that e-learning readiness was affected by all the variables under study, namely effective use of tablets by teachers, teacher training in using tablets, motivation to use tablets, integration of curriculum using the tablets,

sustainability of tablet use, usefulness of tablets, and ease of use of tablets. Statistical tests conducted to establish the relationship between the variables and e-learning readiness revealed a significantly strong relationship between them. This meant that for teachers to be ready for e-learning implementation, interventions geared towards strengthening their capacity to use tablets, their motivation towards use of tablets, and even their perception regarding the use of tablets, are crucial.

While this was a potentially exciting study relating to the implementation of e-learning, the researcher noted a worrying shift in focus in the execution of the study from its design to the final conclusions and recommendation. Normally the researcher would have expected to learn whether primary school teachers in Kenya were ready for e-learning implementation or not, as suggested by the study topic. However, it turned out that the study ended up giving what to work on to get teachers ready for e-learning implementation. Although that was also important, it was a clear departure from the intended focus of the study.

#### **2.7.6 Implementation of e-learning in Zimbabwe**

Konyana and Konyana (2017) carried out a study to establish the feasibility of introducing the use of computers in Zimbabwe's rural schools. The research employed a qualitative case study using interviews, document analysis and observations to source data. Teacher participants were purposively selected from five schools in Chipinge district. The study revealed that technology had not yet been embraced in the schools as teachers were not trained to use the new technology. This caused delay in teachers using computers and introducing them to learners (Konyana & Konyana, 2013).

Konyana and Konyana (2013) observed that some schools made significant progress towards harnessing computer technology in their teaching. Initiatives of this nature were not without challenges. The costs of purchasing and maintaining the computers in the schools were identified as obstacles. Schools located in the remote areas failed to attract qualified ICT teachers and qualified teachers in other disciplines as well.

In another study comparing rural and urban schools, Mavhemwa, Jekanyika and Magomelo (2017) investigated whether access to better quality education could be met

through e-learning. This was qualitative research modelled on the descriptive survey design of ex-post facto open-ended questions and document review. The study population comprised teachers and school heads attending the basic ICT skills training workshops facilitated by the researchers funded by the Higher Life Foundation. Purposive sampling was used to select participants (Mavhemwa, Jekanyika, & Magomelo, 2017).

The study revealed disparities between rural and urban schools in terms of endowment with resources, while confirming that e-learning outcomes in urban areas were way better compared to those in rural schools. Specific findings were that access to e-learning was generally limited in both urban and rural schools. However, learners and teachers in urban schools had better access to e-learning resources than their rural counterparts. The study also found that, while urban areas had better e-learning resources than rural schools, the proportion of teachers with the requisite skills to use them was lower than that of rural schools. Urban schools tended to have senior teachers who were not exposed to basic training in the use of ICTs, while rural schools had younger graduates with ICT competences but without the resources to use for their teaching activities.

The present study presents a strong case for the integration of ICTs in the primary school curriculum as a means to enhance quality, at the same time challenging policy makers to consider the case of rural and urban school inequality in educational opportunities. It also underscores the need for teacher professional development in basic ICT skills as a critical factor for the effective adoption and implementation of e-learning.

## **2.8 FACTORS AFFECTING IMPLEMENTATION OF E-LEARNING AT NATIONAL AND REGIONAL LEVEL**

From the cases discussed above and other literature, a number of factors have been raised as accounting for either the success or failure in the implementation of e-learning programmes in schools. This section summarises the factors affecting the implementation of e-learning.

One major factor that contributes to the successful implementation of e-learning raised through the study of different cases in the foregoing section is that of resources, in this instance, mainly technological resources. In the United States of America case reported

by Gray, Thomas and Lewis (2010), technological resources is a crucial factor. Technological resources encapsulate both the computer hardware and software. In teaching and learning, educational software is very important. The case of Turkey showed that teachers were supplied with computers different from those given to learners in order to meet their functional needs. Additionally, internet is a technological resource that is needed in order to successfully implement online learning. The researcher notes that high-income societies such as the United States and Turkey are more likely to succeed in e-learning implementation than low-income countries such as Zimbabwe and Zambia, among others. Phiri and Mbobola (2018) commented on the issue of inadequate technological resources in Zambia as one major setback to the implementation of e-learning. A difference is observed in the availability of resources between more resourced nations vis –a vis the low-income nations. In the United States and Turkey cases, availability of hardware and internet was not an issue of much concern. While on the Zimbabwe and Zambia case, inadequacy is observed as a major setback to effective e-learning implementation.

Another factor contributing to e-learning implementation is that of teacher professional development. The Turkey case shows that the Intel Corporation took cognisance of that and provided for teacher training. On the contrary, the Zimbabwe case as reported by Konyana and Konyana (2017) revealed that technology had not yet been embraced in the schools as teachers were not yet trained to use the hardware and software in teaching and learning.

In addition to the major factors raised in the foregoing paragraphs, the case of Turkey brought in one factor for consideration. This is the issue of cooperation among all stakeholders. Apart from the education department providing for solutions to the implementation, a company chipped in to facilitate the implementation. Similarly, stakeholder participation seems to lack in the African countries as noticed in the cases selected.

One other interesting indispensable factor is the willingness or commitment by the government to make use of this novel educational delivery mode. In their study of Malaysia, Ghaviekr and Rosdy (2015) stressed this factor. The government of Malaysia, according to Ghaviekr and Rosdy (2015), had a national vision for the adoption and

implementation of e-learning. The government therefore took the responsibility of providing the resources to schools as well as capacitation of teachers.

Lastly, a factor not necessarily pointed out in the case studies is that resistance to change that may emanate from cultural issues. There should be a buy in of the initiative by teachers in order to yield the desired results. This point is articulated by Kaunda, Chemebe and Mukupa (2018). Some of the cultural issues include fear of the defilement of values due to the penetration of internet. The moral decadence that are likely to be brought about by the use of internet may be a barrier to the adoption and use of e-learning in some parts of the world (Abdulrahman & Al-Abdulkareem, 2011). While this may not be an issue in the Western countries, it could be an issue in the Middle East due to religious perceptions or even in Africa.

## **2.9 SUMMARY**

This review of literature on the implementation of e-learning in primary schools started with an overview of Zimbabwe's education system, in which the root of e-learning implementation in Zimbabwean schools was identified as the recommendations of the Nziramasanga Commission of Inquiry into Education and Training (1999). The chapter proceeded to unpack the concept of e-learning, starting with definitions and the various types of e-learning. The next section briefly introduced three theories of e-learning, namely connectivism, constructivism and heutagogy, paving the way for a review of models for e-learning implementation.

The next section sought to learn from practical experiences of the implementation of e-learning through a presentation of various cases of implementation of e-learning in schools. The countries covered were the United States of America, Turkey, Australia, Malaysia, Kenya, Zambia, and Zimbabwe. An important observation was the apparent dearth of literature on the implementation of e-learning in primary schools around the globe, an impetus for this study that contributes to the body of knowledge on the implementation of e-learning in primary schools. The various cases reviewed present success factors and challenges related to the implementation of e-learning. In the next chapter, the theoretical framework that undergirds the implementation of e-learning in schools is discussed.

## CHAPTER 3

### THEORETICAL FRAMEWORK FOR E-LEARNING

#### 3.1 INTRODUCTION

This chapter presents and discusses the theoretical framework guiding the study under investigation. The overarching aim of this study was to assess the implementation of e-learning in primary schools in Zimbabwe. A theoretical framework serves as a foundation for the assessment of the implementation of e-learning in primary schools in Zimbabwe. Like in any study of this nature, a theoretical framework is required to give the reader and programme implementers an understanding of how the assessment was done. The first section of the chapter provides a justification for using a theoretical framework. Three models are deliberated on and the rationale for using the TPACK model is discussed, with a summary of the main issues raised concluding the chapter.

#### 3.2 PURPOSE OF THE THEORETICAL FRAMEWORK

A theoretical framework guides and resonates with every aspect of the research process. This includes defining the research problem, literature review, research methodology, presentation and discussion of the findings, as well as the conclusions that are drawn. This means that a theoretical framework provides a point of reference for every decision the researcher takes at every point in the course of the study, from its design through to data collection, analysis, interpretation and the drawing of conclusions (Adom, Hussein, & Agyem, 2018). This view is shared by Grant and Osanloo (2014) who note that a theoretical framework supports the researcher to make informed decisions regarding the research process, and helps provide the structure to the rationale for the study, the statement of the problem, the research questions, the choice of research methods, and analysis of the findings.

Building a study on some solid theoretical framework informing all stages strengthens it and produces quality research (Yamauchi, Ponte, Ratliffe, & Traynor, 2017). Grant and Osanloo (2014) state that a theoretical framework strengthens the study, while Lederman and Lederman (2015) contend that a research grounded on a sound

theoretical framework is the hallmark of quality research. Using a theoretical framework assures the reader that the study is informed by established theory, and empirical findings are obtained from credible studies (Abend, 2008). This way, a theoretical framework helps in the achievement of credibility, transferability, confirmability and dependability of qualitative data (Kivunja, 2018, p. 48). These concepts are discussed further in Chapter 4.

A theoretical framework provides the researcher with the lens to view the world from various perspectives, which allows a critical assessment of the phenomenon under study (Troudi, 2014). This assessment of e-learning implementation in primary schools in Zimbabwe is a qualitative study undergirded by the interpretivist philosophical paradigm. The researcher believes the study would benefit from a theoretical framework as it provides critical lenses through which the implementation of e-learning in primary schools in Zimbabwe would be considered and assessed (Ravitch & Carl, 2016).

For the reader, a theoretical framework helps to understand the perspective of the researcher in order to further understand the researcher's views, analysis and interpretation (Collins & Stockton, 2018). This means that the reader's questions about the researcher's philosophical standpoint, as well the rationale for their choices are answered by the theoretical framework guiding the study. This helps the reader to understand the researcher's perspective before making any judgment about the study.

In the next section, the technology acceptance/ e-learning acceptance model and the instruction design model are discussed. This is followed by discussing the specific theory used in this study as a framework for the assessment of teachers' competences for effective implementation of e-learning which is the TPACK model.

### **3.3 E-LEARNING IMPLEMENTATION FRAMEWORKS**

Frameworks of e-learning describe where and how technology plays a specific role in supporting learning (Mayes & de Freitas, 2004). They are tools to guide the design and implementation of e-learning programmes. As technology constantly advances, the process of teaching and learning has to equally respond with matching transformations.

Virtual learning environments are gradually taking over. Mayes and de Freitas (2004) note that the physical distance between the teacher and learners, traditionally reduced by the walls of a classroom, seems to be less of an issue in today's world. Attention has rather shifted towards seeking the most effective means of delivering teaching and facilitating learning, taking advantage of the opportunities that technology presents. This is the general direction of education in the 21<sup>st</sup> century. In this section, the researcher discusses three models of e-learning implementation before delving into the model or theory that was adopted in this study in order to widen the horizon of critical thinking when dealing with these theories. The models are also discussed in order to widen the scope of the theoretical framework.

Among the many e-learning implementation frameworks, three have been singled out because the aim of this study is to assess the implementation process. The one that helped most in assessing the implementation is finally discussed in detail as it is more relevant to the teaching and learning process where learning has to be teacher guided. This study looked at primary school level taking cognisance of the relationship between the teacher and the learner.

### **3.3.1 E-learning technology acceptance model (TAM)**

The technology acceptance model (TAM) was developed by Fred Davis in 1989 (Suryawanish & Suryawanshi, 2015). The model argues that the adoption and implementation of a technology-based system, such as e-learning, is a response that can be predicted and explained by user motivation. The model claims that user motivation is a function of the actual features of the system, such as how easy it is to use the system, together with its affordances. Davis (1989) believes that the extent to which people accept the integration of technology can be an essential factor for the success of information systems. The model provides information and explains the relations behind the features of a system, the way people behave while using it, and the attitude that people may have towards using the system. All these are seen as being influenced by the perceived usefulness and ease of use (Lai, 2017).

TAM focuses on the factors that influence a person's general acceptance of computers (Rauniar, Rawski, Yang, & Johnson, 2014). According to Liu, Chen, Sun, Wible and Kuo



(2010), the three main factors of TAM which influence a person's intention to make use of a technology are "perceived usefulness" (PU), "perceived ease of use" (PEoU) and "attitude toward using" (ATU). Generally, people are likely to accept a computer or technological device if they feel that it is useful to their work, it is easy to use, and they have a positive attitude towards the use of the technology (Liu, Chen, Sun, Wible, & Kuo, 2010).

The continued refinement of the model by Davis himself, and its further adoption and adaptation by other researchers, resulted in it gaining prominence as the leading instrument in explaining and predicting system use and implementation (Chuttur, 2009). This has resulted in several studies being carried out using TAM. For instance, Cheng (2011) explored the features that affect e-learning acceptance using TAM. Cheng (2011) concluded that the perceived usefulness, the ease of use, the perceived enjoyment, and individual and social factors are the main determinants of acceptance of the e-learning systems. TAM was also used to investigate teachers' perception of e-learning by the University of Jordan. The study showed that the perception teachers had regarding e-learning, together with their previous experience, affected their behaviour and the way they actually used it (Cheng, 2011).

Despite its growing popularity, TAM has not been spared from criticism. The major criticism of the model is that TAM only gives a general and restricted view on a person's technology acceptance (Liu et al., 2010). Some researchers claim that TAM may have attracted more easy and quick research such that less attention could have been given to the real problems of technology acceptance (Lee, Kozar, & Larsen, 2003). This opens the door for further research on the acceptance of technology as a factor for consideration in the assessment of e-learning implementation. This, together with an understanding of its main assumptions, strengths and limitations, the technology acceptance model remain essential in such inquiries.

The TA model further helps in enlightening the researcher on some factors that determine the implementation of e-learning. However, this model could have been more useful if the scope of the research had been on the learners and teachers. The fact that the researcher focused on teachers as the main participants, the TPACK model prevailed over the TA model.

### **3.3.2 Community of inquiry model**

The community of inquiry model is one of the instructional models among Gagne's nine events of instructional model, ADDIE model and the rapid prototyping model. It was developed by Randy Garrison and Terry Anderson (Suryawanish & Suryawanshi, 2015). It provides a platform where learners can take responsibility and control of their learning through interaction. This then allows for higher order learning. Access to internet and information communication facilities provides support to communities of inquiry.

The three main components of the model are cognitive presence, social presence and teaching presence. These must be considered when planning and delivering an e-learning experience. Cognitive presence refers to the degree to which learners are able to construct and confirm meaning through sustained reflection and discourse. The ability of learners in a community of inquiry to project themselves socially and emotionally is termed social presence (Suryawanish & Suryawanshi, 2015). Apparently, the teaching experience is referred to as the design, while the other two key elements of the community of inquiry model are termed the cognitive and social presence.

The main thrust of this thesis is to assess implementation by the schools and teachers. The model is relevant but does not provide enough parameters for assessment as is given by the e-learning technology acceptance model and the TPACK model. The e-learning technology acceptance model dwells too much on adoption, that is, the attitude towards e-learning technology. This is a partial fulfilment of the requisite elements for assessment. It is therefore the TPACK model which the researcher found quite relevant in this particular research. Nonetheless, there are nuggets that were learnt from studying the other models of e-learning implementation models among those that have been presented here.

It is against this argument that the researcher adopted the TPACK model over other models. In the next section, the TPACK model is discussed and further justification for its adoption given.

### 3.3.3 The technological, pedagogical, and content knowledge (TPACK) model

There is a myriad of theories on the implementation of e-learning. However, for the purpose of assessing the implementation of e-learning in primary schools in Zimbabwe, the TPACK model was adopted. The TPACK model is a framework that allows the creation of active strategies for teaching and learning through the use of ICT (Ozudogru & Ozudogru, 2019; Urban, Navaro, & Borron, 2018; Chua & Jamil, 2014). TPACK can be described as what a teacher must know to effectively integrate technology into curriculum, that is, teacher practices (Kurt, 2018). It represents a combination of teacher content knowledge (CK), pedagogical knowledge (PK), and technological knowledge (TK) (Knolton, 2014). According to Kurt (2018), TPACK allows educators to consider the nature of knowledge required to effectively integrate technology into teaching, and how they can develop that knowledge within themselves (Cejas-Leon, Navio-Gamez, & Barroso-Osuna, 2016).

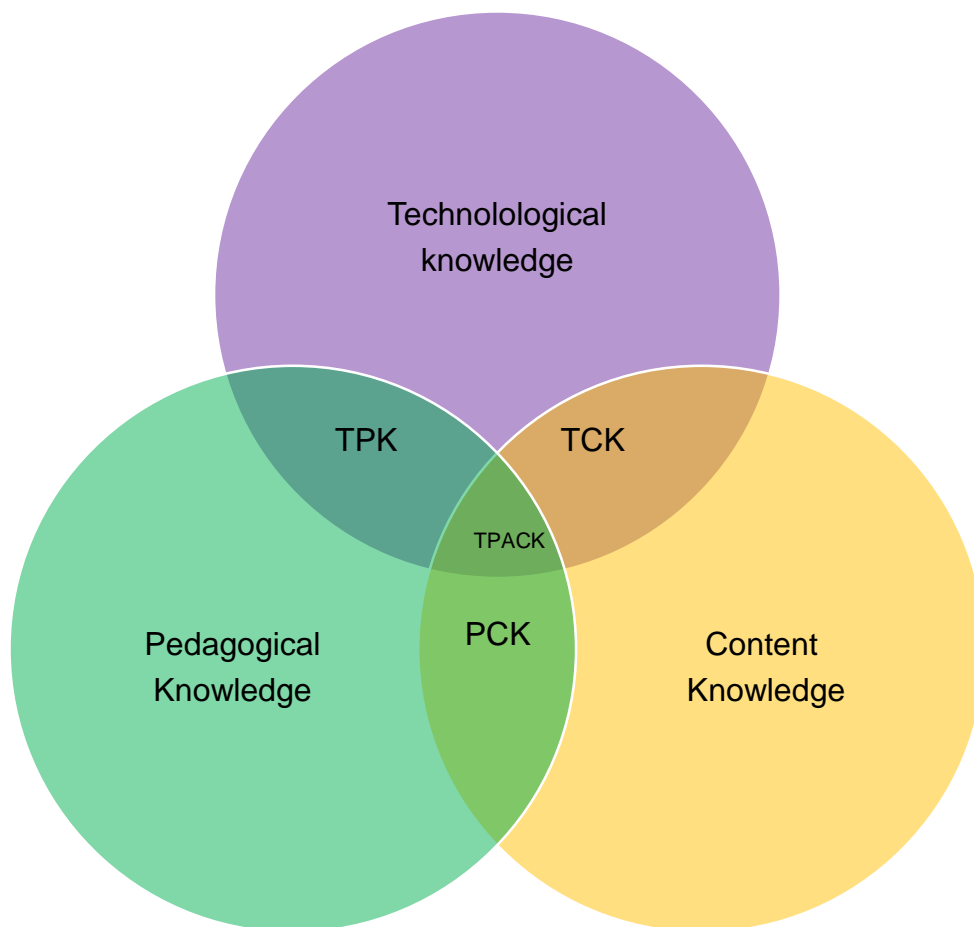
The TPACK model has its origins from the use of pedagogical and content knowledge in the educational field proposed by Shulman (Leiva-Nunez, Ugalde-Meza, & Llorente-Cejudo, 2018). However, it was Mishra and Koehler who developed the TPACK model by integrating technological knowledge with content and pedagogical knowledge (Chua & Jamil, 2014). Since its introduction in 2006, the TPACK model has become one of the leading theories regarding educational technology and its integration, with both research and professional development activities drawing heavily from it (Kurt, 2018). Mishra and Koehler (2006) applied this framework to both pre-service and in-service teacher training and education. The model offers a practical approach to many of the dilemmas that teachers face in implementing educational technology in their classrooms (Kurt, 2018).

Mishra and Koehler (2006) identified TPACK as a framework to guide the integration and implementation of technology in the curriculum and, accordingly, argue that:

*“The basis of good teaching with technology requires an understanding of the representation of concepts using technologies; pedagogical techniques that use technologies in constructive ways to teach content; knowledge of what makes concepts difficult or easy to learn and how technology can help redress some of the problems that students face; knowledge of students’*

*prior knowledge and theories of epistemology; and knowledge of how technologies can be used to build on existing knowledge and to develop new epistemologies or strengthen old ones” (Mishra & Koehler, 2006, p. 1029).*

The TPACK model provides three knowledge areas to consider, namely technology, pedagogy, and content. Using a Venn diagram to represent these three categories helps to see the seven areas that are created in the TPACK framework. Figure 3.1 below shows these seven areas:



**Figure 3.1: Representation of TPACK aspects**  
(Mishra & Koehler, 2006, p. 63).

The various combinations are discussed below.

### **3.3.3.1 Content knowledge (CK)**

Content knowledge (CK) refers to the topics taught in the classes (Cabero-Almenara, Arancibia, & Prete, 2019; Brantley-Dias & Ertmer, 2013). For example, in learning areas such as mathematics, the topics could be numbers, operations, measures, and so on, as articulated in the primary school syllabi. Content knowledge describes teachers' own knowledge of the subject matter. CK includes knowledge of concepts, theories, evidence, and organisational frameworks within a particular subject matter; and may also include the field's best practices and established approaches to communicating this information to students (Kurt, 2018). CK differs according to discipline and grade level. For example, primary school science and technology classes require less detail and scope than undergraduate or graduate courses and; hence, the content knowledge of tertiary instructors should gradually deepen or become broader as the level of learning increases (Cejas-Leon, Navio-Gamez, & Barroso-Osuna, 2016).

### **3.3.3.2 Pedagogical knowledge (PK)**

Pedagogical knowledge (PK) refers to teaching methods (Brantley-Dias & Ertmer, 2013). It describes teachers' knowledge of the practices, processes, and methods regarding teaching and learning. As a generic form of knowledge, PK encompasses the purposes, values, and aims of education, and may apply to more specific areas including the understanding of student learning styles, classroom management skills, lesson planning, and assessments (Salas-Rueda, 2020). E-learning, in this case, can be considered as a teaching and learning strategy or method that teachers should be conversant with, in order to use it.

### **3.3.3.3 Technological knowledge (TK)**

Technological knowledge (TK) refers to the use of ICT in the education field (Cabero-Almenara, Arancibia, & Prete, 2019; Brantley-Dias & Ertmer, 2013). Furthermore, technological knowledge refers to knowledge about various technologies, ranging from low-tech technologies such as pencil and paper, to digital technologies such as the Internet, digital video, interactive whiteboards, and software programs (Shin, et al., 2009). This knowledge describes teachers' knowledge of, and ability to use, various

technologies, technological tools, and associated resources. TK relates to the understanding of educational technology (EdTech), considering its possibilities for a specific subject area or classroom, learning to recognise when it may assist or impede learning, and continually learning and adapting to new technology offerings (Salas-Rueda, 2020) .

#### **3.3.3.4 Pedagogical content knowledge (PCK)**

Pedagogical content knowledge (PCK) refers to what is used to teach the content of the course (Gomez, 2015). According to Kurt (2018), it describes teachers' knowledge regarding foundational areas of teaching and learning, including curricula development, student assessment, and the reporting of assessment results. PCK focuses on promoting learning, and on tracing the links among pedagogy and its supportive practices (curriculum, assessment, etc.) Like CK, PCK also differs according to grade level and subject matter. In all cases though, PCK seeks to improve teaching practices by creating stronger connections between the content and the pedagogy used to communicate it (Kurt, 2018).

#### **3.3.3.5 Technological content knowledge (TCK)**

Technological content knowledge (TCK) refers to the use of technology to transmit the contents of the course (Gomez, 2015). Technological content knowledge is a theoretical framework defined by an emphasis on the “total intersection” between technology and content (Slough & Connell, 2006). It describes teachers' understanding of how technology and content can both influence and push against each other. TCK involves understanding how the subject matter can be communicated via different EdTech offerings, considering which specific EdTech tools might be best suited for specific subject matters or classrooms (Kurt, 2018). Slough and Connell (2006) use the analogy of lenses, one each for technology and content, through which teaching and learning can be viewed. The two components, technology and content become one.

### **3.3.3.6 Technological pedagogical knowledge (TPK)**

Technological pedagogical knowledge (TPK) refers to use of technology in the educational context (Cabero-Almenara, Roig-Vila & Mengual-Andrés, 2017; Gómez, 2015). It describes teachers' understanding of how particular technologies can change both the teaching and learning experiences by introducing new pedagogical affordances and constraints (Kurt, 2018). Another aspect of TPK concerns understanding how such tools can be deployed alongside pedagogy in ways that are appropriate to the discipline and the development of the lesson at hand (Mishra & Koehler, 2006).

### **3.3.3.7 Technological, Pedagogical and Content Knowledge (TPACK)**

Technological, pedagogical and content knowledge is the result of these various combinations and interests. It draws from the three larger underlying areas of content, pedagogy, and technology in order to create an effective basis for teaching using educational technology (Kurt, 2018). In order for teachers to make effective use of the TPACK framework, they should be open to certain key ideas. Concepts from the content being taught can be represented using technology. Pedagogical techniques can communicate content in different ways using technology. Different content concepts require different skill levels from students. Educational technology can help address some of these requirements. Students come into the classroom with different backgrounds, which include prior educational experience and exposure to technology. This means that lessons utilising educational technology should account for this possibility. Educational technology can be used in tandem with students' existing knowledge, helping them either strengthen prior epistemologies or develop new ones (Harris & Hofer, 2011).

## **3.4 RATIONALE FOR USING THE TPACK MODEL**

The researcher was persuaded to use the TPACK framework from the observation that it is an empirically sound and valid theory to assess the integration and implementation of educational technology (Archambault & Barnett, 2010). According to Archambault and Barnett (2010), any good framework or theory must be tested, proven, and tested again. To test the validity of the TPACK model, Archambault and Barnett (2010) conducted a

factor analysis on the framework using a modified 24-item survey on a population of 596 online teachers from across the United States. Archambault and Barnett (2010:1658) indicated that the “highly accepted seven mutually exclusive domains of the TPACK theory may not exist in practice”, but that “the existence of three factors: pedagogical content knowledge, technological–curricular content knowledge, and technological knowledge” were reported. The participants showed a connection between technological content, technological pedagogy, and technological pedagogical content questions.

Kurt (2018) notes that effective implementation of technology in the classroom requires acknowledgment of the dynamic, transactional relationship among content, pedagogy, and the incoming technology – all within the unique contexts of different schools, classrooms, and cultures. Factors such as teacher capacity, specific grade level being taught, class demographics, and many others, mean that every situation may demand a different approach to educational technology integration. TPACK leaves room for researchers and practitioners to adapt the framework to different circumstances, acknowledging that no one combination of content, pedagogy, and educational technology is applicable for every setting.

In another study grounded in the TPACK framework, Kohen and Kramarski (2012) demonstrated that the TPACK framework is capable of helping guide the way that teachers view the interaction of technology, pedagogy, and content; and that the instrument is flexible, valid, and reliable. Dilworth, Donaldson, George, Knezek, Searson, Starkweather and Robinson (2012) share similar findings in their study and note that teachers view emergent technologies as offering opportunities to understand concepts in deeper and more meaningful ways. Dilworth et al., (2012) are of the view that the growth in understanding can only occur if teachers learn to effectively use the technologies.

Kurt (2018) argues that, because it considers the different types of knowledge needed and how teachers can cultivate this knowledge, the TPACK framework is a productive way to consider how teachers can integrate educational technology into the classroom. TPACK can also serve as a measurement of teacher knowledge, which can inform both training and professional development offerings for teachers at all levels of experience. Finally, the TPACK framework is useful in the ways in which it illuminates the types of knowledge most needed in order to make technology integration successful in the



classroom (Kurt, 2018). Teachers need not even be familiar with the entire TPACK framework in order to benefit from it. They simply need to understand that instructional practices are best shaped by content-driven, pedagogically sound, and technologically forward-thinking knowledge (Knolton, 2014).

Shin et al. (2009) conducted a study to investigate whether in-service teacher beliefs about teaching, technology, and the TPACK concept changed after receiving a focused, three-course series of face-to-face and online educational technology courses over a 6-week period. The study was an extension of the previous work in several studies conducted in the prior 4 years that used TPACK as the framework. Using TPACK as the framework, Shin et al. (2009) conducted an investigation to see how the teachers viewed the relationship between technology, content, and pedagogy.

The results demonstrated an increase in students' overall technology knowledge while their knowledge of content and pedagogy did not increase. However, learners' understanding of the relationship between technology, pedagogy, and content (TPACK) improved. The study also concluded that the TPACK survey instrument could be used as a measuring tool for the integration of technology into curriculum. Although Shin et al. (2009) admitted that some limitations to this study existed, the experiment added to the overall body of knowledge of the TPACK framework. It demonstrates that the more teachers understand the complex relationship between technology, pedagogy, and content, the better the opportunities to develop effective integration of technology into curriculum for in-service teachers.

This study influenced the researcher in the choice and design of the instrument to assess the teachers' competences in integrating and implementing e-learning in the primary school curriculum. The researcher is also guided by the MoPSE expectations for each teacher at primary school (MoPSE, 2016). The researcher was particularly interested in investigating the teachers' and school leaders' understanding of the intricate relationship between technology, pedagogy and content, a critical factor in the effective integration of technology in the school curriculum.

While Mishra and Koehler (2006) suggest that TPACK should guide curriculum development and teacher education, the practical application of TPACK in the classroom

is offered by Harris and Hofer (2009). They explain how TPACK should change the way teachers plan their daily lessons. They describe a planning process where teachers first choose the learning outcomes (content) that they will be working on that day or during that class session. The next step is choosing an activity type (pedagogy) or how learners are going to learn the content. Finally, teachers can choose technologies that will support the activity type and aid the learning process. Using various practical examples, Harris and Hofer (2009) show how instructional planning should include each part of the TPACK framework and allow teachers to create and develop the overlapping knowledge to make the best learning environment for all learners. This literature inspired the researcher in the design of the observation instrument, and she became aware of what exactly to look out for in assessing teachers' planning for the integration of technology in the classroom.

The TPACK model allows for the evaluation of the use of digital tools and technological applications in the teaching-learning process, and identification of the impact of ICT in school activities (Cheng & Xie, 2018; Phillips, 2016). This is well in line with this study, which is an assessment of the implementation of e-learning in primary schools in Zimbabwe. TPACK provides a framework for assessing the competences of teachers and school leaders in implementing e-learning in their schools.

### **3.5 SUMMARY**

This chapter started by discussing the purpose of a theoretical framework, with the major point to note being that it provides guidance at all levels in the choices of the researcher. The theoretical framework informs the reader of the researcher's philosophical standpoint, and her view of the world, helping the reader to understand, not only the decisions made in the research process, but also why they were made.

The study adopted the TPACK model as the guiding framework in assessing the teachers' capacity to integrate and implement technology in their teaching. The model shows the various combinations of knowledges a teacher must possess for effective implementation of e-learning, namely technological knowledge (TK), content knowledge (CK), pedagogical knowledge (PK), technological pedagogical knowledge (TPK), technological content knowledge (TCK), pedagogical content knowledge (PCK) and technological, content and pedagogical knowledge (TPACK). All these knowledges were

discussed in the chapter. Furthermore, the chapter discussed the rationale for adopting the TPACK model as a theoretical framework for assessing the implementation of e-learning in primary schools in Zimbabwe.

The next chapter focuses on the research design and methodology used to assess e-learning implementation in primary schools.

## **CHAPTER 4: RESEARCH METHODOLOGY**

### **4.1 INTRODUCTION**

This chapter presents the research design and methodological choices the researcher made. This includes the purpose and reasons for the selected methodologies. This study is an investigation of how e-learning was implemented in Zimbabwe, and is guided by the main research question: "What are the determinants of e-learning implementation in primary schools?" The chapter discusses the rationale for this empirical investigation, followed by a discussion of the research design. The design comprises the paradigm, philosophical standpoint, approach and strategy employed in the study. In addition, the design encapsulates methods of data collection and how the data was analysed. Towards the end of the chapter, the researcher discusses factors affecting the trustworthiness of findings and how they were addressed, together with ethical considerations. A summary of the chapter concludes the chapter.

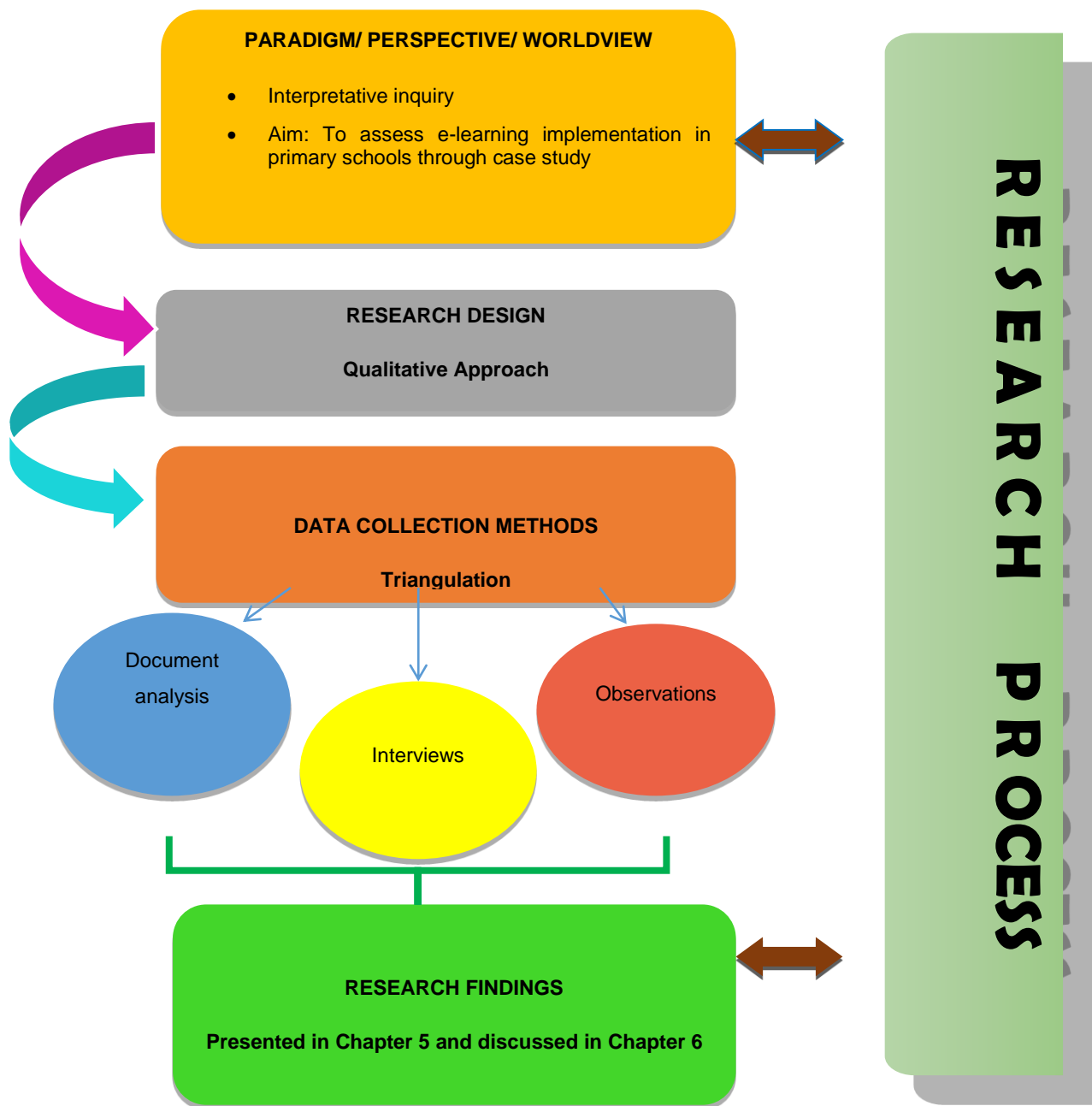
### **4.2 RATIONALE FOR EMPIRICAL RESEARCH ON ASSESSING THE IMPLEMENTATION OF E-LEARNING IN PRIMARY SCHOOLS**

The purpose of this study was to assess the implementation process of e-learning in primary schools. The review of literature revealed a deficiency of empirical studies on the implementation of e-learning in primary schools, which gave impetus to this study. The study aimed at advancing knowledge on the implementation of e-learning in primary schools through gleaning the best practices and offering guidelines for the implementation process. To achieve this, the researcher identified teachers and school heads as the main participants in the study. Teachers are involved in the day-to-day implementation process of the school curriculum and were, therefore, the main source of information for this study. Heads of schools ought to lead, supervise and monitor curriculum implementation, and play a huge role in supporting teachers. Their involvement in the study was naturally considered for the role they play in leading and supervising all initiatives relating to the school curriculum. The researcher believed that they would be a rich source of information regarding the implementation of e-learning in primary schools.

The choice of the research problem for this study emanated from the modern trend of e-learning in schooling systems. E-learning should be seen as a new teaching and learning approach in modern society. New and appropriate teaching approaches are required to meet the needs of the present-day learner. Research supports the notion that the present-day learner is expected to learn skills required in the 21st century, such as critical thinking, creativity, and collaboration, to prepare them for future jobs and careers (Blaschke & Hase, 2016; MoPSE, 2015). In addition, the ever developing and improving technology oblige teachers to improve their teaching strategies to benefit their learners. Harnessing e-learning as an additional teaching method is considered as one way of realising this (Ghavifekr & Rosdy, 2015).

Technology has revolutionised teaching and learning in most classrooms around the world. This revolution compelled the researcher to explore how e-learning, as a new approach to teaching and learning, was implemented. The researcher noticed that studies on the implementation of e-learning and/or online teaching and learning are mostly focused on institutions of higher learning (Schroeder, 2018; Cavas, Karoglan, & Kislá, 2009; Marengo & Marengo, 2015) The researcher further noted that not much research has been conducted in the area of primary school education and e-learning implementation in Zimbabwe. Although few schools have already implemented e-learning as a new approach to teaching and learning, no empirical report has been made available at this point.

The illustration below summarises the research process.



**Figure 4.1: Research process from a constructivist point of view**

The next section specifies the plan that enabled the researcher to generate empirical evidence used in answering the research question.

### **4.3 RESEARCH DESIGN FOR ASSESSING THE IMPLEMENTATION OF E-LEARNING**

A descriptive qualitative design was selected for this study to get in-depth participants' lived experiences of the implementation process of e-learning in Zimbabwe primary schools. Research design is a set of procedures for conducting a study (Tobi & Kampen, 2018; Mukherjee, 2017; Jha, 2014) detailing the activities a researcher undertakes (McMillan & Schumacher, 2010). Yin (2009) avers that, in its elementary sense, a design is a logical sequence that connects the empirical data to a study's initial research questions and, ultimately, leads to its conclusions. The selected descriptive qualitative research design provided an overall strategy to integrate the different components of the study in a coherent and logical way (Tobi & Kampen, 2018).

The design facilitated the smooth application of the various research operations (Mukherjee, 2017). It allowed yielding of maximum results with the application of minimum effort, time and money (Omair, 2015). It laid out the procedures undertaken in the conduct of research activities and providing guidance on steps taken. This gave the study a firm foundation for strengthening the reliability of its findings, getting rid of confusion and muddled approaches. The descriptive qualitative research procedures necessitated a more systematic way, guaranteeing quality findings (Mukherjee, 2017).

The next section presents the design elements, highlighting the selected research paradigm, approach, process and activities undertaken.

#### **4.3.1 Research paradigm**

An interpretive research paradigm was employed to get an in-depth analysis of the social interaction embedded in the use of e-learning facilities. The paradigm gave the researcher a philosophical framework underpinning and informing the researcher's choice of research questions, methodology and intentions, a view shared by Agboneji (2016). This conceptual framework provided a set of interrelated philosophical values and beliefs needed to understand the participants' social world. The interpretive paradigm

provided the researcher with the means to interpret the participants' three levels of interaction, namely the philosophical, social and technical levels.

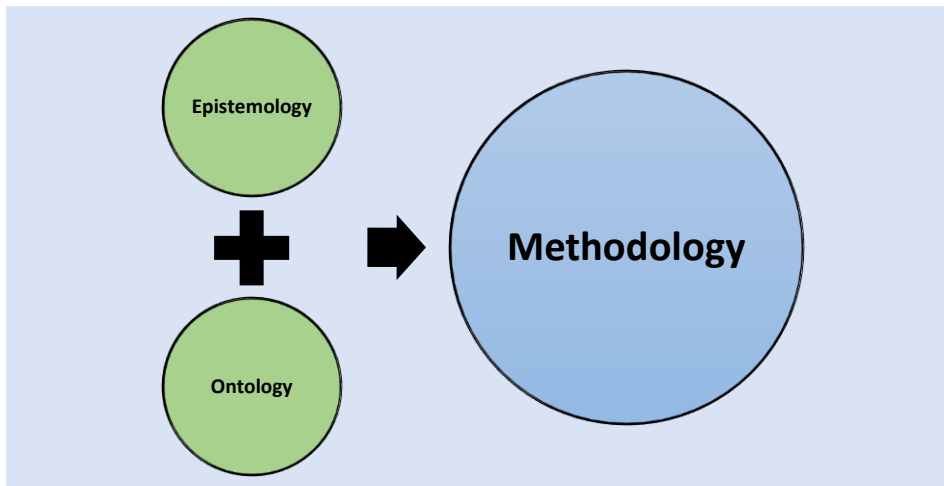
The paradigm is heavily embedded in ontological, epistemological and methodological assumptions, which guided the researcher's paradigmatic view. This directed and enlightened what constituted both the subjective and objective realities of how knowledge and experiences were acquired in the e-learning implementation process (Neuman, 2014).

The ontological dimension exposed the nature and kinds of e-learning implementation realities (Neuman, 2014). It addressed the questions of what reality is, and what can be known about that reality since interpretation was subjective and dependent on various teachers involved in their different schools. Mertens and McLaughlin (2004) refer to this as multiple realities. By defining what constitutes reality, ontology tried to mediate and provide consensus towards a common definition of what implementation of e-learning is all about (Mertens & MacLaughlin, 2004).

Epistemology provided an understanding framework through which knowledge acquisition, creation and communication could be interrogated (Gill & Johnson, 2010). Neuman (2014) avers that epistemology focuses on how we know what we know or the most valid ways to reach truth. Epistemology is about the assumptions we make about the nature of knowledge and the relationship between the knower and what is known or is sought to be known. It deals with how to differentiate truth from falsehood.

Ontology, combined with epistemology, enriched and enhanced the methodology, as illustrated in Figure 4.2. The research methodology used in the study then emanated from the researcher's view of ontology, epistemology, and axiology. Since axiological assumptions were closely related to epistemological ones, they both combined to inform the researcher's values on the research process. The researcher's values could not be suspended as they mediated and shaped the understanding of the framework of e-learning implementation process.





**Figure 4.2: Schematic Illustration of the elements of research paradigm**

### 4.3.2 Interpretive paradigm

Being embedded in an interpretive paradigm provided insights significant for discovering the socially constructed meanings subjectively created in the social world “as it is” (Abdel-Fattah & Galal-Edeen, 2017). The interpretive/constructivist paradigm emphasised that reality was created through a process of social interaction (Mertens & McLaughlin, 2004).

It is further emphasised that in an interpretive/constructivist paradigm, meaning is embedded in the participants’ experiences and mediated through the researcher’s own perceptions (Antwi & Hamza, 2015). Research participants created both reality and knowledge about the phenomenon under investigation. The researcher, through asking critical probing questions, facilitated the construction of some reality, since there is no one reality awaiting to be discovered, but one constructed socially through interaction.

Since there is no one reality but multiple realities, perceptions of different people had to be sought (Mertens & MacLaughlin, 2004). Thus, in interpretive/constructivist research, extensive interviews and other forms of collecting data, such as classroom observations, explore multiple perspectives of the underlying phenomenon. The interpretive paradigm sought to understand people through the way they experienced the world, through their social interaction with the e-learning phenomenon (DuPlooy-Cilliers, Davis, & Bezuidenhout, 2014).

Since teachers and heads of schools facilitated the e-learning implementation process, their views were indispensable to the study. The interpretive paradigm provided flexibility that necessitated full elicitation of meaning by participants, thereby allowing simultaneous generation and analysis of data (Agboneji, 2016).

The interpretive paradigm explored the richness, depth and complexity of the e-learning phenomena. It aimed at characterising how people experienced the world, how they interacted together, and in which settings these interactions took place. Since it is an inductive paradigm, phenomenon was observed, and patterns were developed to reach a conclusive theory. Since the study was heavily embedded in naturalistic inquiry, interpretations were made based on real people in their natural environment.

#### **4.3.2.1 Rationale for selecting the interpretive paradigm**

The researcher's choice of the interpretive paradigm for this study was influenced by the need to eliminate bias and avoid being emotionally involved in the subject under investigation. If social scientists desire to (1) eliminate all bias and preconceptions, (2) not be emotionally involved with or have a particular attitude toward the subject, or (3) move beyond common-sense belief, they should use the interpretivist paradigm (Kivunja, 2018).

The interpretivist approach provided participants an opportunity to share their views, concerns and practices, thereby enabling the researcher to get insights and in-depth information of the processes and practices of e-learning (Tahn & Tahn, 2015; Creswell, 2014). E-learning in developing countries, like Zimbabwe, cannot be implemented without its practices and challenges being noted and addressed. Therefore, adopting the interpretivist paradigm in this research enabled teacher participants, as change agents in technology, to describe their concerns about the implementation process.

Furthermore, using the interpretive research in the study aligned with Kivunja's (2018) assertion that, through its use, the researcher's beliefs and preferences, as well as those of the participants, are interrogated. Consequently, an in-depth understanding of e-learning implementation in the school was enhanced since it was greatly influenced by the belief system and preferences of the practitioners. An understanding of these beliefs

and preferences required probing and eliciting subjective views and thoughts of the participants. The interpretive approach enhanced the grasping of the concerns and claims of stakeholders in the context of the implementation of e-learning in schools.

The next section explains the research approach adopted for the assessment of the implementation of e-learning in primary schools in Zimbabwe.

#### **4.4 QUALITATIVE APPROACH**

A qualitative research approach was preferred as it is concerned with life as it is experienced and lived. The researcher needed to explore purely descriptive data on how e-learning was being implemented in Zimbabwe primary schools. The study preferred the qualitative approach's ability to generate in-depth data on the e-learning phenomenon. Its subsequent use of descriptive procedures was also considered. The researcher became part of the instruments during the interaction with the participants whose views and experiences were being studied. Techo (2016) supports the use of the qualitative approach since it addresses a research problem in its natural environment, where the facts are unknown and need to be explored (Hammarberg, Kirkman, & deLacey, 2016).

A qualitative approach was selected, following McMillan and Schumacher's (2010) assertion that research may be conducted using any one of the three approaches; quantitative, qualitative and mixed method. However, this view is criticised by Techo (2016), who argues that researchers cannot be purely qualitative or quantitative. Techo (2016) is of the opinion that an element of both is inevitable. One cannot exclusively do away with the quantitative approach.

The quantitative approach was not considered as it appeared only concerned with objective measurements where numbers are used to explain findings (Given, 2008) at the expense of a description of lived experiences. Its impersonal limitations could have excluded rich and vivid social interactions of participants and their voice in the implementation of e-learning in schools. The participants' lived experiences could not possibly be expressed in numbers. Creswell (2013) notes that the context of the participants would be limited in the quantitative approach. A mixture of both approaches is not considered, especially because of the great limitations of the quantitative approach

in addressing social interactions, and its failure to capture them as they are lived. For this study, the qualitative approach was found suitable to collect, analyse and interpret socially constructed information from data sources.

In fact, the nature of the research problem dictated the research approach used to obtain the information necessary to answer the main research question and the subsequent questions (Agee, 2009). Since the goal of the study was to assess the implementation of e-learning in primary schools in Zimbabwe, the researcher felt the assessment of the process required descriptive data capturing. The implementers' own written and spoken words and observable behaviours (Zireva, 2013), and not figures, provided answers to the key research questions. Boru (2018) further points out that the qualitative approach to research is uniquely suited for uncovering the unexpected and exploring new avenues. The qualitative approach was considered because it is interpretive, rigorous, reflexive and deep in nature (Mortari, 2015; Yilmaz, 2013).

Boru (2018) further observes that qualitative researches are designed to provide the researcher with a means of understanding phenomenon by observing or interacting with the participants. The researcher was interested in exploring and explaining the e-learning phenomenon as it occurred in its natural setting. The ecological settings enabled the researcher to make sense of, and interpret the phenomena, in terms of the meanings that participants attached to them. Denzin and Lincoln (2005) concur that qualitative research involves an interpretative, naturalistic approach to the world.

Small numbers were used in this study thereby adopting a case study approach, as described in the next section.

#### **4.4.1 Case study in qualitative research**

In assessing the implementation of e-learning in selected primary schools, a case study method was used. The case study method was used to investigate three specific schools that implemented e-learning. This method allowed e-learning implementation to be studied in detail, in a real-life context, as suggested by Crowley et al. (2011). This also allowed in-depth assessment using various sources of evidence like interviews, observation, archival documents, and physical artefacts, which allowed for the

triangulation of findings (Yin, 2009). All participants chosen shared a direct connection to e-learning implementation experiences. To deal with the shortcomings of the case study strategy, such as lack of generalisability, reliability and validity of results in this study, the researcher applied measures of data trustworthiness. These are discussed in detail in a section that follows in this chapter.

The next section discusses the research methods.

## **4.5 RESEARCH METHODS**

What constitutes methods in this study is how research participants were selected, the procedure for collecting and analysing data. It also involves the measures of trustworthiness ethical measures taken in data collection. Hence, research methods are generally a plan to carry out a study (Neuman, 2014).

The next section discusses the several components of the methodology for this study.

### **4.5.1 Research site**

The study was a case of three primary schools located in three of the seven districts in Harare Province of Zimbabwe. These were schools expected by policy to be implementing e-learning. One government school each from Northern Central District, Warren Park-Mabelreign District, and Mbare-Hatfield District were purposively selected. In Zimbabwe, primary schools are run by different responsible authorities. Some are owned by city councils, some by rural councils, some by churches, and others by individuals; while the majority are owned by government. However, all schools are registered with the Ministry of Primary and Secondary Education, which is the overall regulatory authority. They are run in accordance with policies and statutory parameters, though some degree of autonomy is granted to non-government schools. The three selected schools had the necessary infrastructure needed to facilitate e-learning. They had computer laboratories, ICT devices, internet connectivity and skilled personnel. These three schools, where participants experienced the phenomenon under investigation, are the ones Mhlanga and Ncube (2012) refer to as research sites.

#### **4.5.2 Population**

The study target population comprised 123 teachers from the three selected schools, as well as the three school heads. A population in research is referred to as the totality of all participants who conform to a set of specifications (Surbhi, 2016; Rudhumbu, 2014; Ghihiramay, 2017). That entire group of persons had some attributes that attracted the interest of the researcher (Rudhumbu, 2014). Rudhumbu (2014) further notes that, results can be generalised to that group. Therefore, the number of heads of schools and teachers in the three schools made up the study target population. The school heads, as gate-keepers, were eligible participants. The identified participants were seen as qualified to provide comprehensive information and in-depth experiences of the implementation of e-learning in the primary schools.

It is from this target population that the researcher selected a sample. How this was done is discussed in the next section.

#### **4.5.3 The sample**

The study sample comprised three heads of schools and nine teachers, three from each school. The process of coming with the sample is discussed next.

#### **4.5.4 Purposive sampling**

Because of its strengths and suitability for purpose, purposive sampling was used to determine the sample (Singh & Masuku, 2014). Participants were purposively selected on the basis that their schools were resourced with ICT laboratories and e-learning technologies. As qualitative case study requires a small number of participants, the sample consisted of twelve participants from three primary schools. The twelve participants were teachers in the infant and junior grades. Among the participants, three primary school heads automatically qualified by virtue of being the head teachers in these schools. They implemented the e-learning transformational leadership role entrusted to them by virtue of having such infrastructure at their schools.

Although the sample was small, it represented teachers from the schools in the urban context of this research as all are under the same jurisdiction. The teacher participants shared and exhibited their experiences regarding the implementation of e-learning in the classroom, following the updated curriculum framework recommendations. The selection of participants was also guided by the research question of the study.

One of the criteria that contributed to the selection of participants was the professional development training that teachers received at school level (Morgan ZINTEC College of Education offers in-service course on ICT which is sponsored by UNESCO on the implementation of e-learning in their teaching responsibilities); proximity of the schools, and the availability of minimal e-learning environment infrastructure and e-learning platforms at the schools. Since all the 123 participants could meet the eligibility criteria in the selected schools to come up with the nine, the three different levels of the primary school were used. First, was the administrative level, which saw the school head automatically becoming one of the participants. The second one was the infant level where each school had to provide and the third level consisted of junior school teachers. This became the basis of the selection of the participants from each level of the primary school. Within the same level, the participants were seen to have the required knowledge about e-learning and use of ICTs. The three teachers from the three schools, one from each were computer teachers. These were specifically deployed in these schools because of their knowledge and training from college or university. The other two from each school were selected due to their knowledge and interest in the subject matter of this study as evidenced by self-capacity development in that area or capacity development sponsored by the school.

**Table 4.1: Demographic data of participants**

RESEARCH PARTICIPANTS					
Participants	Sex	Number	School		
			A	B	C
School Heads	<i>F</i>	3	1	1	1
Specialised Teachers	<i>M</i>	2	1		1
	<i>F</i>	1		1	
ECD Teachers	<i>F</i>	1	1		
Grade 1 & 2 Teachers	<i>F</i>	3	1	1	1
Junior School Teachers (Grade 3 – 7)	<i>M</i>	1		1	
	<i>F</i>	1			1
<b>Total</b>		<b>12</b>	<b>4</b>	<b>4</b>	<b>4</b>

#### 4.5.5 Composition of participants

- i) School Heads: School heads were coded as HA, HB and HC meaning Head of School A, Head of School B and Head of school C respectively. These are the headmasters or head teachers of the participating schools. They are, in some cases, referred to as school leaders, although 'school leader' is a broader term which encompasses the head, deputy head, teacher in charge, and even the chairperson of a school development committee. School heads are responsible for everything that happens in the school. They lead, manage, supervise staff, and have the responsibility for curriculum and academic issues that happen in the school, as part of their management and administrative responsibilities. It is their expected role to support the implementation of e-learning in the school.
- ii) Specialised Teachers: These were coded as TA1, TB1 and TC1 meaning Teacher 1 from school A, Teacher 1 from School B and Teacher 1 from school C respectively. In the context of this study, specialised teachers are those with a recognised qualification in ICTs. There are a few such teachers in the schools. Mostly, they are involved in teaching ICT related subjects and offer ICT services to the schools. Sometimes they are charged with the responsibility of offering continuing professional development in ICT to their colleagues in the school. Such teachers were considered key informants for the study.



- iii) ECD Teachers: Early Childhood Development (ECD) in the Zimbabwe education system is a phase for learners between 4 and 5 years who are in pre-school. Their method of learning is predominantly learning through play. It would be interesting to see how e-learning was being implemented in this category of learners, which is why ECD teachers were selected to participate in the study.
- iv) Grade 1 & 2 Teachers: Grade 1 and grade 2 learners are in the first 4 years of primary education and are transitioning from ECD to junior education. They are a special group of learners known in the system as infant learners. Implementation of e-learning within this category of learners would be special, taking into account their age and learning needs. This is why teachers of grade 1 and 2 learners were specifically selected to share their views and experiences with implementation of e-learning in the schools.
- v) Junior School Teachers: Learners in grade 3 to 7 are known as junior school learners, according to the Zimbabwean education system. These are graduating into a certain level of maturity with age and their learning needs, activities and content is different. As they reach grade 7, they sit for a national, exit examination to gain promotion into secondary education. Obviously, their experiences with e-learning implementation would be different and interesting to capture and reflect on in this study.

The teachers were coded as Teacher 1, 2 and 3 from school A. Which translates to TA1, TA2 and TA3. For School B, Teachers used the same pattern, which is TB1, TB2 and TB3. In school C, it also took the same coding system, that is, TC1, TC2 and TC3. School heads were coded as HA, HB and HC. This meant head of school A, Head of school B and Head of school C.

In the next section, a discussion of how data was collected is presented.

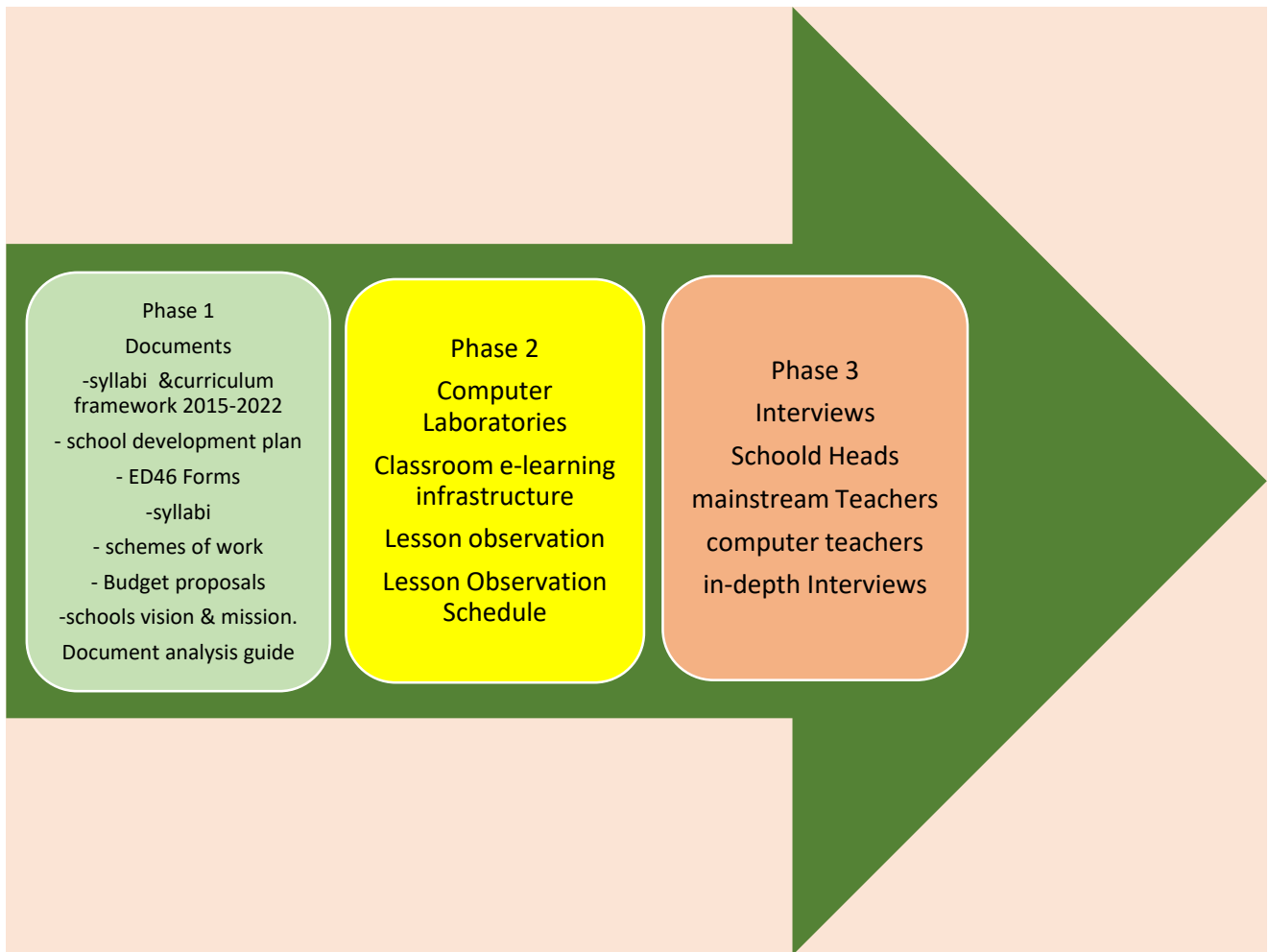
#### **4.6 DATA COLLECTION PROCESS**

As indicated earlier, the study adopted a descriptive qualitative design, where the participants were selected using purposive sampling procedures. For the collection of data in the field, three methods were used. These were document analysis, interviews and observations (Agunuis, Hill, & Bailey, 2019). Data collection involved the gathering

of data in an established systematic manner, which enabled the researcher to answer stated main research questions, sub-questions and evaluate outcomes. The process involved identifying and selecting individuals, obtaining permission to study them, gathering information through document analysis, as well as asking questions and observing participants' behaviours (Creswell, 2014). The goal for data collection was to capture in-depth quality e-learning interactive evidence that would translate into rich data analysis. This allowed for the building of a convincing and credible answer to questions that were posed.

The data collection process was done in three phases. In each phase, a different method was used to collect data. The justification for using the three methods was to triangulate data to deal with the shortcomings of a case study, and ensure the reliability and validity of results. This also enhanced trustworthiness of data gathered (Anney, 2014).

The figure illustrates the three methods, and how they flowed as phases in the data collection process.



**Figure 4.3: Flow chart showing phases of data collection**

#### **4.6.1 Phase 1: Document analysis**

The researcher analysed documents that spells out how e-learning is implemented. This helped the researcher to get an insight of e-learning implementation best practices. Document analysis is a way of collecting data by reviewing existing documents (Anney, 2014; Bowen, 2009). In this study, documents served a dual purpose. First, as a source of primary information on implementation of e-learning in primary schools, and secondly, for triangulation with data obtained through interviews and observations (Bryant-Lukosis, DiCenso, Blythel, & Neville, 2014). The researcher analysed the Ministry of Primary and Secondary Education documents such as the Curriculum Framework 2015-2022, the Commission of Inquiry into Education and Training (CIET) of 1999, teacher professional standards handbook; Education Act 2019 as amended, syllabi, ministry strategic plan of 2018, and the ICT draft policy for primary and secondary education of 2016. At school

level, documents analysed were the school vision, mission statements and values; schools' strategic plans; school budgets; supervision instruments; ED46 forms; asset registers; teachers' lesson plans; and digital content installed in school computers meant for e-learning. This was meant to establish the nature of the implementation of e-learning in the schools.

For the analysis, the researcher developed a checklist containing items such as evidence of a school vision embracing the adoption and implementation of e-learning as a way of teaching and learning, evidence of planned and taught lessons via e-learning, evidence of digital content created and stored for e-learning purposes, as well as the adequacy and quality of work delivered through e-learning as documented in teachers' lesson plans and evaluation reports. From the documents, the researcher wanted to get the data indicated in Table 4.2

**Table 4.2: MoPSE documents**

<b>DOCUMENTS</b>	<b>DATA ANALYSED</b>
<b>The Education Amendment Act 2019</b> <b>Curriculum Framework for Primary and Secondary Education 2015 - 2022</b>	What does it say about techniques of education delivery? How should e-learning be implemented?
<b>National ICT policy document</b>	What does government policy say about e-learning?
<b>ICT draft for primary and secondary education</b>	What does the relevant ministry say about e-learning?
<b>School Vision, Mission Statement and Core Values</b>	What is the school's vision on embracing technologies and implementing e-learning?
<b>School Budgets</b>	What are the school priorities that relate to e-learning?
<b>Schools Strategic plans/development plan</b>	What have the schools planned for, with regards to e-learning implementation?
<b>Supervision Instruments</b>	How do the instruments cover the supervision of delivery of lessons by e-learning?
<b>Subjects syllabi</b>	How do the syllabuses embrace the use of technology in teaching and learning?
<b>Teachers' schemes</b>	Presence of time allocated of e-learning Do the activities indicate the use of electronic content?
<b>Installed educational content</b>	Availability, alignment and usability
<b>Asset Registers</b>	Availability and number of e-learning equipment
	How does e-learning come into play?
<b>Teacher Professional standards Handbook (TPS)</b>	Competences required for the implementation of e-learning.

The analysis of the documents was guided by both the main research question and sub-questions of the study. The main research question was: “What are the determinants of e-learning implementation in primary schools?” The sub-questions were:

- i) What models are teachers using in the implementation of e-learning in Harare Province primary schools?
- ii) How is the school system affecting the teacher implementation of e-learning in primary schools?
- iii) What teacher competencies are required for effective implementation of e-learning in primary schools?

As Bowen (2009) puts it, documents are stable, “non-reactive” data sources. They provide meaning that can be read without changing the content. The content cannot be influenced by the researcher or research process. This assures quality preservation of data. What is contained in documents remains as is, unlike in lesson observations where a teacher could keep up appearances to appear as e-learning is a thing of the day.

Analysing documents also helped the researcher to identify questions that needed to be asked (phase 3) or situations that needed to be observed (phase 2). Using documents to analyse information is a way of ensuring that the current research is critical and comprehensive (O’Leary, 2014).

The next section presents procedures used for applying observation and how data was collected. The section also presents the type of data the researcher was looking for.

#### **4.6.2 Phase 2: Observation of e-learning facilities and lessons**

Non-participant observation was used to collect data to substantiate the implementation of e-learning in action, but without interfering with its processes. It was selected because it is unobtrusive and very flexible, as well as oriented to the discovery of knowledge. As a systematic process of collecting data, it allowed the researcher to observe the e-learning implementation process in its natural environment. Since e-learning implementation process was relatively unexplored, it was important to understand it in detail, while maintaining the natural environmental conditions in which it was occurring.

Observation was found to be the only relevant and reliable way to obtain data for the analysis of participants' behaviour during their expected practical implementation of e-learning.

Letters to seek parental consent for observation during lesson delivery were issued through the class teachers. Observation gave direct access to phenomenon under study (Creswell, 2013). The researcher only directly observed what was happening during the lessons, took notes and recorded in the observation guide. Apart from the lesson, the researcher also took note of e-learning technologies and other physical attributes of e-learning in each classroom and laboratory, depending on where the lesson took place.

The technique allowed the researcher to be a non-participant, observing the participants without actively taking part in the activities (Nieuwenhuis, 2007). It was used to immerse the researcher into e-learning implementation culture for a deeper understanding. (Dawson, 2013). In order to assess e-learning implementation, the non-participant observation was carried out before the interview sessions, and the target for observation were the physical attributes of the computer laboratories, how electronic media were used, and the behaviour of the participants and the learners in the classroom.

Phase 1 was about document reading and taking down notes guided by the research question. Phase 2 entailed the observation of lessons and e-learning infrastructure in the selected schools. The next section is a discussion of phase 3 of the data collection, where the researcher interviewed all teachers and heads participating in this study.

#### **4.6.3 Phase 3: In-depth interviews**

The researcher visited each of the sampled schools and held interviews with the purposively selected teachers. After reading the introductory letters, participants signed consent forms. The purpose of the interview was to hear unadulterated opinions of teachers about e-learning implementation, and how they viewed it as a technique to deliver curriculum content to primary school learners.

Gathering data was through direct verbal communication using semi-structured interviews. These provided a clear set of instructions for the interviewer to enable a

collection of reliable and comparable qualitative data. During the process, the researcher began with generic questions, and encouraged participants to speak out their opinions freely about the topic. An interview schedule was prepared consisting of six main questions derived from the main research question and sub-questions. The schedule permitted follow-up related questions where necessary.

The method allowed both the researcher and interviewee time to probe further for clarity (Stuckey, 2013). Both semi-structured and informal interviews were held after observations, with the intention of getting clarity on unclear observed issues. They allowed the researcher to develop a deep understanding of the e-learning implementation process. The inclusion of open-ended questions provided opportunities for identifying new ways of seeing and understanding the topic at hand. The interviews allowed the researcher to probe the views and opinions of the participants where necessary (Gray, 2009; Frenz et al., 2014). Such probing allowed for the broadening of the interview into new pathways which, while not originally considered a part of the interview, helped towards meeting the research objectives (Gray, 2009). It made it easy to collect information as desired, since the participants gave their independent opinions. This helped towards meeting the research objectives (Gray, 2009). In-depth interviews provided opportunities to justify previous answers and establish a connection between several topics. It also offered very rich information besides offering a comfortable atmosphere in which participants felt more comfortable to establish a conversation.

#### **4.6.4 Data analysis**

In this study, content analysis was employed since it is an approach to qualitative data analysis that encompasses other analyses techniques. Content analysis was employed to identify patterns that emerged from data by grouping the content into words, concepts, and themes. The thematic analysis approach, a part of content analysis, was predominantly used to deduce the meaning behind the participants' words (Vaismoradi, Jones, Turunen, & Snelgrove, 2016).

The process began with gathering and collecting descriptive data from documents observed, followed by observations, and then interviews. This was a process of reading through data to get sense out of it, removing irrelevant data and grouping data into

understandable units with the goal of discovering useful information that would inform conclusions, and support decision-making (Hashemnezhad, 2015). Inspecting, cleansing, transforming and modelling meant that the unstructured data went through the processes of analysis, assigning of value, and organising into a single folder for easy access. It also made it easier for the feedback data to be analysed in a consistent manner. Since the feedback data was now organised in one folder, the next step was coding it for easy extraction of meaningful insights.

The process involved coming up with themes through analysing the word and sentence structure of notes. The focus was to obtain information from raw data to make sense of it. The data was broken down into manageable themes, patterns, trends and relationships, for the purpose of understanding its elements.

Recorded information from interviews was transcribed verbatim into text, as proposed by Sutton and Austin (2015). Data were then thematically coded to enable extraction of meaningful insights. Coding is a process of identifying segments of meaning in the data, and labelling it with a code (Linneberg & Korsgaad, 2019). This was done using a short phrase or a word to capture visual data. Coding enabled the organisation of data in a way that identified emerging themes, as well as the relationships between these themes (Kivunja, 2018).

## **4.7 MEASURES OF TRUSTWORTHINESS**

As data trustworthiness measures, the researcher focused on four concerns which arise from qualitative approach to research. These are credibility, transferability, dependability and confirmability (Korstjens & Moser, 2018). The ways in which these were ensured are explained in detail in the subsequent paragraphs.

### **4.7.1 Credibility**

Credibility is concerned with truth value of research findings. It is the confidence that can be placed in the truth of research findings (Korstjens & Moser, 2018; Moon, Brewer, Januchowski-Hartley, Adams, & Blackman, 2016). Credibility demonstrates that the subject has been accurately identified and described. In addition, credibility also



demonstrates that the research was conducted in a publicly accessible manner (Nowell, Morris, White, & Moules, 2017). This means that credibility establishes whether the findings of the research are from the participants' original data. More so, interpretation emanates from the initial or original perspectives of the participants (Korstjens & Moser, 2018). To ensure the credibility of this research, the researcher employed prolonged involvement, member checking and triangulation.

#### **4.7.1.1 Prolonged engagement on the research site**

Prolonged engagement refers to spending extended time with participants in the schools, where implementation of e-learning was practised in order to gain a better understanding of the behaviours, values and social relationships in sampled schools.

The researcher was on the site of the study long enough (two to three months) to build trust with the participants. The researcher could not be in the three schools at the same time so the researcher took leave days for a month in Schools A and C, and longer in School B, because the latter was the researcher's work place (Anney, 2014).

#### **4.7.1.2 Member checking**

The purpose of member checking was to eliminate researcher bias in the analysis and interpretation of results (Korstjens & Moser, 2018). The analysed data were shared with the participants to check if the analysis made by the researcher was in line with what they had articulated during interviews. The participants checked for accuracy and resonance (Birt, Scott, Cavers, Campbell, & Walter, 2016). The voices of the participants were included in the analysis in the form of quotations to validate the claims. Involving participants at this stage helped to clear inconsistencies.

#### **4.7.2 Triangulation**

The researcher considered triangulation a powerful technique that facilitated validation of data (Heale & Forbes, 2013). In this study, the researcher triangulated three instruments of data collection. These were document analysis, observations and face to face in-depth interviews. The researcher analysed the MoPSE and school documents on the

implementation of e-learning. In addition to this, the researcher observed lessons without intruding in the proceedings of the lesson while making notes about the e-learning physical attributes in the schools like computer laboratories, classrooms and gadgets available, their quantity, where they were kept, and their condition. Interviews were then carried out with the selected participants. This assured that data were obtained through different instruments of data collection (Heale & Forbes, 2013)

The researcher also triangulated data sources. Triangulation was used to test validity through the convergence of information from different sources (Carter, Bryant-Lukosius, DiCenso, Blythe & Neville, 2014). The data sources in this study were various documents and different categories of participants. Triangulation of data sources was done to check the consistency of findings obtained by different instruments of data collection within the same method (Carter et al., 2014).

#### **4.7.3 Transferability**

Another aspect of trustworthiness of qualitative method is transferability. In order to ensure that this research could be replicated in another context, the researcher explicitly detailed the methods and settings of this research. This involved the researcher elucidating all the research processes, from data collection, context of the study, to production of the final report (Houghton, Dymphia, & Shaw, 2013). This is called thick description. It helps other researchers to replicate the study with similar conditions in other settings, and come out with the similar results. The population of this study was all teachers in selected primary schools in Harare Metropolitan Province who are assumed to be implementing e-learning in curriculum delivery. A sample that is representative of the schools was purposively selected based on the similarities of the e-learning context of the schools. Consequently, the research findings could be transferable to other primary schools to assess teachers' e-learning implementation in their teaching practices. This implies that the methods and findings can be applied to other studies in other contexts. Additionally, it implies that a future researcher should be able to replicate the study using similar participant demographics or an entirely different research site and come with the same results (Lemon & Hayes, 2020). However, this can only be possible if the contexts have the same conditions. The researcher also has the view that, with the nature of this particular phenomenon under study, replicating it at another time may have

results influenced by technological advancements. Transferability was therefore assured through thick descriptions.

#### **4.7.4 Dependability**

The dependability criterion in this study was achieved by keeping an audit trail. This involved an examination of the inquiry process and product to validate the data. The researcher accounted for all the research decisions and activities to show how the data were collected, recorded and analysed (Moon, Brewer, Januchowski-Hartley, Adams, & Blackman, 2016). Interview recordings were stored on the computer but secured by a password so that access was restricted, and only intended people had access to the desktop. Audios were saved on an external hard drive so that they were not easily destroyed.

#### **4.7.5 Confirmability**

In this study, confirmability was assured by referring to literature study on e-learning implementation in other countries, together with keeping an audit trail. The researcher demonstrated how conclusions and interpretations were reached, and provided a track of data to its source so was the explicit logic used to interpret the data (Kyngas, Kaariainen, & Elo, 2020; Moon, Brewer, Januchowski-Hartley, Adams, & Blackman, 2016).

Apart from trustworthiness as one of the cornerstones of this research, the researcher took cognisance of certain moral principles critical to monitoring the conduct between the research participants and the researcher. These ethical considerations are discussed next.

### **4.8 ETHICAL CONSIDERATIONS**

It is important to respect the site in which the research takes place (Creswell, 2012). This respect should be shown by gaining permission before entering a site, and avoid disturbing the sites as much as possible during a study. The researcher regarded self as guest at the place of study. Before embarking on the empirical investigation, the

researcher obtained ethical clearance from the College of Education at the University of South Africa, in terms of the university's research policy.

To obtain permission to carry out research in Harare Province primary schools, the researcher applied to the Permanent Secretary of the Ministry of Primary and Secondary Education in Zimbabwe (MoPSE). The application letter indicated the schools, title of the study and contributions of the study to the education system. The following documents were attached to the application letter before submission of the application to the head office: an abstract and research instruments and a clearance letter that had been obtained from the Ethical Committee of UNISA.

After receiving the permission letter from the head office, the researcher submitted an application letter to the Provincial Education Director (PED) of Harare Metropolitan Province to seek permission to carry out research in his or her jurisdiction. Permission was granted and more application letters were written to the districts under which the three schools belonged for permission from the District Schools Inspectors (DSIs) who are the custodians of the schools. Consent was granted through stamping and signing.

Finally, letters were written to heads of schools for permission to enter the particular schools. To all the applications, the researcher attached a permission letter from the higher office down to the head's office. This is when the researcher had to talk to the teachers, familiarised with them and explained to them the intention of the research and gave letters for them to read on their own. Consent was granted at all level (see appendices).

The purpose of providing this information prior to the commencement of data collection was to allow participants to decide whether to participate in the study or not, and to opt out if they so decided. Each participant signed a consent slip that was attached to the introductory letter (Gupta, 2013). The researcher also strongly emphasised that the information obtained was going to be used for academic purposes only. The participants were given letters that detailed all this information about the research and the researcher's contact details, as well as those of the supervisor. A consent letter was attached for them to sign, which they did (see appendices).

A participant is considered anonymous when the researcher or another person cannot identify the participant from the information provided (Cohen, Manion, & Morrison, 2007). To achieve this, data were stripped of identifiers before sharing them with co-researchers, assistants, readers, or audience members. Letters of the alphabet were used for names of schools and school heads. Teachers were numbered in Arabic numerals. Tracy (2013) warns that stripping qualitative data of identifiable material can be tricky because some participants may be identified even if their name is a pseudonym. However, it depends with the kind of project one would be carrying out.

#### **4.9 SUMMARY**

This chapter discussed the plan to carry out the study and revealed information on how to go about examining the implementation of e-learning. The rationale for empirical investigation was presented, and this was then followed by the research paradigm or the philosophical dimensions that the researcher adopted to address the research question. The research design for this study was an exploratory qualitative case study analysed through qualitative methods. The qualitative approach was adopted in order to exploit the demands of the research question. Methods for carrying out this study were discussed and justified in this chapter. These included the selection of participants, data collection and analysis, and measures of ensuring trustworthiness in qualitative studies. The chapter also discussed the procedural and situational ethical issues undertaken to make sure the findings are derived in an honest and truthful manner.

In the next chapter, the research findings are presented and analysed.

## **CHAPTER 5**

### **PRESENTATION AND ANALYSIS OF DATA**

#### **5.1 INTRODUCTION**

The previous chapter made a detailed outline of the methodology used in this study. This chapter begins with a brief report on the preparatory work preceding the data collection process. Findings are presented with detailed analyses, before concluding with a summary. In this chapter, the researcher focuses on the presentation and analyses of data sourced through reviewing of relevant documents, non-participant observation of teacher implementation of e-learning and the physical attributes of e-learning environment found at each school, as well as in-depth interviews with teachers and school heads. The execution of this task requires the re-stating of the main research question to serve as a background to the qualitative assessment of e-learning implementation in primary schools. The main research question: “What are the determinants of e-learning implementation in primary schools?”

To answer the main research question, three sub-questions were formulated as follows:

- 1) What models are teachers using in the implementation of e-learning in Harare Metropolitan Province primary schools?
- 2) How is the school system affecting the teachers’ implementation of e-learning in primary schools?
- 3) What teacher competencies are required for an effective implementation of e-learning in primary schools?

#### **5.2 ANALYSIS OF DATA**

The data analysis process started in the researcher’s mind as data was being collected. This culminated in pragmatics, which involved sorting and handling the qualitative data (Vaismoradi, Jones, Turunen & Snelgrove, 2016).

Hashemnezhad (2015) describes the process of data analysis as a systematic procedure through which the researcher moves from the collected qualitative data to an

understanding of the participants' utterances in order to interpret and explain the phenomenon being investigated. Consequently, data collection and analysis are interwoven and influence one another (Kabir, 2016). Data analysis is not a linear procedure but a cyclic process consisting of two procedures, which go hand in hand in order to build a coherent interpretation of data. The study predominantly used the inductive process of data analysis, which involves the subjective interpretation of the data through coding and theme identification. The deductive process was minimally employed, and involved objective analysis of documents.

### **5.2.1 Analysis of data from documents**

Analysing documents involves coding content into themes similar to how interview transcripts are analysed (Linnesberg & Korsgaard, 2019). The steps are described under the analysis of interview data section. All data were turned into text in word, and saved on the computer. The text from notes became the source of analysis as the coding process unfolded.

### **5.2.2 Analysis of data from interviews**

#### **5.2.2.1 *Transcribing***

Transcription is the process of converting audiotape recordings or field notes into text data (Creswell, 2012, p.239). Soon after each interview, the researcher embarked on verbatim transcription of all respondents' responses in the audio recordings. Tapes were played repeatedly to transcribe the data into text. Sutton and Austin (2015) indicate that audio- or video-recorded data must be transcribed verbatim before data analysis begins. Sutton and Austin (2015) maintain that transcribing is a demanding process, even for the most experienced transcribers, but it must be done to convert the spoken word to the written word to facilitate analysis. It took 3 to 4 hours to finish transcribing one recording because the audios had to be played repeatedly in order to get a sense of what the participants had said. In some instances, the researcher had to telephone the respondents to clarify what they wanted to say because it was not audible in the audio recording. This transcription process was done through the steps discussed below.

### **5.2.2.2 Familiarising with the data**

This was the first step in the primary-coding cycle. In this process, the researcher was immersed in the data. This involved checking the transcripts for accuracy, listening to the tapes again with the transcript in hand. This helps to get a fuller sense of what the text was about. It is difficult to obtain familiarity with the data during in-depth interviews or while observing as there are so many other things to attend to during data collection. Even though the researcher forms the overall impressions, there is great need to immerse oneself in the data by reading and re-reading to familiarise with the data (Nowell, Morris, White & Moules, 2017).

### **5.2.2.3 Coding/Indexing**

The second step involved coding raw information into categories. The coding process allowed sub-themes (categories) to emerge from the data, which then led to themes. Summative content analysis involved counting words to produce latent meanings and themes (Hashemnezhad, 2015). Coding or indexing is a process of labelling and systematising the data (Tracy, 2013). In the subsequent paragraphs, the researcher articulates how coding was done in this research until themes emerged.

The researcher used open coding to break down data into small parts to interpret it. This open coding was performed as the researcher read through for the first notes from recently collected data. When using open coding, themes are brought to the surface from the data. This is when themes and initial codes are assigned to condense the mass of data into categories (Claufield, 2019).

Computer aided coding was employed using MS Word processing programs. These were used to highlight in different colours, the preliminary identified themes in all the texts saved in word format. The blue colour was used to colour-fill words or phrases that were interpreted as pointing to how teachers implement e-learning. Red colour-fill was used to highlight words, phrases and sentences that hinted on school system factors that affect e-learning, while orange was used to colour-fill words, phrases and sentences that pertained to skills and competences required for teachers to be able to implement e-learning. Yellow was used to show the general determinants of e-learning in the schools.



This was done to all the typed data including field notes from observations, notes from document analysis, as well as transcriptions of interviews. The theoretical framework helped to come up with the initial themes.

Axial coding was the second stage of coding during which data was organised to unravel key categories (Neuman, 2014). During open coding, the focus was on the actual data and assigning code labels for themes, while in axial coding, there was a set of initial preliminary concepts (Darlington & Scott, 2002). The focus was therefore on the initial coded themes more than on the data. More codes, however, came up as new ideas emerged during this second phase of going through the data notes.

The initial coded documents were kept open, and a new document was created. This was given the title, "Further Analysis Breakdown". A bold heading using Tahoma font type for each theme was created and then copied and pasted under each heading on the data of the relevant colour from the various field notes, document analysis notes, and interview documents. This resulted in an analysis breakdown document more than 40 pages long, which I printed out in colour.

Selective coding was the last stage in coding where the researcher examined previous codes to identify and select data that supported the conceptual coding categories that were developed. This last process left the research with fewer major themes that emanated from the second stage (Tracy, 2013). Selective coding involved scanning all the data and previous codes, looking selectively for cases that illustrated themes, and making comparisons after most or all data collection had been completed (Lyons & Doueck, 2010:148).

The hard copy document showing further breakdown analysis was kept handy in order to refer to it for examples of data associated with certain codes. It was also saved on the desktop of the laptop so that the researcher could either just retype that segment from the hard copy or conduct a computerised word search and copy and paste it onto the findings and analysis of the data analysis chapter.

In a nutshell, to achieve credibility, the research passed through a rigorous process. As explained above, this entailed categorising, coding and re-coding, so as to come out with

sub-themes that were further revised to come up with themes. This helped to answer the main research question. Content analysis was employed using the thematic approach. In this procedure, the researcher closely examined the data to identify common topics, ideas and patterns of meaning that came up repeatedly. These emanated from interviews, reviews of documents and observations. The first step was familiarisation with the data. Data was read several times to establish the meaning. A search for meaning was also done through direct interpretation of notes from the MoPSE and analysis of school documents, interview transcripts, and observations. The researcher came up with categories that formed a theme. All this sought to ensure rigour in qualitative research (Hashemnezhad, 2015, p.60).

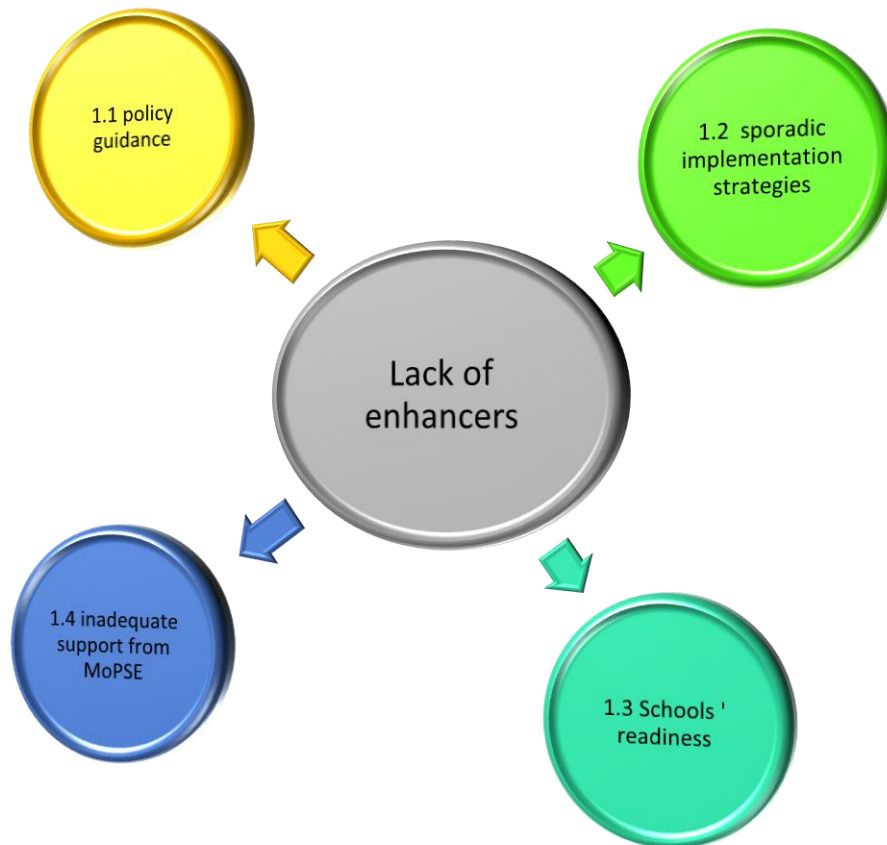
Three major themes emerged from the data. These themes answered both the main research question and the sub-questions of the study. Each sub-question had a related theme and categories tagged to it. Presentation of findings and analysis followed the order of the sub-questions. The findings and analysis of data obtained through the three data collection instruments were presented. On each theme, the researcher presented the findings and then an analysis for each category. This way of presenting helped in the triangulation process to ensure credibility of research findings as discussed in Chapter 4. The following themes and categories emerged:

**Table 5.1: Themes and categories**

<b>NO.</b>	<b>THEME</b>	<b>CATEGORY</b>
<b>1</b>	Lack of Enhancers	1.1 Guidance on effective implementation of e-learning 1.2 Sporadic implementation 1.3 School readiness 1.4 inadequate support from MoPSE
<b>2</b>	Ineffective school system	2.1 Curriculum support and integration 2.2 School Policy on E-learning integration and use 2.3 E-learning network and equipment 2.4 E-learning storage and maintenance 2.5 E-learning co-ordination 2.6 E-learning professional development 2.7 E-learning access 2.8 E-learning Planning for inclusion 2.9 E-learning health and safety 2.10 E-learning review and evaluation
<b>3</b>	Teacher skills and competences	3.1 Attitude towards e-learning integration 3.2 Low technological knowledge 3.3 Pedagogical knowledge 3.4 Content knowledge 3.5 Need for Continuing professional development

### 5.3 THEME 1: LACK OF ENHANCERS

This is a diagrammatic representation of Theme 1 and categories tagged to it.



**Figure 5.1: Lack of enhancers**

#### 5.3.1 Document analysis findings and analysis

Findings mainly derived from the analysis of the MoPSE documents, namely the Education Act Amendment (2019), the Zimbabwe Curriculum Framework 2015-2022, the Commission of Inquiry into Education and Training (CIET) 1999, and syllabi for primary school learning areas. School documents included the vision statement, schemes of work, timetables, the MoPSE census form (ED 46), and digital content in PCs, as well as e-learning software installed.

### **5.3.1.1 Category 1.1: Guidance on effective implementation of e-learning**

The point of departure was understanding the guidance offered to the schools by the Ministry of Primary and Secondary Education for the implementation of e-learning. This is what prompted the review of relevant documents from the MoPSE, particularly the new curriculum framework. The researcher considered the curriculum framework and its accompanying instruments such as syllabi, teacher professional standards booklets where supervision instruments are contained, circulars, and other related documents. The researcher hoped that such documents would provide schools with choices for guidance to the various approaches and models for the implementation of e-learning.

The Nziramasanga Commission provided guidance to government on the need to embrace implementation of e-learning and the use of ICTs in the education system. The Commission did not provide the implementation instruction, but only recommended. The Commission was therefore restricted to the recommendation level.

The Education Act Amendment 2019 stipulates how schools are run. It lays the foundation for the implementation of e-learning by indicating, not only the subjects to be taught, but also the need to promote quality education delivery, generally considered one of the aspects e-learning can achieve. However, the Act is silent about how e-learning and ICTs should be incorporated in the teaching and learning process. The act merely gives an operational framework.

Findings from the MoPSE's Zimbabwe Curriculum Framework (2015-2022) revealed that the framework provides a medium to long-term policy direction to make improvements. The improvements hinge on Zimbabwe's education remaining committed to fulfil the potential of learners. Emphasis was on providing improved access and quality education. The framework is inspired by the need to transform the education system to meet the opportunities and challenges of the growing economy. The curriculum framework acknowledges that the rapid technological and social developments over the last three decades have led to access to information, knowledge, especially through ICTs. The curriculum framework also acknowledges that the virtually access to information has created new contexts and demands for teachers. Teachers are no longer seen as the sole sources of knowledge and information. They are expected to help learners develop

competencies to access and process information independently and responsibly, as well as to develop broader life skills. The role of teacher is therefore becoming that of facilitators. All this hinges on e-learning as a method of education delivery. The curriculum framework was found available in all the three schools.

It is in the syllabus that the researcher sought to find how, in the different learning areas, e-learning could be implemented. It was found out that, in the different learning areas, the syllabi only suggested the use of ICT tools as media to facilitate learning. The syllabus expected teachers to plan how they would implement e-learning. The use of suggested media and resources rest upon the teacher and school leadership. Table 5.2 shows an extract from the Visual and Performing Arts Syllabus as an example.

**Table 5.2: Visual and performing Arts syllabus**

TOPIC	LEARNING OBJECTIVES Learners should be able to:	CONTENT (attitudes, skills and knowledge)	NOTES AND SUGGESTED ACTIVITIES	RESOURCES
<b>MUSIC</b> <ul style="list-style-type: none"> <li>• Elements of music</li> <li>• Staff and Tonic solfa notation</li> </ul>	<ul style="list-style-type: none"> <li>• recognise songs in binary form</li> <li>• analyse texture in songs</li> <li>• fit in tempo markings in songs</li> <li>• translate music pieces from staff notation to tonic solfa and vice versa</li> </ul>	<ul style="list-style-type: none"> <li>• Form and texture in addition to               <ul style="list-style-type: none"> <li>- Rhythm</li> <li>- Pitch</li> <li>- Melody</li> <li>- Harmony</li> <li>- Tempo</li> <li>- Dynamics</li> </ul> </li> <li>• Staff notation writing</li> <li>• Tonic Solfa writing</li> </ul>	<ul style="list-style-type: none"> <li>• Singing songs in question and answer form (binary)</li> <li>• Collecting songs sung in binary form from the community</li> <li>• Analyzing songs with different textures from the community</li> <li>• Fitting tempo markings to known songs</li> <li>• Translating music pieces from Tonic Solfa to Staff Notation and vice-versa</li> </ul>	<ul style="list-style-type: none"> <li>• video</li> <li>• Audio and visual devices</li> <li>• Radio</li> <li>• Computer</li> <li>• Smartphones</li> <li>• Keyboard</li> <li>• Modulator chart</li> <li>• Musical instruments</li> <li>• Internet</li> </ul>
<b>VISUAL ARTS</b> <ul style="list-style-type: none"> <li>• Aesthetic qualities</li> <li>• Elements and principles of design.</li> <li>• Different cultures depicted in works of art in Zimbabwe</li> </ul>	<ul style="list-style-type: none"> <li>• derive meaning of what they perceive in works of art.</li> <li>• apply elements and principles of design to assess works of art for aesthetic qualities.</li> <li>• develop specific criterion as individuals or groups to assess works of art from different cultures</li> <li>• analyse ways in which Zimbabwean culture is being reflected in current works of art.</li> </ul>	<ul style="list-style-type: none"> <li>• Aesthetic qualities in art works</li> <li>• Elements and principles of design</li> <li>• Artworks/artifacts and their meaning in different cultures</li> </ul>	<ul style="list-style-type: none"> <li>• Identifying aesthetic qualities involved in artworks.</li> <li>• Discussing the meaning of what is perceived in works of art.</li> <li>• Assessing art works using elements and principles of design as a criterion.</li> <li>• Comparing how art elements are used by different cultures in the works of art</li> <li>• Deriving meaning from different cultural artworks</li> <li>• Evaluating how Zimbabwean culture is reflected in the current artworks</li> </ul>	<ul style="list-style-type: none"> <li>• Artifacts</li> <li>• Resource persons</li> <li>• Appropriate Textbooks</li> <li>• Photographs</li> <li>• Internet</li> <li>• Cameras</li> <li>• Art works from different cultures</li> <li>• Local community</li> <li>• Culture centres at school and community</li> <li>• Art Gallery</li> <li>• Computers</li> </ul>

The timetables in the three schools indicated allocation of different lessons and the duration of each lesson, which was 30 minutes for junior grades. Infant classes, such as the ECDs, had 20-minute lessons and 15-minute lessons. It was also found out that the ICT learning area was a subject on its own. This helped the learners to acquire technological skills that would assist in e-learning.

The other document examined was the ED 46 form, which has several sections that describe the school enrolment, assets, e-learning implementation, which a school head is expected to manage, among other things. It is quite a detailed form that informs the MoPSE about each school, and is completed yearly by school heads. Section E of this form showed the number of computers and other related gadgets in the school such as radios, televisions, DVDs and projectors. All schools had these but in varying quantities.

While the documents reviewed above were meant to establish the guidance provided to schools for the implementation of e-learning, the actual practices were established through interviews and observation.

The Nziramasanga Commission recommendations, and the Zimbabwe Curriculum Framework, gave an outline for incorporating technological skills and other 21<sup>st</sup> century skills through the use of learner centred approaches to teaching, such as Inquiry-based approaches. It provided the main guiding elements that cater for the cohesion and consistency of the planned education activities through aims, values and principles underpinning the curriculum, learning outcomes, orientation architecture and learning content, teaching and learning, and assessment in different learning areas across the curriculum. The syllabus articulates objectives, the expected outcomes, the learning content, the recommended teaching and learning approaches, as well as the resources to be used. Table 5.2 shows a number of e-learning equipment in the column of resources. It also includes assessment strategies in a body of knowledge and learning. The curriculum is guided by the framework, while the syllabus is an aspect of the curriculum. How e-learning can be implemented lies in policy directives from the MoPSE. That is why, in this analysis, the researcher observed that there was no policy articulation from the MoPSE to say how primary schools could do it for consistency in all the schools.

There was a 100% availability of the documents in the three schools, which indicated that the schools were aware of the expectations of the ministry.

#### **5.3.1.2 Category 1.2: Sporadic implementation strategies**

The schemes of work which were seen and analysed, showed that each teacher had own way of making use of ICTs to facilitate teaching and learning. This was how they viewed

e-learning. The following are extracts from the schemes of work of the three teachers from the three schools:

**Table 5.3: TA1: An extract from the scheme of work: Learning Area - ICT**

PERIOD	TOPIC/CONTENT	OBJECTIVES	S.O.M	AIDS	METHOD AND ACTIVITIES	EVALUATION
<b>AIMS: TO HELP PUPILS UNDERSTAND THE SKILLS OF USING WEB PROGRAMMING</b>						
Week 1 06/09/19	<b>The world wide web and online collaboration</b>  <b>Web design</b>	By the end of the lesson learners should be able to: <ul style="list-style-type: none"> <li>Use web programming</li> <li>Explain the roles of web developer</li> </ul>	Syllabus page 18 Personal Notes	Joomla, word press, presentation package such as Ms power point, word processor	<ol style="list-style-type: none"> <li>Facilitator explain and give instructions to learners how to design a web page by converting a file into an Html format</li> <li>learners use templates from a web programming software to create a web page</li> <li>learners write notes</li> </ol>	

**Table 5.4: TB3: An extract from the scheme of work learning area - Science and Technology**

WEEK ENDING	TOPIC AND CONTENT	OUTCOMES: By the end of the lesson learners should be able to:	SKILLS	SOM	MEDIA	METHOD/S AND ACTIVITIES	EVALUATION
04-11-19	<u>Animals</u> Characteristics of invertebrates	-outline at least 3 characteristics of invertebrates.  -state at least 5 examples of invertebrates	-outlining -stating	science and technology syllabus grade 3-7 page 25  Ventures Primary Science and Technology Learners book 3 page 137-142	Recommended text books  Electronic media  Insects  Museum	characteristics of invertebrates c. In grps learners outline characteristics of invertebrates d. learners discuss on group findings on invertebrates and state at least 5 examples of invertebrates. e. oral question and answer.	
	Useful insects Bees-nectar Pollination Dragon fly-determine river health	-identify and draw at least 5 useful insects.	-identifying -drawing			a. facilitator explains on what an insect is. b. in groups learners identify at least 5 useful insects d. learners discuss on group work findings. e. learners draw and label 5 useful insects.	
	Harmful insects  House-fly-diarrhoea Mosquito-malaria	-identify and draw at least 5 harmful insects.	-identifying -drawing			a. recap on the previous lesson. b. in groups learners identify at least 5 harmful insects d. learners discuss on group work findings. e. learners draw and label 5 harmful insects.	



**Table 5.5: TC2: An extract from the scheme of work learning area – Visual and Performing Arts**

WEEK ENDING	TOPIC/CONTENT	OBJECTIVES	MEDIA	S.O.M/REF	COMPETENCES	METHODOLOGIES
1	Lighting and mood. - watching videos.	-watch a video. -dramatise on the story watched.	V.P.A gr 1 syll page 57	Picture - I.C.T tools -	- Explaining - Discussing -Identifyin -Stating	<b>Assumed knowledge:</b> Learners know film. <b>Intro:</b> -Learners tell a story from a picture <b>LD:</b> Teacher plays a video. -Learners watch some short film attentively. -In groups learners dramatise the story. -Group feedback. <b>Concl:</b> Learners answer oral questions.
	Lighting and mood	-demonstrate the use of light in creating mood in theatre performance.	V.P.A gr3 syll page 57	Picture - I.C.T tools - Resource person	- Explaining - Discussing -Imitating	<b>Assumed knowledge:</b> Learners can perform an action. <b>Intro :</b> Learners imitate movements done by the teacher. <b>LD:</b> Tr explains theatre performance. -Demonstration to the class. -Groupwork and report back. <b>Concl:</b> -Answering oral questions.

TA1 taught about ICT and later on taught using ICT resources as learners used a template on the computer. This was document analysis. The researcher concluded that since there is the computer and ICT tools in the media section, learners would use the computer to type notes. TA1 was knowledgeable about use of software to teach. This teacher is most likely able to use learning management software (LMS) with ease. This could then be continued at home for further practice using parents' smartphones. TB3 had electronic media indicated as media, but the methodology did not match the media to be used. E-learning is a methodology, where the methodology should state how electronic media would be used. TC2 would play a video in the lesson, then learners would mime and eventually all of them be able to dramatise as alluded to by the teacher. What TC2 did is learning through ICTs very close to e-learning in its general definition.

The three extracts indicate that all the three schools were aware that use of ICTs improves retention, and they listed media to be used. However, what differed was the way they used the different ICTs to teach. TA1 actually would let learners navigate the computers or smartphones. TB3 is the one who used electronic media as mentioned in the media column, what learners will simply do is to watch and name. This is a little step towards pure e-learning as compared to what TA1 planned, because learners would have to navigate the computer which will lead to gaining competences for use in e-learning or online learning. TC2 exemplified what is referred to a teacher as a facilitator. The teacher

is not the sole bearer of all knowledge. Use of a video would allow learners to learn on their own as they watch from the videos.

The three ways of implementing e-learning, according to the three extracts from the three teachers differed in each school. This shows sporadic implementation. There is no one way of doing it.

### **5.3.1.3 Category 1.3: School readiness to implement e-learning**

School readiness to implement e-learning was noted in the MoPSE census form (the ED46). The statistics showed that the schools had insufficient computer hardware for both teachers and learners to effectively implement e-learning. Insufficient computer hardware indicated that the schools were not fully ready to implement e-learning.

The number of ICT gadgets that were recorded indicated a deficit compared to the learner enrolments. Although schools had the basic requirements, they were not sufficient when one looks at the enrolment of 1400 learners. School B had 34 functional laptops against 1600 learners. School C was also battling with about 45 desktop computers against an enrolment of 1500 learners. The ratio ranged from 1400 to 1600 learners against 30 to 50 desktop computers in the laboratories. Apart from the insufficient hardware, the ED 46 for school B indicated that some of the computers were not functional. For example, School B had 50 laptops, of which 34 were functional while 16 were broken down.

### **5.3.1.4 Category 1.4: Inadequate support from the MoPSE**

The findings indicated that the MoPSE was responsible for providing the three kinds of resources, namely human, financial and material. The three schools had specialist computer teachers. School A had two, Schools B and C had one each. The curriculum framework indicated that the teacher-learner ratio for technical vocational subjects such as ICT was 1: 200. While the teacher - learner ratio for junior grades (grade 3 to 7) is 1: 40. On financial resources, there was very little support from the Ministry of Primary and Secondary Education, as shown by the school budget income and expenditure. This was seen in the budgets and asset register, which indicated that the e-learning hardware, software and digital content were purchased from levies paid by the parents. There was

no school grant from government through the MoPSE. Had it been there, the expenditure records of the schools would have shown it in the Ed46 census statistics form. The three schools had not benefited from the presidential e-learning promotional programme that donated e-learning hardware and software to schools. The MoPSE did not support the schools financially. Although there were enough teachers for the schools, teachers lacked skills and knowledge. There was no MoPSE budget to equip the schools with the required gadgets. It was also noted that the digital content and platforms that School A had were purely from the school's SDC funds. These funds were from levying parents and guardians of learners in the school. This was done through the school development committee.

In the next section, the researcher presents findings and analysis from data collected through interviews. In the second phase of data collection, the researcher interviewed 12 participants using two interview schedules; one for school heads and the other one for teacher participants in this study. The findings corroborated evidence from data analysis.

### **5.3.2 Observations, findings and analysis**

Observation included lessons observed and observation of the physical attributes in the schools.

### 5.3.2.1 Category 1.1: Guidance on effective implementation of e-learning

Table 5.6: Lessons observations

Teacher	How the teachers infused e-learning
TA1	Used a computer-based programme to teach shapes and colouring.
TA2	Each learner had a tablet. The tablets' educational digital content was installed by the school. The content was used to teach the concept of shapes.
TA3	She did not make use of her digital content because the projector was awaiting fixing. She had intended to display the content on a projector screen.
TB1	Learners were sharing a computer and the teacher used Microsoft office to teach colouring.
TB2	Teaching of phonics the <i>ck</i> sound Learners listened to a recorded audio of the articulation of words with the "ck" sound. The teacher used her laptop. Sound was low since the class had 50 learners.
TB3	Used Microsoft publisher to prepare birthday cards, Christmas cards, and happy new year cards. All learners could navigate the computer. One learner actually helped the teacher by going around helping others who were slow.
TC1	Using prepared educational content in the desktop computers, learners were taught computer programming. Some computers were not functional so there was congestion on the functional machines
TC2	The teacher had downloaded some dances from YouTube, and these were played on the television in the classroom using a VCR.
TC3	Only had the schemes prepared in her laptop, but no use in the actual teaching and learning was seen.

Findings showed that TA2, TB2, TB3, TC2 assisted their learners to learn using ICTs. Learning with ICs involves bringing ICT resources into the classroom to transform the teaching and learning process. TC3 only prepared for the teaching process using the computers and learners were not involved. Teachers TA1, TB1 and TC1 demonstrated learning through ICTs. TA3 could not use any technology as the projector was broken down.

TA3 demonstrated challenges that are associated with technology use in teaching and learning, especially when IT specialists are not available in each school to quickly fix technical problem that may not otherwise be fixed by the teacher. TC3 thought merely planning work using a computer e-learning was a very serious misconception of e-learning. It also indicated the lack of uniformity in the same school. This also showed that guidance was not sufficient. TC2 from the same school had a different view as the downloaded videos of Visual and Performing Arts dances were shown so that learners

could learn how to perform the dances from the videos. This indicated how technology can transform the teaching and learning process. The teacher is not the sole source of knowledge. TA1, TB2 and TC1 were computer teachers who were more knowledgeable about technology use because they were assigned to the school specifically to teach computers or ICT as a learning area. What they did was closest to the definition of e-learning in the study. This was preparation for advanced level in integration of ICTs which eventually translates to online learning- type of e-learning. Generally, in most of the observed lessons, teachers demonstrated their effort towards e-learning in their respective subjects and lessons. TA3 had all the preparation in place but that was thwarted by technology failure. The researcher treated these observations with caution. Could the teachers have performed to the gallery, knowing that they were under observation?

#### **5.3.2.2 Category 1.2: Sporadic implementation**

Through observation of the physical attributes of the school, different facilities were noted. School A had two computer laboratories. The laboratories were small but with all the equipment favourable for effective e-learning to take place. School C had one laboratory and state-of-the-art facility, but it had no equipment such as interactive boards, server, desktops, and printers. It was also connected to internet. School C had a fairly good laboratory but without resources.

The researcher noted the differences in availability of resources in the three schools, and this attributes this to the sporadic implementation of policies. For instance, School C had a state of the art building which had no computer hardware and software. E-learning is still a far cry if the laboratory is not furnished with the right equipment. School A had the right equipment but the laboratories were small. The junior school one was even an attachment to the school hall. It was like an improvised facility, which initially was not built for that purpose. It was in fact a library. School C was grappling with both the infrastructure, and also the computer hardware to facilitate e-learning effectively. The researcher observed that the state of the infrastructure was a major determinant of e-learning.

### 5.3.2.3 Category 1.3: School readiness

Table 5.7: School readiness

ITEM AVAILABILITY	SCHOOL A	SCHOOL B	SCHOOL C
Computer Lab	✓	✓	✓
Internet/Wi-Fi	✓	✓	✓
Desktops	✓	✓	✓
Laptops	✓	✓	✓
Tablets	✓	x	x
Electrified classrooms	✓	✓	✓
Other ICT Tools	✓	x	x

The above findings show that all the three schools had the basic facilities to be able to implement e-learning. However, readiness cannot be measured by the facilities in the school. One would want to know whether these facilities are also available in the learners' homes. It should also be considered whether teachers are able to effectively use the available assets. While availability of infrastructural resources is one of the determinants for e-learning implementation, the success of e-learning is coupled with other factors which could not be determined by observation. These were extracted through interviews and documents and are presented in the sub-heads under 5.3.3.

### 5.3.2.4 Category 1.4: Inadequate support from MoPSE

The differences in the presentation of laboratories, e-learning hardware and software highlight the initiatives of these individual schools.

## 5.3.3 Interviews findings and analysis

### 5.3.3.1 Category 1.1: Lack of policy guidance on how to implement e-learning

Findings indicated that teachers' *understanding of e-learning was an indicator of lack of policy*. The first part of the interviews sought to capture the teachers' understanding of e-learning before getting into how e-learning was implemented in the schools.

The teachers described e-learning as the use of modern electronic gadgets to impart skills and knowledge to learners. They indicated that, in the primary school, this is done within the four walls of the classroom for the purpose of demonstrating, explaining, and simplifying concepts; as well as for assessment, evaluation research, and homework. Teacher 1 described the implementation of e-learning as follows:

*Learners can have lessons while at home. Computers and mobile phones can be used in e-learning. In this school, we have computers, tablets, projectors mounted in each classroom and interactive boards. Internet, Wi-Fi and application software such as MS Word, MS PowerPoint is essential in preparation of learning material for primary school learners. WhatsApp platforms and e-mails can be used in e-learning. (TA1)*

The teacher detailed what happens in an e-learning environment but he said it was not fully done in their school due to various challenges. A teacher from School B described e-learning as the use of computers to assist in lesson delivery. This was the consensus of what e-learning was in the school. He said:

*In my understanding, e-learning is a situation whereby the teacher who has been given a computer uses it to plan for the lessons, research and find information to teach learners. If learners could have their own computer, the better because they can then work on their own to research and do homework even at home. (TC1)*

Teachers in School C described e-learning as the use of television and the laptop to help in preparing for lessons. The laptop is used to access the internet, which the participant said was available for all teachers' use in the school. Each teacher said they had a laptop. A grade one teacher said she used the television and DVD player to show some content to learners. The following was her understanding of e-learning:

*E-learning is when I use electronic gadgets like that TV and that VCR to show learners some learning material. For example, I am not conversant with Visual and Performing Arts content, so I record from YouTube then play on the following day to these Grade ones. (TC3)*

### **5.3.3.2 Category 1.2: Sporadic implementation strategies**

Responses showed that how teachers implemented e-learning in the primary schools differed. Responses to this category therefore differed from school to school. In School A, Teacher 3 gave the following model of e-learning in the school:

*We have projectors in every classroom, and each teacher has a laptop. We have software installed in our laptops that we use to teach certain concepts or to consolidate concepts. The school has a laboratory where learners go and use tablets. The tablets are one to one when learners are in the computer laboratory. These are the tablets used by all learners in the infant department. We have 525 ECD to grade two learners in the infant department. The junior school has its own computer lab, so the school as a whole has two computer labs. Our classes are big. I have 60 learners here. We do not have a system of doing it, and our head, when she comes for lesson observation, she expects us to make use of the technologies that have been made available to us. (TC1)*

The head of School A also indicated that the school made use of learning portals which the school paid for. She said:

*When I hear about a new technology, I quickly grab it for my teachers. At the moment, we have four sources of digital content for use by our teachers to implement e-learning. We have Ruzivo, Britannica, Encarta and Dare Dzidzo. This is one of the first public schools to purchase the basic e-learning equipment, which are computers, interactive boards, projectors and tablets for learners. (HA)*

School B had a cart of laptops used to move them around as the teacher uses them to teach. These are mainly used by the teacher who teaches computers. Computer teachers teach computers as a subject to the allocated classes ranging from ECD to grade 7. Teachers with specific classes book for the use of the laptops. Teachers did not have laptops provided by the school, as was the case in Schools A and C. The use of electronic media rested upon the teacher's interest as resources in the form of computer hardware and; therefore, was not sufficient.



HB also explained how the school had put some effort to implement e-learning:

*We have used the e-learning platforms like Ruzivo. You submit children's names. Each child is given a password. Access will be on any gadget as long as you have internet connectivity and a gadget. This is done by interested children. We also have Dare Dzidzo but then, when it came we had part of the new curriculum, they were offering old curriculum staff. So, the school had to pay for the installation of Dare Redzidzo e-learning platform for the tutorials that they offer. Their content was solely old curriculum, when the school was adopting the competence based updated curriculum for some of the grades. It was value for money that we considered and stopped the payment to the organisation. It was affordable though. They offered tutorials in English, mathematics, and Shona. The content was aligned to the old curriculum syllabi and much better than Ruzivo Digital content platform. (HB)*

The schools had also installed some applications that teachers and learners could make use of. Here is an explanation of how this worked in the schools:

*We have some educational content purchased by the school, and learners can use them in the school and at home. We can make use of the activities offered there to give differentiated activities to learners, which is one aspect of e-learning. It allows for fast learner to move on, and slow ones to have time to regurgitate concepts that they might have not grasped during lessons. Yes, we have learning content in subjects such as in science, maths, and heritage social studies. We have software Dare Redzidzo. We use that one. All learning areas are covered. (TB1)*

The way e-learning was being implemented showed no specific pattern or some sort of road map being followed since the schools are in the same set up. Each school is doing what they deem as correct in terms of e-learning.

### **5.3.3.3 Category 1.3: School readiness**

When asked about how ready the teachers are to implement e-learning, the following responses were given in the three schools

*I am ready to use ICTs to teach. I even do that at home with my own children. If we are provided with the laptops and internet made available, then what could stop us? Any new thing can be learnt. When smartphones came, we did not know how to use them, but now we are proficient. The school should just give induction and we are ready to go. (TB3)*

The same sentiments were shared by another teacher from a different school. The teacher responded to the question on preparedness or readiness as follows.

*Even though I have not been trained under the ministry capacity development programmes, I already hold a certificate in ICT. I am conversant with the gadget. (TA2)*

The teacher who indicated a different view had this to say about readiness:

*The laptops that the school purchased for us teachers are meant for my plans of work and preparation. E-learning is only being implemented by the infant department because they are the ones who have the equipment. In my classroom I only have a laptop. Our desktops are in the computer lab. (TC3)*

School heads also shared the schools' readiness to implement e-learning:

*We have included the issue of purchasing e-learning equipment in our budget and it is also part of our strategic plan to improve the pass rate in the school. As a school, we mostly get our funds from levying parents and guardians. The levies are distributed among several needs that the school has. Some of them cannot be compromised such as utility bills and cleaning materials. We need to keep our hygiene standards high. Such things take a lot from our school coffers and we end up dropping the purchase of computers and other e-learning equipment as well as software. (HC)*

*Our school is making efforts to prepare, teachers, learners and parents for e-learning. So far we have trained all teachers at school level just to navigate the equipment that we have. Our SDC have purchased learning management software that we are using. The content has been uploaded into our school computers. However, it is still very difficult for us to have online lessons at the moment due to the fact that some of our learners do not have access to internet at home. Parents do not allow them to use their smartphones for educational purposes, but we have some who allow their children to access educational sites, like our own MoPSE digital platform. (HA)*

*Our teachers are not yet ready, I do not want to lie to you. In this school I have about three to four teachers, aged ones of course, who are very negative about ICTs. As a school we have tried to make use of Ruzivo, a digital learning platform, but we have since dropped it because they want payment and we are not able to pay for it. Our budget is strained with more need issues. We have also sent teachers for training. At school level, teachers are difficult to train. Some are not interested. (HB)*

There were mixed responses from the teachers. TB3 and TA2 were confident of being able to effectively use e-learning in day-to-day teaching and learning activities provided resources were made available. However, TC3 had a different view as the question of readiness was discussed. It seems as if, within the same school C, some teachers were ready while others were not. This mixed readiness was caused by the school authorities who availed resources to the infant department or level and not to the other level of the primary school, the junior level.

All heads, HA, HB and HC highlighted some level of readiness in their schools but with varying intensity. According to the head's indication, School C had gone an extra mile compared to its counterparts in this research. HB brought a very interesting observation worthy taking note of in this study. This was the issue of attitude towards ICTs and e-learning from aged teachers in the school. Not only aged in some instances, but also some who are not comfortable with innovations. They are stuck in their old ways of doing

things. The attitude could also be attributed to inadequate resources. The three heads also indicated financial resources as a major constraint or setback to effectively implement e-learning.

#### **5.3.3.4 Category 1.4: Lack of support from the MoPSE**

The teachers also showed that the MoPSE was not doing enough to support the e-learning initiative.

*The ministry should assist us to have subsidised personal computers that we will pay for and be able to use them at home. E-learning is something that we need to do even from home. (TB2)*

This notion was supported by the following participants as they gave their views in the following excerpts:

*Computers, smartphones and other gadgets are very expensive for us. Our salaries are very low. We cannot afford to buy such gadgets, but they are very essential in this day and age of technology. (TB2)*

*The SDC and the school should assist us to have data, it is very expensive to send and receive information from learners when we are at home. It is alright that there is internet connectivity when we are in the school. Now that the school has purchased a generator, the issue of power is no longer a nightmare. Learning through ICTS would continue undisturbed. (TA3)*

The government has always been in support of these initiatives. A number of teachers have been involved in capacity development in different areas. Primary education was made free in 1980 to allow education for all. Levying of parents was an idea adopted in order to allow fairly economically performing societies to assist in government initiatives to uphold the quality that the nation aspires to reach. Zimbabwe is amongst the leaders in literacy but, unfortunately, technological literacy remains an area of concern. The issue

of subsidies raised by the teacher is one possible solution to the challenges faced in the successful implementation of e-learning.

The parent ministry has rolled out teacher capacitation programmes, but the schools had only 1 or 2 who benefited out of 40 or so teachers in each school. Each school however sent its own teachers for capacity development. Most teachers have not been beneficiaries of the teacher capacity development programmes. This shows that the support for schools is not adequate.

#### **5.3.4 Overview of Theme 1**

Theme 1 (*lack of enhancers*) and its tagged categories (*guidance on effective implementation of e-learning, sporadic implementation, school readiness, and inadequate support from MoPSE*), indicate that there is no specific policy guidance on e-learning implementation. This section focused on policy directives, models and frameworks that provide a road map for e-learning implementation in schools. Evidence from documents, observations and interviews showed that policies are there which speak to the implementation but they lack specificity. The current policies mandate the schools to implement e-learning but do not go further to say how that could be done. This leaves schools to implement it in their own ways, following their resource endowment, technical expertise, and the discretion of both teachers and school leadership. Findings indicate that schools do not have clear-cut policy directives for the implementation of e-learning. The section stressed the need for teacher readiness for implementation of e-learning, which some school leaders regard mainly as a need for capacity development for the adoption and use of ICTs in teaching and learning. The school heads appealed to the MoPSE for support.

The second theme that emerged from data is presented in the next section.

#### **5.4 THEME 2: INEFFECTIVE SCHOOL E-LEARNING IMPLEMENTATION PROCESS**

The researcher considers the school as a complex organisation where broad lenses are required to assess its role in the implementation of a programme such as e-learning. The

NCCA’s Guidelines for Teachers for the Integration of ICTs in the Primary School Curriculum (2005) identifies factors within the school, which must be considered and evaluated for effective integration of ICTs in the school curriculum. The researcher adopted these, and developed a framework for evaluating the school system in terms of how it affects implementation of e-learning in primary schools (see appendices). Components of the school system and the evaluation questions were used to gather data on the school’s role in supporting teacher implementation of e-learning. This also assisted with the following categories tagged on the theme, that is, *ineffective school e-learning implementation process*.



**Figure 5.2: Categories tagged in the theme: Ineffective school e-learning process**

## 5.4.1 Document analysis findings and analysis

### 5.4.1.1 Category 2.1: Curriculum support and integration

Findings in this category were from the schools' vision statements, mission statements and strategic plans. The three documents complemented each other, as the vision and mission statement were encapsulated in the strategic plans. School A's vision spelt out the technology use aspect in its presentation. Schools B and C had nothing explicitly indicated in the vision, mission statement and core values to support technology integration. Table 5.8 shows the vision statements of the three schools. These were displayed in the schools' administration blocks foyers.

**Table 5.8: Schools' vision statements**

School A	<i>A trend-setting, ICT-driven, well governed academic centre of excellence producing holistic world-class citizens</i>
School B	<i>To be the best school in respect of academic work results, building maintenance, grounds maintenance, sporting activities and socially developed beings</i>
School C	<i>To be the best performing school in Harare.</i>
MoPSE	<i>To Be The Leading Provider of 21<sup>st</sup> Century Inclusive Quality Education For Socio-Economic Transformation By 2030.</i>

The strategic plans reflected the schools' commitment towards the mobilisation and setting aside of resources for effective implementation of e-learning. The five-year strategic plan of School A articulated the channelling of resources towards procurement of e-learning material and training of teachers. In its five-year school development plan, School B also indicated the issue of channelling resources towards teacher training on e-learning. The same is reflected in School C's strategic plan, where e-learning was highlighted as one of the focus areas of the school.

The implication of the findings is that, vision statements show inability by the school leadership to enact their vision from the MoPSE vision. The MoPSE vision speaks of being the leading provider of 21<sup>st</sup> century, inclusive quality education for socio-economic transformation by 2030. Vision statements from the schools are not all encompassing to cover the provisions of the MoPSE vision. This indicates failure on the part of school

leadership and the school development committees to align with the requirements of the MoPSE. This may lead to failure to support curriculum activities.

While these MoPSE and school documents indicated commitment by the schools to the implementation process, there was a mismatch between school planning, vision statement, and e-learning technologies and gadgets as indicated in the schools' census statistics section. This section in the Education 46 form, school census statistics (ED46 –C1 primary), requires school heads to furnish the Ministry of Primary and Secondary Education with the available e-learning infrastructure in the school. This section did not tally in its provision with the enrolments and e-learning requirements of the schools.

#### **5.4.1.2 Category 2.2: school policy and e-learning integration and use**

The researcher found out that the Ministry of Primary and Secondary Education had a draft on ICT integration in schools. The draft had this about e-learning in schools:

*The country has 1 336 140 infant and 1 841 600 junior learners who are spread in 5 933 primary schools. Of these schools, only 303 have internet connectivity and have integrated e-learning programmes into day- to- day teaching and learning, but with great variations between urban and rural as well as government and non-government schools. (ICT Policy for Primary and Secondary Education in Zimbabwe Draft, 12 November 2016, p.4)*

The draft acknowledged that quite a substantial number of schools have begun integrating e-learning programmes in their teaching and learning activities. The draft already notes disparities between urban and rural and between government run and non-governmental schools.

While there is general knowledge of the provisions of the national ICT policy for the integration of ICTs and e-learning in the school curriculum by the school leadership, none of the participating schools had a customised, school-based acceptable use policy (AUP). The schools were laden with general policy documents for guiding the general functioning



of the schools, but none of them was about e-learning implementation. The result was ineffective e-learning implementation.

#### **5.4.1.3 Category 2.3: e-learning network and equipment**

From documents such as the schools' inventories, findings showed that all the schools were networked. The inventories showed existing infrastructure. Generally, all the three schools had a well-managed inventory system, tracking all computer hardware in the school, including their functionality status. School A's system was most advanced and most elaborate, and included maintenance dates, faulty equipment, and reports on servicing. School B had 50 laptops but only 34 were recorded as functional, while 16 were damaged beyond repair. School C had some outdated desktops that were no longer compatible with the latest software programmes needed for e-learning.

Ineffectiveness of the school system is shown in the differences that is seen among the schools in terms of systems available to track all computer hardware and software, which was evident in School A. School B lacked close tracking because a number of laptops were broken down. School C was even worse because the laboratory was full of computers, but these were no longer compatible with the latest software. This indicates that the systems in Schools B and C were not effective. Implementation of e-learning rests upon the resilience of the school as a system.

#### **5.4.1.4 Category 2.4: E-learning equipment storage and maintenance**

The question here sought to establish whether the schools had procedures in place that ensured the safe storage of e-learning equipment and software, and provided for routine maintenance and repair of equipment. In School A, equipment was stored in a computer laboratory. All the tablets were locked in a strong room. They were taken when they were to be used. In School B, laptops were stored in a trolley. This was locked in the administration block secured with burglar bars. The block had a security alarm as well. In School C, teacher laptops were kept by the teacher. Computers were kept in a well secured laboratory.

Just as with the inventory of existing equipment, the schools had laid down procedures for servicing and maintenance of e-learning equipment. Servicing of equipment was outsourced as the schools did not have a specialist e-learning equipment technician. When the equipment failed to work during the lesson, this meant that the school had to wait for the technician who would not be readily available. This, therefore, challenged the implementation of e-learning.

While the three schools had made great strides towards storage, the main challenge was in the outsourcing of personnel to service and fix the equipment. School A had some broken down projectors which had gone for weeks without fixing. The inventory showed that the projector had broken down for over a month. The school was failing to act timeously to fix the problems. School B had 16 laptops awaiting servicing and checking. They had been down for quite some time. School C also had a number of old machines which not only needed to be repaired but also to be replaced by new ones. The researcher is of the view that School C faced financial challenges. School authorities probably prioritised other needs of the school at the expense of e-learning equipment servicing, repair and purchase. E-learning was still a far cry if IT personnel would take time to fix technological problems and, school administrators prioritise other issues in the school budgets at the expense of e-learning hardware and software.

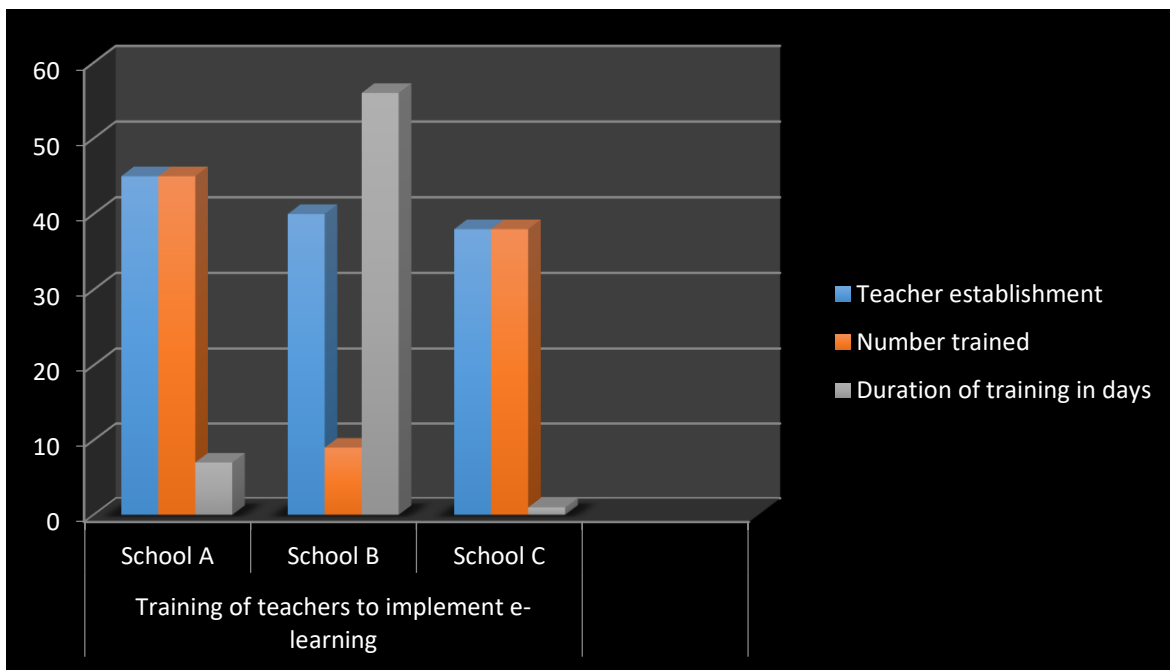
#### **5.4.1.5 Category 2.5: E-Learning coordination**

Documentation, that is, the Ed46 form analysed in each school showed that in School A, there were two teachers specially trained to teach computers as a subject, which could be called learning about ICTs. Schools B and C had one each. The schools, therefore, had potential leaders with the right technical expertise to support others for the successful adoption and implementation of e-learning.

Surprisingly, such teachers were not equipped with enough resources and, without further training in new technologies, they may end up lagging behind and; thus' fail to coordinate the implementation. The school enrolment, as shown in the same ED 46 document, showed that School A had 1400 learners, School B 1560, and School C 1460. These enrolments showed a great deficit in terms of the ministry policy on teacher-learner ratio for technical – vocational subjects. For instance, one teacher in Schools B and C

taught 1400 plus learners. This is unrealistic if learning about, with and through computers is to be achieved. The MoPSE policy on teacher-learner ratio is 1:200. The schools had a deficit of five to six of teachers. The school system, that is, including stakeholders, are letting the system down leading to inefficiency in the implementation of e-learning.

**5.4.1.6 Category 2.6: E-learning professional development**



**Figure 5.3: E-learning professional development**

The school budgets for School A and B showed that there was allocation of funds for teacher training. In school B, nine teachers out of 42 had been trained. School A had only one teacher whose in-service course on e-learning was being paid for by the school. Others had trained at school level. Figure 5.3 shows information about teacher training, duration of the courses, and areas in which the teachers had been trained. Teachers from Schools A and B had been sent to a local teachers' college for an in-service course in the use of technology, such as computers and its applications in teaching and learning, as well as how to plan using computers.

The findings indicate that School B had 21% of the staff complement who received training. School A was sponsoring only one teacher, and not the other teachers. It is

noted that at school level, training is short, done for a day or two but enrolling at a college takes a year to two years. This means that the training is robust. The teachers who train at the institutions are most likely to be more equipped than those that are trained at school level. All that shows inefficiency on the part of the school system to effectively take on technology integration. The goal of technology use is to have total infusion of technology, and not only a handful of teachers. Schools lacked enough funds for training or if funds were available, the issue could be on prioritisation by the leaders.

#### **5.4.1.7 Category 2.8: Planning for inclusion**

The finding here was that the schools did not have school based e-learning policies. There was no documentation to support e-learning activities in the schools. Inclusive practices were, at best, only on sporadic; and based on the skills and natural qualities of the teacher in question. At a micro scale, and in isolated cases, some schemes of work and lesson plans reflected positive intent towards ensuring all learners were included.

For effective e-learning implementation in a primary school, there should be policies and procedures in place to support equality of access to e-learning resources for all learners irrespective of gender, age, cultural background, special educational needs, and learning support needs. This meant that this area was not being given due attention.

#### **5.4.1.8 Category 2.9: E-learning hardware and software health and safety**

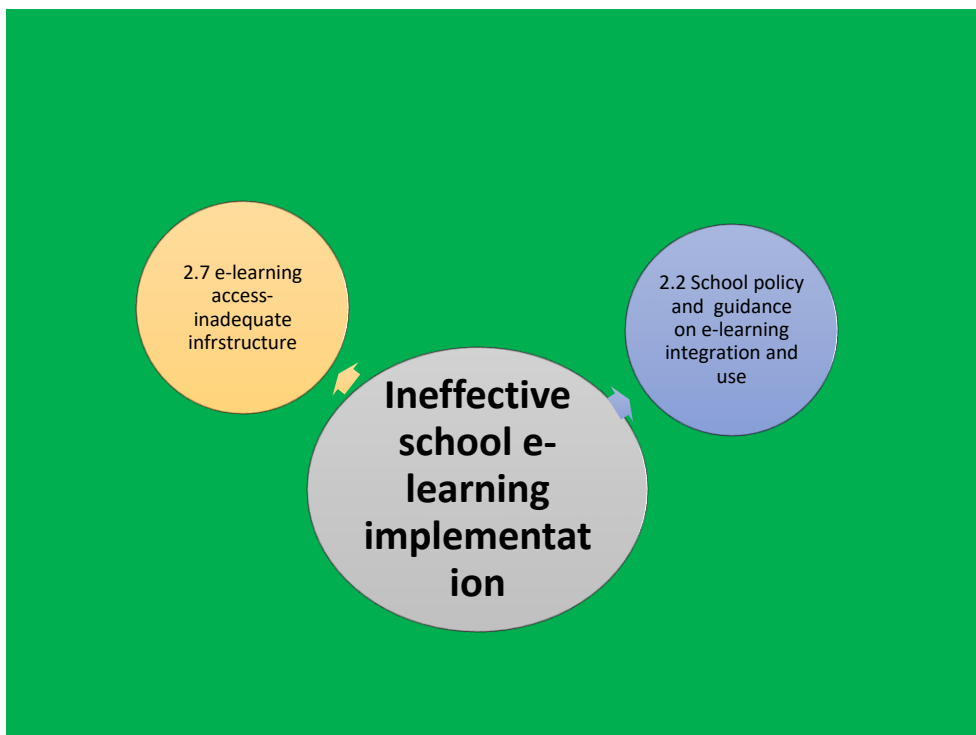
This was a critical factor addressed in a standard school-based e-learning policy, which all the three schools did not have.

Policy directives are an essential part of effective e-learning implementation at primary school level. The health of both teachers and learners are of paramount importance in e-learning implementation. Lack of such knowledge means e-learning is most likely unable to take off, and neither successfully nor effectively implemented.

### 5.4.2 Observations findings and analysis

In this area, the researcher observed school attributes that showed the presence of e-learning. The researcher also observed lessons from the nine teachers. Observation of lessons and e-learning infrastructure provided answers to the research questions.

The lessons observed, as well as the observation checklist of the presence of e-learning attributes in the school, had 3 of the ten categories tagged in Theme 2. The categories were also noted from data from both documents and interviews. The figure shows these categories.



**Figure 5.4: Categories tagged in the theme: Ineffective school e-learning implementation on non-participant observation**

From the 10 categories tagged in Theme 2, two came out explicitly from observation data. These were:

- i) Category 2.2: School policy and e-learning integration and use
- ii) Category 2.7: E-learning access- inadequate infrastructure

**5.4.2.1 Category 2.2: School policy and guidance on e-learning integration and use**

**Table 5.9: Findings from lessons observed**

TEACHER	GRADE TAUGHT	LEARNING AREA	HOW E-LEARNING WAS IMPLEMENTED
TA 1	4	ICT	He used a computer-based programme to teach shapes and colouring.
TB 1	2	ICT	Learners were sharing a computer and the teacher used Microsoft office to teach colouring
TC 1	4	ICT	Using prepared educational content in the desktop computers, learners were taught computer programming. Some computers were not functional, so there was congestion on the functional machines.
TA 2	ECD A	Maths	Learners had each, a tablet and they used digital content installed by the school to learn about shapes.
TA 3	1	English	Teacher did not make use of her digital content because the projector was awaiting fixing.
TB 2	2	English	Learners listened to a recorded audio of the articulation of words with the “ck” sound. The teacher used her personal laptop. Sound was low since the class had 50 learners.
TB 3	4	Heritage Social Studies.	No implementation was noted during the lesson.
TC 2	1	Mass Displays	The teacher had downloaded some dances from YouTube, and these were played on the television in the classroom using a VCR.
TC 3	5	Shona	Only had the schemes prepared on her laptop, but no use in the actual teaching and learning was seen.

The above findings indicate that TA1 and TB1 delivered the lesson using technology, and both the teacher and learners were in the same environment. According to the definition of e-learning in this study, this constitutes e-learning. However, it was noted that TB1 had insufficient computers, and learners were sharing. This was noted as one challenge that the three selected schools faced in the implementation of e-learning.

TA1, TA2 and TA3 had digital content installed on their PCs. The digital content was from private companies, and these schools were capable of paying for the installations. One challenge noted from Teacher TA3 was that, on the day of observation, the projector was broken down and the teacher could not use it. The teacher said the school was waiting for an expert to fix it.

TB2 made use of recorded teaching of phonics in English. The volume was very low. The researcher noticed that use of speakers could have made it louder. In a discussion after the lesson, the teacher also indicated that the laptop used was not school property. This showed inadequacies in infrastructure to allow for effective e-learning implementation in schools.

TB3 and TC3 never showed any e-learning in their lessons. The discussions after the lesson indicated that they were going to send homework through the class' WhatsApp platform. It is in this communication that learners were going to research on the renewable and non-renewable sources of fuel, that is, the topic they had learnt.

TC2 used content downloaded from YouTube to show some dance moves that the teacher wanted learners to practice in a Mass Display lesson in a grade 1 class. In a primary school, this qualifies as e-learning. It can be noted that e-learning was demonstrated in these lessons.

As shown on Table 5.9, there was no specific way of implementing it. Each school did it in a way it deemed suitable and, according to what it could afford. No seriousness was rendered to teaching through ICTs (e-learning) because there were no specific policy directives from the MoPSE. The different ways in which e-learning was utilised in the lessons shows diverse conceptualisation of e-learning from teachers in the same school. Even though the policies are available to stress the importance of the use of technology, the policies do not zero in on the actual 'how' part of the implementation. This leaves most of the teachers confused and unsure of what exactly to do. The policy guidance is inadequate as evidenced by the lessons delivered. Teachers also lacked knowledge on conducting online lessons. They all thought e-learning was only about the teacher and the learners being within the four walls of the classroom. E-learning could be done when the teacher and the learners are physically apart synchronously or asynchronously. The use of WhatsApp is an example. Teachers could send voice notes giving instruction on how to calculate a mathematical problem. The teacher then gives six to ten different problems, which require the same way of solving them. Learners then listen to the voice notes while at home at different times and do the work (asynchronous e-learning)

### 5.4.2.2 Category 2.7: E-learning access - inadequate infrastructure both hardware and software

The observation checklist for schools' e-learning hardware and software indicated the following findings.

**Table 5.10: Checklist of e-learning facilities**

School	Presence of e-learning facilities											
	Functional laboratory	Desktops in lab	Computers in c/rooms	tablets	Interactive boards in c/rooms	Interactive boards in lab	Others like TVs, DVDs etc.	Internet in c/rooms	Internet in lab	Projectors	Electric wiring	Education platforms like Ruzivo, smart kids etc.
A	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓
B	✓	✓	X	X	X	X	X	X	✓	✓	✓	X
C	✓	✓	X	X	X	X	✓		✓	✓	✓	X

Findings from the observation of e-learning attributes showed that access to e-learning infrastructure did not match the number of learners in the schools. In School B, access to internet did not cover the whole school. Schools B and C had one computer laboratory to cater for learners from ECD-A to Grade 7.

School A stood a very good chance to implement e-learning as it had twelve out of the twelve basic requirements, translating to 100% availability. School A therefore had all the ingredients necessary for e-learning. School B had five out of twelve, translating to 41% availability of the requirements illustrated in Figure 5.9. School B is lacking most of the listed requirements, which could affect implementation. School C had seven of the twelve basic requirements translating to 58.3% availability. The school was capable of implementing e-learning to a certain level. Digital content and platforms used by the primary schools under the same jurisdiction, in this instance, all were under the MoPSE and guided by the same curriculum framework, should have a system in place of how to implement e-learning.



### 5.4.3 Interviews findings and analysis

Theme 2 had three categories confirmed by document analysis from the ten categories tagged in the theme. In this section, Theme 2 and categories tagged in it are presented and analysed. These were:

- i) Category 2.6: E-learning Professional Development
- ii) Category 2.7: E-learning access.
- iii) Category 2.10: E-learning review and evaluation.

#### 5.4.3.1 Category 2.6: E-learning professional development

In the evaluation of the school system under this component on continuing professional development of staff, the questions sought to establish the level of staff knowledge/expertise in relation to e-learning; the teachers' awareness of the most appropriate training programmes to support them in incorporating e-learning into their teaching; and whether teachers received sufficient resources (time, training and support) to develop the skills and knowledge required to effectively integrate e-learning in their teaching. This is what one school head said about professional development supported by the school as a system:

*We have so far sent nine teachers for training at Morgan ZINTEC College on ICT integration. Is that not close to e-learning that you talking about in your studies madam? Once you develop abilities in ICT use, you are home and dry. It is only that the school cannot send all of them at once because there are costs to it. So far we have sent the deputy head and a few key teachers. We have teachers who do not want to go for training at all. For example, Mrs ... and Mrs... are almost to their retirement age, so they say they do not want to be troubled. The SDC, on the other hand, is hesitant to spend the school funds on teachers who eventually leave the institution. For example, one of the beneficiaries, the deputy head left the school soon after completion of the course on promotion as head in another school. (HB)*

In response to the same questions on teacher professional development, another head also shared that:

*The school gets its funding from the levies and fees paid by the parents and guardians. In our school development strategy, capacitation of teachers is one of the pillars to improved quality of education that our Education Act calls for and the curriculum framework for the competence-based curriculum that I showed the other day you were here to see documents that relate to your area of study. Even if you look at our annual budget, it sets aside funds for development of our staff. Not only do we develop teaching staff but also non-teaching staff. The school has one teacher who is currently doing a block release programme sponsored by the government. The teacher was lucky to be selected. If we could have more of them doing programme, that would improve our staff. However, we've not just waited to see how far the government will take but, as a school, we do our short training to equip our teachers. Even the old teachers who are almost retiring can now navigate the ICT tools that we have in the school. At first, the older teachers were hesitant but, over time and through encouragement from the administration, they are doing very well. One of them Mrs ... who teaches special class is doing very well. The learners now enjoy lessons through the use of digital content and software that we have installed in our school computers. We have two labs, one for the infants and the other for the juniors. Teachers can make use of the afternoon to learn computer skills with the help of our ICT teachers and other teachers who are younger. Younger teachers are very versatile. They like ... and grasp very fast the use of educational technology. The digital content you were checking the other day has now been handy with them. Let me also hasten to say that we have a mixed bag of teachers. Some are still adamant about technology use, they are fearful. (HA)*

The third school head had also similar sentiments on teacher profession development:

*The school has participated in the training programmes that were availed by the district. Most of the teachers attended. The time was too short and some do not continue to practise and hence, they lose memory of some of the ways in which these things are done. Infusion of technology in teaching and learning is experiential. One develops expertise through continued use. It is just like driving. One gets a driver's licence today but it takes a bit of experience to master all the competences on the road. Similarly, if our teachers do not continue to make use of the gadgets they do not gain experience. As a school, we have not yet sent our teachers for training at Morgan College. The school funds are not enough. Things are not well with our parents in this economy madam. (HC)*

Not only school heads indicated that training is essential but also teachers:

*E-learning requires us to get trained regularly. A programme was recently introduced at the school and our school head embraced. It's called PROFUTURO. It requires training on how to manage the teaching and learning software. Even though I once trained in technology use, new technology is coming in. (TA2)*

*My fellow teachers do not want to be trained. I have always requested through the head's office that those who need assistance in the use of educational technology should make use of afternoons so that I can assist them. (TB1)*

The findings reflect varying levels of expertise from specialist to novices, as reflected in the teacher participant profiles. From interview data, specialist teachers, who are TA1, TB1 and TC1 showed their awareness of the existence of training programmes available to meet their capacity development needs for effective implementation of e-learning. This, however, was not the case with Teachers TA2 TA3, TB2, TB3, TC2 and TC3, who all relied on the schools to identify the training programmes for them. The question about resources explored, not just the material resources like e-learning equipment, but also

the school's commitment of financial resources to support continuing professional development of its staff towards effective implementation of e-learning.

The issue of age was raised by HB but HA refuted this as the old teachers at the school showed great interest and made use of the provided educational technology.

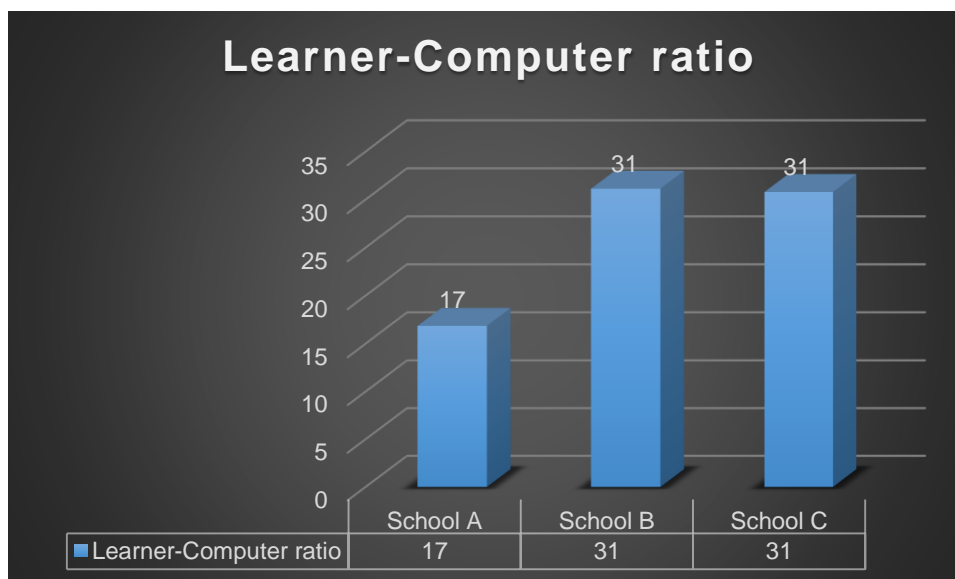
#### **5.4.3.2 Category 2.7: E-learning access**

Under this component of the school system, the researcher explored the issue of whether all learners and teachers had opportunities to use the school's e-learning resources, whether in a shared computer laboratory (for example, timetabled sessions) and/or in individual classrooms (for example, on a rota basis). The findings are detailed below.

The biggest hindrance to accessing e-learning seemed to be the shortage of resources. One teacher painted a bleak picture on the shortage of relevant e-learning resources, indicating a lack of both laptops and training for teachers in their school. The participant said:

*I will use the computers when the school provides me with one, and I do not know what criteria was used to send some of the teachers for training. I am willing to embark on the new method of teaching provided I get the necessary resources. (TB3)*

Figure 5.5 indicates the number of computers that the three schools had, versus learner enrolments. This helps to demonstrate the learner to computer ratio. Schools B and C had a high learner to computer ratio of 31 learners to one computer, whereas School A's ratio stood at 17 learners to a single machine.



**Figure 5.5: Learner-computer ratio in the selected schools**

Schools B and C teachers said much about shortage of computers provided by the school, while School A was a bit comfortable with infrastructural resources provided by the school. TB1, TB2 and TB3 had much to say about insufficient computers and laboratories in proportion to the number of learners enrolled in the school; almost 1562 from ECDA to Grade 7. All these used one laboratory, which was well- built, but only had a capacity of 56 learners for School B and 50 learners for School C. They were demoralised and demotivated by unavailability of computers in the classrooms, both for teachers and learners. Below are some extracts from the interviews:

*I am not satisfied with the support that the Ministry of Primary and Secondary Education is giving to primary schools in order for us, as teachers, to be able to use e-learning as an aid in teaching and learning. In the school, very little is done to procure the technologies like interactive boards, laptops for every teacher and ensuring availability of power. We need desktops within the classrooms; the small computers that we have are movable. You have to move from one classroom to the other, and this is not feasible for young children in Grade 3 (7-8 year olds). If there is no electricity, it means there is no e-learning. If we had the technologies in the classrooms, I can use them in all the subjects that I teach. I can say, 'get laptops from the lab and use them in the classrooms.' There is no e-learning in this school. (TB1)*

*We do not have the technologies in our classroom specifically provided by the school. Right now, if I want to do something on the computer, I have to use my personal computer. That same laptop is also used by my son, who is in secondary school. It would be better if the school could provide us with laptops. (TB2)*

*I have my cell phone and my laptop. Yes, we have computer lab, and we use it once a week for 30 minutes. I am not satisfied with the e-learning technologies that we have in the school. We only have one lab and I have 54 learners in a class. So, to attend to them in 30 minutes, it's not adequate. I need more time. If funds permit, we need more labs and gadgets. (TB3)*

*In the lab, we only have computers and no other gadgets that complement the computer in order to make e-learning a success. Children need their own cell phones and overhead projectors in each class, and cell phones. (TB1)*

Dissatisfaction was also indicated on the unavailability of IT staff to take care of broken-down devices, and to fix connection problems.

The conversation on access to e-learning resources to support effective implementation of e-learning inadvertently strayed beyond what the schools were providing to both teachers and learners, to how the home and families were complementing the school's effort in implementation of e-learning.

Next to the large class sizes as an impediment to access, teachers lamented that they were failing to get the support of parents in their effort to implement e-learning. As noted by TA2, most parents did not allow their children to carry or use cell phones to research at home. When asked about giving homework using e-mail or WhatsApp, TA2 said:

*We are not yet there, ma'am. Our parents do not allow their children to use their cell phones for homework at home, so all the use of electronic media is done here at school. (TA2)*

In an interview with TA3, the researcher noted that the teacher taught a class of 25 learners, and they all had tablets that were kept in the school lab for security reasons. There was an interactive board in the classrooms, and a laptop provided by the school. There was also a desktop computer in the class for use by learners. Learners went to the laboratory for computer lessons but also took them if there was a lesson that required learning software that was installed in the computers located in the school's computer laboratory. In an interview, the teacher had this to say about learners going to the laboratory during their own time:

*It promotes discovery learning. Learners get a chance to do their own things on their own. (TA3)*

The teacher participant also considered this as an advantage of e-learning, as learners learnt at their own pace and at their own convenient time. However, this would not be as independent as it would be in universities and colleges. Primary school learners needed guidance from the teachers. So, in the teacher's view, the kind of e-learning that is in the primary school is not the wholly online such as in colleges and universities. The teacher argued that e-learning in the primary schools was better delivered through a combination of web-based learning and face-to-face learning. The e-learning was guided by the teacher.

In a case of contrasting fortunes, TC1 complained about the condition of computers in the laboratory saying they were old:

*They are now obsolete or in other words, I can say all the 50 computers in lab are semi-functional. They are windows XP. Windows XP can only be updated to windows 7. They cannot go further than that, otherwise they begin to freeze. That is one limiting factor to my job. (TC1)*

While School B had portable laptops, School C had just a few desktops in both laboratories, one located in the infant department and the other in the junior department of the school. Asked about the computer laboratory TB2 said:

*I have my cell phone and my laptop. Yes, we have a computer lab, and we use it once a week for 30 minutes. I am not satisfied with the e-learning technologies that we have in the school. We only have one lab and I have 54 learners in a class so to attend to them in 30 minutes, and that is not adequate. I need more time. If funds permit, we need more laboratories and computers. In the lab, we only have the computers; learners need their own tablets and overhead projectors in each class and cell phones. (TB2)*

The sentiments shared by TB1, TB2, TB3, TC1, TC2 and TC3 converged on the fact that the schools have inadequate infrastructure and resources which are crucial determinants of e-learning implementation. TC1, TC2 and TC3 showed that their school is better resourced than the other schools. The implementation process is bound to be more effective in School A than in Schools B and C.

#### **5.4.3.3 Category 2.10: E-learning review and evaluation**

This component sought to assess the participation and involvement of implementers (the teachers) in periodic evaluation of the use of computers and other gadgets that facilitate teaching and learning through technology in the school curriculum, and the subsequent modification or revision of the school plans. The teacher at School A expressed satisfaction with the involvement of stakeholders in e-learning review and evaluation:

*Every end of term, we have an evaluation workshop and the SDC hires an expert who occasionally comes to facilitate the evaluation of school programmes, one of them being improving pass rates which we think can be enhanced through e-learning. This is someone who is not part of the school, an expert in creating strategic plans. This involves all stakeholders including representatives of the school parents' body, the administration, parents' representatives, grade representatives and community leaders' representatives. The district office to represent the district school inspector is also invited. (TA2)*

This contradicted with what happens in Schools B and C.



*The school leadership does not involve the teachers; they only consult the ICT teacher. Our ideas are not considered (TB3).*

*Even if you look at our school vision, no teacher gets into planning meeting. There is no evaluation here. I do not know, probably the head does it alone with the ICT teacher. The school leadership should know that we also have valuable contributions. (TC2)*

School A was quite advanced in the involvement of teachers in ongoing reflection, and planning for the integration of e-learning practices in the school curriculum. The school employed a decentralised planning system that ensured participation of all members of staff. However, in Schools B and C, only the specialist teachers were involved in school-based evaluations and planning for the implementation of e-learning. At primary school level, the strategy needs participation of all teachers, and not only specialist teachers.

#### **5.4.4 Overview of Theme 2**

This theme addressed the school system and how it affected the implementation of e-learning. A number of issues were raised concerning the school, ranging from policy; leadership; to issues of resources, their availability, management, storage and maintenance. The study observes that schools which excel in the use of e-learning are mostly those where the leadership, in the form of school heads, embrace the potential of technology to improve teaching and learning. The leaders were themselves modelling e-learning implementation. These research findings convey the message that the sustainable use of electronic media by teachers and learners depends on the school head's interest in learning technologies.

Issues of teacher professional development as a responsibility of the school were also raised, together with involvement of the teachers in planning and evaluation of the school curriculum for effective e-learning implementation. The general observation was that the schools participating in this study were largely doing well in their leadership, resources and coordination. However, the issue of policy requires urgent attention.

In the next section, the third theme that came out of data from the three methods of data collection is presented in the same format that the researcher used to present the preceding Themes 1 and 2. Theme 3's categories were mainly derived from observations of lessons. In order to show that the three instruments triangulated the findings, the researcher shows the categories that were confirmed by data from documents and observations before delving into interview findings.

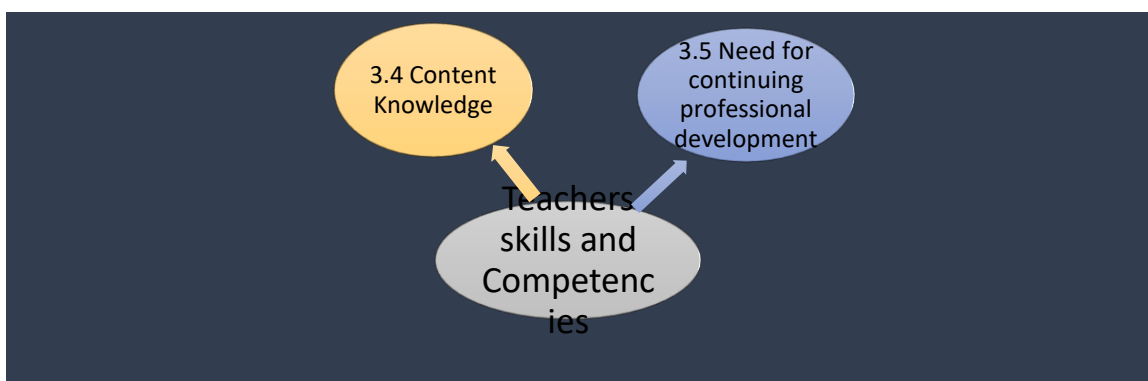
## 5.5 THEME 3: TEACHER SKILLS AND COMPETENCIES

In this section, the researcher presents categories tagged in Theme 3. Presentation will follow the pattern established already in Themes 1 and 2.

Five categories tagged in this theme were:

- Category 3.1: Attitude towards adoption of technology.
- Category 3.2: Low technological knowledge
- Category 3.3: Pedagogical Knowledge
- Category 3.4: Content knowledge
- Category 3.5: Need for continuous professional development.

### 5.5.1 Document analysis, findings and analysis



**Figure 5.6: Categories tagged in the theme: Teacher skills and competencies derived from document analysis**

Not all five categories could be derived from the different data sources, the researcher therefore selected those that were clearly outstanding from the method. For documents, two of these categories emerged and these are presented in Figure 5.6.

#### **5.5.1.1 Category 3.4: Content knowledge**

Every teacher indicated that the *Teacher Professional Standards (TPS)* booklet had three domains that are benchmarks of qualification to practise as a teacher. Domain A constitutes the academic requirements and professional requirements a teacher should meet. The domain also covers the aspect of curriculum. Academic requirements refer to what a teacher has achieved in terms of the agreed minimum academic qualifications in order to meet the requirements for the level in the field that they are teaching. For ECD and primary, it is five ordinary level passes with C or better including mathematics, English language and science plus any other officially recognised language. Professional requirements for ECD and primary are a diploma in education. On curriculum, a teacher should demonstrate a full understanding of the syllabus that they are expected to teach. The teacher is expected to interpret the syllabus and adapt it to the local context. Documentation indicated that all teachers in the school met the stipulated criteria as per teacher professional standards. The schools' records indicated that all teachers were qualified to teach at primary school level, and were knowledgeable about the subject matter.

The three schools had a 100% qualified staff complement who met the minimum TPS requirements. The teachers were capable of teaching the topics taught at their grade levels. These teachers had knowledge of concepts, theories, evidence and organisational framework for the subjects that they taught. They knew how best to go about it to effectively facilitate the learning process. The question however is on the link between this knowledge and technology use. It is this link that the finding sought to explain. The researcher is sure that technological skills can be acquired effectively if the teacher is aware of the subject matter to be taught or the parameters of the curriculum to be delivered. Technology could then be developed through continuous professional development. This category is presented in the next section.

### **5.5.1.2 Category 3.5: Need for continuing professional development**

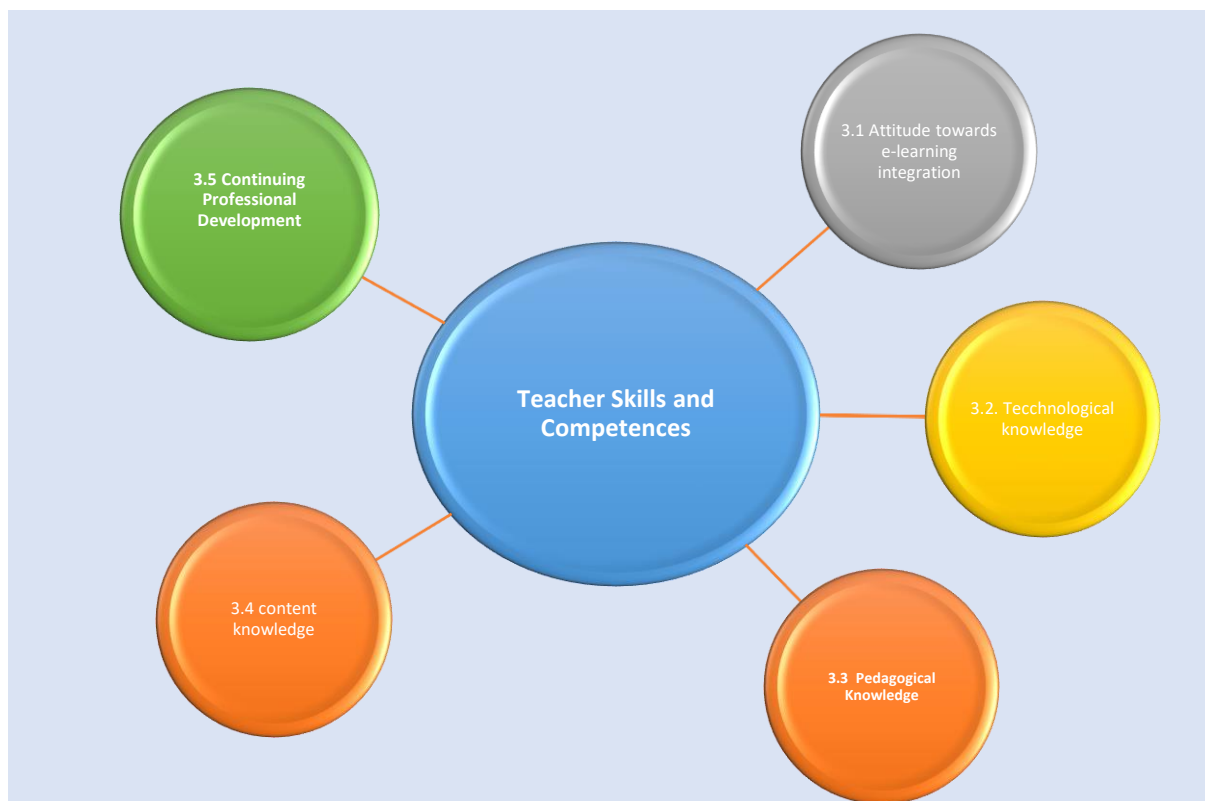
According to the ED46 school statistics, the teachers in the participating schools were continually developed through school funds, and some were enrolling on their own in different universities to further their studies. School A had 20 out of 45, School B 16 out of 40 and School C 19 out 38 teachers who pursued diplomas or degrees after completion of the minimum teacher qualification described in the presentation of the foregoing category.

School A had 44.4% of the staff members who went beyond the minimum professional qualification. They continued to upgrade themselves in order to keep abreast with the requirements of the modern teaching and learning processes. School B had 40% of the teachers continuing to learn. School C had 50%. The range of further improving themselves ranged from 40% to 50% in the three schools. It is envisaged that continuous professional development (CPD) for teachers, as a means to maintain and acquire new and updated knowledge, skills and attitudes, would benefit their professional practice and that of others. Worry is however still on the other 55.6% in School A, 60% in School B and 50% in School C. Economic difficulties bedevilling the country could have forestalled CPD for some teachers because those who want to advance themselves have to pay their own tuition. A hundred per cent of CPD in all schools would assure total transformation of teaching practices that include e-learning implementation. E-learning implementation is not something that one just knows how to do but is experiential.

The MoPSE's goal is to maintain its position as a leader in education, and to ensure that the country is competitive in the rapidly evolving technological global economy. The objective is to provide learners with quality and relevant education that includes the use of the most up-to-date information and communication technologies (ICTs). To meet this end, increasing the capacity for the deployment and use of ICTs in schools is one of the cornerstones of the Education Sector Plan (2016-2020), as well as the Zimbabwe Curriculum Framework (2015-2022). This should be coupled with the provision of suitably trained teachers to teach the learning arrears. There is therefore a need for continuous development of all teachers and not some, as revealed by the findings.

## 5.5.2 Observations findings and analysis

Data from observation of school attributes and lessons confirmed the all the five categories tagged in Theme 3, that is, teacher competencies and skills. The categories are represented diagrammatically in Figure 5.7.



**Figure 5.7: Categories tagged in the theme: Teacher competencies/skills derived from physical attributes of e-learning and lessons observed**

### 5.5.2.1 Category 3.1: Attitude towards e-learning integration

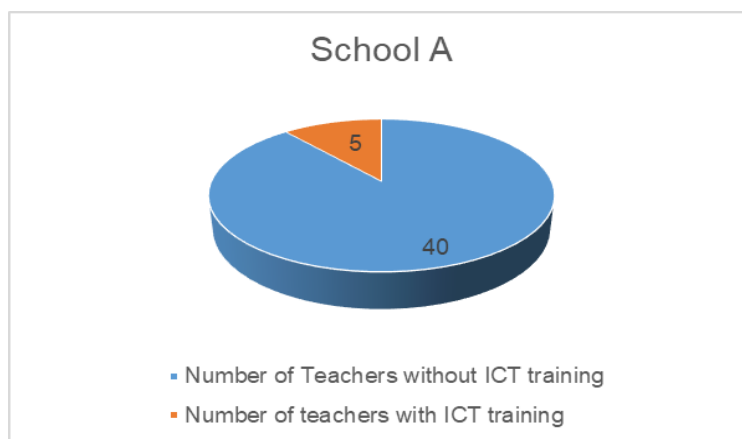
Three consecutive visits were made to Schools A, only to find that there was no electricity. The school purchased a generator. School C had a generator but it did not cover the whole school. When there were power outages or load shedding, only administrative work could be done using the generator power. There was no use of electricity in the classrooms. The power cuts were frequent even in the surrounding areas where the schools are located. The issue of power cuts was less frequent in School C because it is along the grid that supplies one of the main hospitals.

Another finding under attitude was that in the same school some teachers did not have laptops. To make matters worse, school enrolments were too high in proportion to the number of computers, tablets and other e-learning hardware and software in the schools.

When a teacher has planned and the implementation is hindered by factors such as insufficient infrastructure and power cuts, the teacher is most likely to get demoralised. Demoralisation could lead to negative attitude towards adoption and implementation. Teachers could become frustrated and they end up losing hope of ever being able to infuse technology in teaching and learning. Intermittent power cuts in the surrounding areas also affected the learners who went to these schools because they could not access learning content while at home for those who wanted internet-based e-learning. Desktop computers work with available power just like a refrigerator, unlike a smartphone, tablet and laptop. These conditions could have led to negative attitude towards execution of a programme.

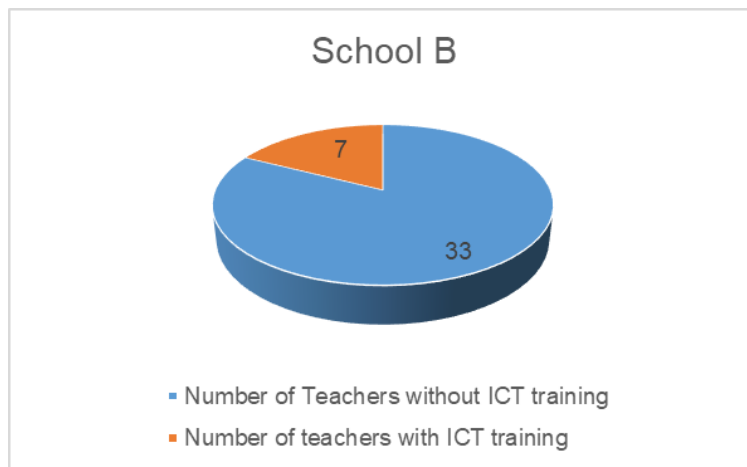
#### **5.5.2.2 Category 3.2: Low technological knowledge**

The Figures 5.12, 5.13 and 5.14 show the number of teachers who had been trained in educational technology use. These were not just some certificates of completion done at school level but certificates and diplomas related to ICT. Such training enhanced e-learning implementation because teachers would be conversant with the dictates of technology to be used. Technological knowledge is the knowledge of digital technologies ranging from internet, digital videos, interactive whiteboards and software programmes.



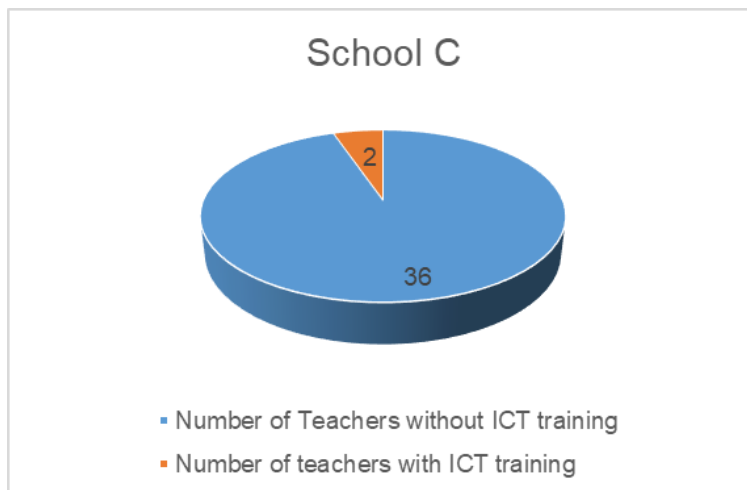
**Figure 5.8: Number of teachers trained and untrained from School A**

The Figure 5.8 shows the number of teachers who had been trained in the use of ICTs in School A and those who had not. Out of the 45 teachers in the school, 5 had training while 40 did not.



**Figure 5.9: Number of trained and untrained teachers in School B**

Figure 5.9 indicates the status of School B in terms of the number of teachers who had ICT training. Similar to what was noticed in School A, a substantial number had not been trained. Out of the 40 teachers in the school only seven had been trained while thirty-three (33) had not.



**Figure 5.10: Number of trained and untrained teachers in School C**

School C was the most affected of the three, only two had proper ICT training and the rest did not, as indicated in Figure 5.10.

School A had five teachers with either a certificate/ diploma or degree. This translates to 11.1% of the staff with high competences with the use of ICTs. School B had 17.5%, while School C had 5.3% of such teachers considered highly proficient with technology and specifically computers. School B had a better percentage as compared to the other two schools, but still all the figures are too low for the schools to be rated as having highly proficient teachers. It is envisaged that teachers who are trained are able to use even the web 2.0 technologies such as zoom, webinars, Microsoft Teams and others.

With the MoPSE mantra of technology infusion in all classes by all teachers, the number of untrained teachers was very high.

### **5.5.2.3 Category 3.3: Pedagogical knowledge**

Pedagogy is the science of teaching. Through the lessons that were observed from the nine teachers, all of them had a fair knowledge of how they should teach. They were aware that a lesson should have an introduction to captivate learners; and lesson development, where learners discover that they are delving into discovering a new skill, attitude, or value. A lesson therefore has a touchdown, just like a plane that takes off, cruises and finally lands. It should also have a conclusion that sums up or recaps what has been learnt. These expectations were observed in all the lessons observed. Furthermore, the lessons were learner-centred.

A 100% knowledge of pedagogy translates to the fact that the methodology of education is embedded in these teachers' teaching culture. However, there was a mismatch between understanding of the methodology of education and use of modern ways such as e-learning. TA3, for example, could not use the projector because it was broken down. Pedagogical knowledge needs to be intertwined with technological expertise if e-learning is to be successfully implemented in all schools. The teacher is not the sole bearer of knowledge. The internet is now highly laden with knowledge that learners can tap into. Teachers are to guide the learners.



#### **5.5.2.4 Category 3.4: Content knowledge**

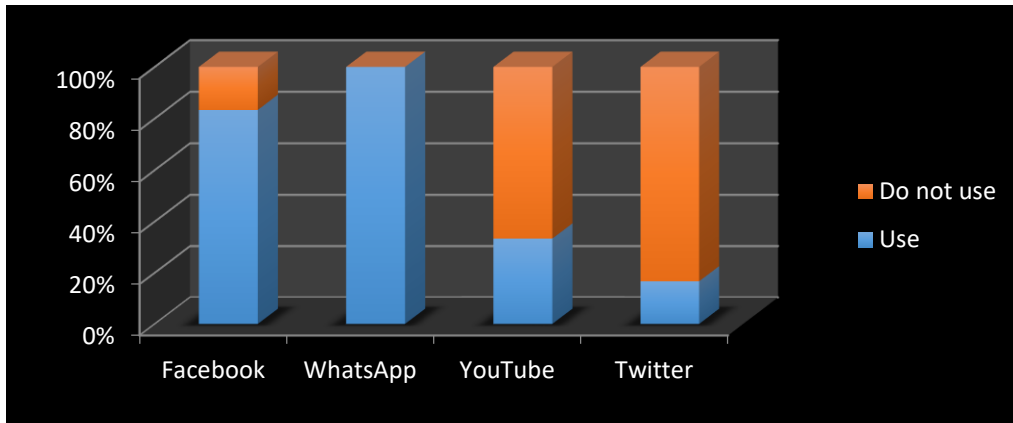
Observations confirmed findings from documents. All the teachers were conversant with the subject matter they were supposed to teach. This is because the curriculum framework and the syllabuses for different e-learning areas clearly stipulate the parameters of each topic according to grade level.

#### **5.5.2.5 Category 3.5: Need for continuous Professional Development (CPD)**

Continuous professional development is a means for teachers to maintain and acquire new and updated levels of knowledge, skills and attitudes that can benefit their professional practice and that of others. It enhances and promotes professional integrity among teachers, thus ensuring that teachers are up-to-date with the latest pedagogical and technological advances in education.

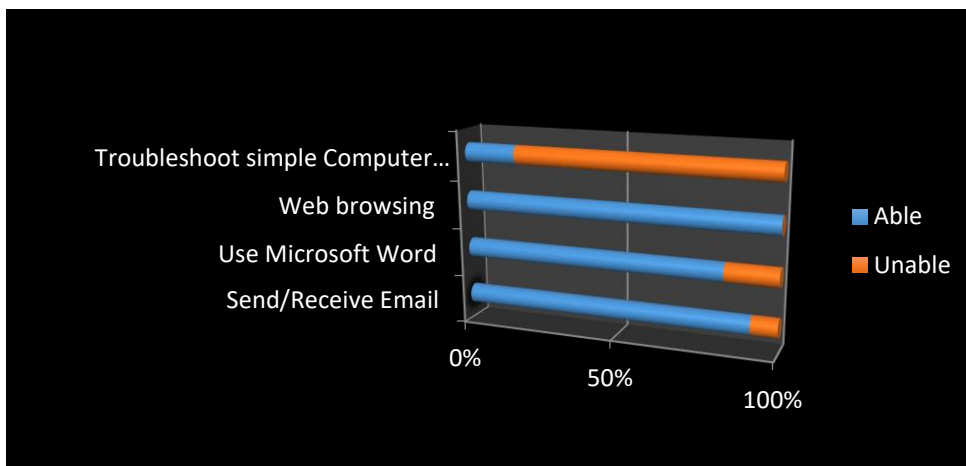
The researcher also looked at some aspects of teacher compatibility with e-learning environments. These included the ability of the teacher to navigate the internet, and to see whether the teacher had e-mail, which could be evidence that the teacher is skilled in technology use. One other aspect looked at was the teacher's involvement in the use of a plethora of online social media platforms like Zoom, Webinars, Microsoft Teams, Facebook, Twitter, WhatsApp, Skype, and other blogs. Their ability to use the internet was also considered for decision-making on competence levels of teachers. These platforms can be used to facilitate the transfer of e-learning content to users. The social media platforms therefore play a pivotal role in the teaching and learning process.

The standout challenge was in performing basic troubleshooting of



**Figure 5.11: Participants' use of social media platforms**

The percentages of teachers who proved to be users of social platforms is represented in Figure 5.11.



**Figure 5.12: Participants' use of internet**

Figure 5.12 was created to present the percentage from the sample of teachers who could solve simple computer problems, browse the websites, use Microsoft Word and send or receive e-mail.

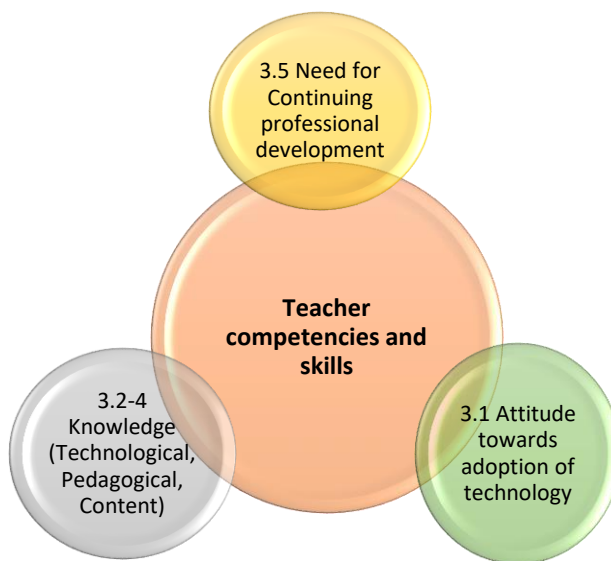
Figure 5.11 shows participants' use of social media and endorses the popularity of WhatsApp (95%) as the social media platform most used, and an insignificant 5% of non-users by all teachers from the 3 schools. WhatsApp was followed by Facebook, with twitter having the least number (10%) of users. In terms of using the internet, all teachers (100%) from the three schools claimed they were able to use the internet, with a

significant number of them showing they were comfortable with emailing as well as manipulating Microsoft Word.

Figure 5.12 showed participants' use of the internet with almost 100% using web browsing, followed by 90% who were engaged in sending and receiving emails, then 80% using of Microsoft Word, and an insignificant 10% on troubleshooting simple computer problems. The implication of these results is that most teachers used the internet to search for information helpful to capacitate them, as well as provide learning materials for the learners

### 5.5.3 Interview findings and analysis

The interviews had the same three categories tagged in Theme 3. These are illustrated in Figure 5.13.



**Figure 5.13: Categories from teacher interviews tagged in the theme: Teacher competencies and skills**

#### 5.5.3.1 *Category 3.2: Need for continuous professional development*

In an interview with HC, the following sentiments were shared:

*In my day-to-day observations, I realise that there is a lack of ICT knowledge on the part of the teachers. Teacher capacity development is therefore necessary. (HC)*

HB concurred with HC, as evidenced by the extract from the interview transcriptions with the head.

*Lack of ICT knowledge on the part of the teachers ... capacity development is needed. Three years ago, the then Minister of Primary and Secondary Education had put aside a fund to capacitate teachers on various areas, including the use of ICTs. Nevertheless, of late, the programme has since been aborted. I do not know why. I think its lack of national budget on education concerning teacher capacity development. I think the programme is not bankable. (HB)*

The above excerpts indicate that there is a need for measures to orient and induct teachers on the implementation strategy. This constitutes an important area in teachers' continuous professional development or in-service training. The use of technology is something to be embraced by every teacher. Lack of teacher continuous professional development (CPD) leaves the goal of implementing approaches, such as e-learning, unreachable. The fact that the school leaders acknowledged shows that they were aware of the need to train teachers, that is, to channel funds towards teacher capacity development. The heads understood that capacity development results in professional development. The advantages of continuous professional development are that the teachers develop a new skill and gain a competitive edge. CPD also builds confidence. The school head can verify progression. For example, HA was able to train all teachers at school level. HC had assisted nine teachers to acquire diplomas in ICT. CPD also allows the school heads to display achievements of their school teachers. At a speech and prize giving day, a head could brag about having a staff complement of trained teachers who could use technology.

### **5.5.3.2 Category 3.2: Knowledge (technological, pedagogical and content)**

All the participants in this research concurred that skills in computer use and other e-learning technologies is one concern that needs to be addressed before one could talk about e-learning implementation, and even the general use of ICTs in the classroom. Heads had this to say about teacher skills in computers:

*There is no teacher proficiency in the use of ICTs. We asked the computer teacher to train teachers in the afternoon after lessons, so that at least as school our teachers can have ICT proficiency. (HB)*

The findings indicated that some of the teachers benefitted from the government's capacity development programme. This programme was part of the rollout of the recently ZCF (2015-2022) introduced competence-based curriculum (CBC) in primary and secondary schools in Zimbabwe. HA and HB had this to say about the programme:

*Teacher capacity development was needed. Three years ago, the then Minister of Primary and Secondary Education (Dr Lazarus Dokora) had put aside a fund to capacitate teachers on various areas, including computer use in education training. However, of late, the programme has since been discontinued. We were not informed why, but I think its lack of funds. (HB)*

*In this school, we have one teacher who was selected for computer use in education training through the government's initiative to capacitate teachers in technology use. The programme only took one teacher, others have not had the chance. So, as a school, we are training our own teachers. I do not think the programme is still on-going, probably lack of funds. (HA)*

Some teachers indicated that they had been trained at school level. Some received one-day training, a week's training, while others had not received any training at school level or cluster level. HB said the school had set aside funds to send teachers to a local teachers' college for an in-service course on how to use electronic media to prepare

lessons, teach and share learning materials. The course runs during school holidays for one and a half years.

*We have so far sent about nine teachers for training at Morgan ZINTEC. It is only that I am beginning to worry about paying for teachers' capacity development. They transfer from the school when you have equipped them. Mrs (name withheld) who got promoted while we had sent her for training, and also recently Mrs (name withheld) resigned from the service to go and run her own school after we had sent her for training.*

**(HB)**

The need to train teachers was also pointed out by the teachers. One of the teacher participants had this to say:

*Some facilitators are not satisfied with the use of computers since they lack the know-how and consider e-learning laborious, especially on the part of preparing learning materials using applications they are not conversant with; applications such as MS PowerPoint. I am okay because I did computers at degree level. (TA2)*

Knowledge of pedagogy, technology and content are encapsulated in each other for e-learning implementation. Teacher training on the use of e-learning technologies is crucial in the implementation process. It can be noted that teacher capacity development is prevalent in the schools. However, the school heads lamented the availability of funds because their schools had more needy in developmental issues. If they channel all funds to training, other developmental attributes would collapse. The three school heads attested to the view that CPD was crucial for e-learning implementation given the availability of resources.

### **5.5.3.3 Category 3.3: Attitude towards adoption of technology**

Some teachers displayed some elements of technophobia. This resulted in attitude problems towards the implementation of e-learning methods in teaching and learning.

Heads also talked about the attitude of some teachers towards technology. One head said:

*We asked the computer teacher to train teachers in the afternoon after lessons so that at least, as school, our teachers can have ICT proficiency. But she would stay the whole afternoon alone. No teacher would pitch up for such programs - resistance to change on the part of the teachers. (HB)*

HC concurred with HB's view and shared that the attitude of some teachers emanated from lack of motivation.

*Teachers' salaries have become too low, so, even if, I, as the head, tries to spearhead e-learning, the programme may fail to take off due to that. (HC)*

HC attributed lack of motivation on the part of teachers to poor remuneration. Attitude is a predisposition, a state of mind, and it influences choice of action. The response/feeling/emotions by teachers to e-learning implementation may either be positive (values) or negative (prejudice). Attitude coupled with fear of technology is a major hindrance to the implementation of e-learning. Fear could be caused by inadequate resources to involve all teachers into the in training or capacity development. Attitude could also be caused by a lack of motivation.

#### **5.5.4 Overview of Theme 3**

E-learning is experiential and, in this research, it was noted that, although some teachers had acquired university qualifications in computers, they did not have the competencies required to implement e-learning as a teaching and learning methodology. In the discussions with the researcher, teachers shared general knowledge on e-learning, and how learner-centred lessons could be delivered through technology, but lacked the practical application. In essence, they were more comfortable in their traditional teacher-centred methods of teaching, hence, the need to capacitate them to enhance their competencies in the use of technology. Teachers had low technological expertise due to

either lack of or inadequate training. Resources were a major hindrance to positivity towards e-learning and resulted in a negative attitude. In this case, the resources were in three forms, that is, financial, human and time. There was also a mismatch between technological knowledge, content knowledge and pedagogical knowledge. The three are inter-connected when it comes to teaching and learning in e-learning environments.

## **5.6 SUMMARY**

The aim of this chapter was to report on the findings of the assessment of e-learning in primary schools. Findings were presented in response to the key research question on the determinants of e-learning implementation, particularly the three e-learning questions; the models being used in the implementation of e-learning in the schools, how the school system affected teacher implementation of e-learning, and the competences needed for effective implementation of e-learning. These competences became imminent and that there should be a balance or interconnectedness between technology, content and pedagogy. The major determinants for successful e-learning implementation can be summarised as resources and training.

The next chapter is an interpretation and discussion of the research findings, to determine convergences or divergences with earlier literature findings.



## **CHAPTER 6**

### **INTERPRETATION AND DISCUSSION OF FINDINGS**

#### **6.1 INTRODUCTION**

In the previous chapter, findings from reviewed documents, semi-structured interviews as well as observed e-learning lesson and e-learning physical attributes were presented. The purpose of this study was to assess the implementation of e-learning in primary schools in Zimbabwe. The study was guided by the key research question: “What are the determinants of e-learning implementation in primary schools in Zimbabwe?” This chapter presents an interpretation of the findings and analysis, then discusses each finding based on the themes and categories.

#### **6.2 INTERPRETATION AND DISCUSSION OF FINDINGS**

E-learning has been defined in this study as an education delivery technique that makes use of information and communication technologies (Coman et al., 2020; Machumu 2016; Arkorful & Abaidoo, 2015; Clark & Mayer 2011). In order to facilitate successful implementation of e-learning, some examples of information and communication technologies like computer hardware and software, televisions, radios and digital versatile disks (DVDs), compact discs, read-only memory (CD-ROMs) and mobile phones, should be made available in the school system for use by teachers and learners ( Al-Zoubi, Abdul Salam, & Annamalai, 2016).

There are various types of e-learning. Literature indicates that e-learning ranges from computer-based e-learning, which encapsulates CMI and CAL; and internet-based e-learning, involving the synchronous and asynchronous modes (Dhull & Arora, 2019; Jingyou, 2014). Computer-managed instruction and computer-assisted learning can be done without being connected to the internet, unlike synchronous and asynchronous e-learning where connectivity is a pre-requisite (Kokoulina, 2020). It is this knowledge that the researcher used for document analysis, in-depth interviews, and observations to solicit data. Additionally, the researcher used literature on the benefits of these types of e-learning, especially on the synchronous and asynchronous modes (Chauhan, 2017; Misbah, et al., 2017; Maloba, Chelule & Wesonga, 2015; Hrastinski, 2008).

In this study, the researcher sought to assess the implementation of e-learning in primary schools. Data were collected using document analysis, semi-structured interviews, and observations. Three major themes emerged during data analysis, which were presented in the preceding chapter. These were enhancers for e-learning implementation, ineffective school system, and teacher skills/ competences. The major findings summarised under each theme are repeated in the next sub-heads followed by the interpretation of the findings to pave way for discussion.

### **6.3 THEME 1: ENHANCERS OF E-LEARNING IMPLEMENTATION**

#### **6.3.1 Category 1.1: Policy guidance for e-learning implementation**

One of the major roles of the Ministry of Primary and Secondary Education (MoPSE) is to formulate policies to guide the implementation of government programmes. Developments in education, such as the rollout of a new education curriculum, are an example of government initiatives whose implementation can benefit from policy guidance. It was against this background that this study sought to establish policy directives from the Ministry of Primary and Secondary Education aimed at guiding the implementation of e-learning in primary schools in Zimbabwe. In particular, the study sought to establish whether there was any specific model proposed by MoPSE for implementation of e-learning in primary schools at strategic decision level. The study revealed that the MoPSE did not provide any specific model to be followed in the implementation of e-learning. This lacuna creates an assumption that the operational issues were to be decided by schools, which had to find their own answers on how they would implement e-learning.

The Education Amendment Act (2019) does not overtly articulate e-learning implementation. Schools do not have e-learning policy directives that clearly articulate how e-learning should be implemented. What was noticed is a draft of the ICT policy for primary and secondary schools. Even the national ICT policy of Zimbabwe does not have any official guidance for its implementation on the ground. One of the sub-objectives, according to the national ICT policy in the education sector, is to promote e-learning and use of e-learning materials throughout Zimbabwe. However, the policy does not go further to spell out the implementation modalities. The researcher contends that, ideally, national

policies tend to be formulated that way. There must be a demand for the 'domestication' of the policies by the schools for their operationalisation. A national or ministry policy has to be translated into a school policy to demonstrate how schools can operationalise the policy. The absence of such school-based policies in Zimbabwe means implementation of e-learning lacks policy guidance. The fact that all school heads acknowledged the importance of policy was not reflected in their own schools as none possessed an e-learning policy.

All the heads were aware of the need for policy to guide their operations, and the lack of it signalled the need for urgency. The researcher contends that strategic plans are in themselves policy documents. However, as observed from the way strategic plans were formulated, there were few guiding principles in the implementation of e-learning in schools. Strategic plans tended to express broad goals and wishes such as to "implement e-learning and have state-of-the-art infrastructure by 2025". These, unfortunately, did not provide useful information on the operationalisation of the ministry policy on e-learning implementation in the schools. A good plan should have SMART objectives, clear priorities, main activities, implementers, budget, implementation dates, and monitoring and evaluation tool.

The purpose of enhancers for implementation has been explained as that of describing where and how technology plays a specific role in supporting learning. Implementation enhancers are tools that guide the design and implementation of e-learning programmes. As in the systems development life cycle (SDLC), the process follows a well laid down plan that guides and directs the main activities. In their absence, both the design and implementation strategies of e-learning lack theoretical and systematic guidance. The MoPSE's laissez faire approach in guiding schools on specific model(s), or enhancers for e-learning implementation, implies that schools would have a hit and miss approach towards goal attainment. It is assumed that school factors such as resource endowment, availability of technical capacity, and the attitude of school leadership towards adoption of technology can easily become key determinants guiding schools in making decisions on the implementation criteria suitable for their e-learning programme.

The researcher advocates the implementation of e-learning. The 2020 to 2022 school lockdowns induced by the COVID-19 pandemic paralysed the school system but

facilitated e-learning. Nonetheless, had the schools been implementing any of the types of e-learning as discussed in Chapter 2, the lockdowns could have had less negative impact, compared to what they did. As a school administrator, the researcher observed that, after lockdowns, a number of learners had serious numeracy and literacy problems. Online lessons and computer-based e-learning, such as CMI and CAI (Phiri & Mbobola, 2018), could have worked in this context if schools had measures in place. Appropriate learning approaches, such e-learning, serve the needs of learners in the twenty-first century. Hase and Kenyon (2016) aver that people live in a world of abundance of information that is readily available and easily accessible. Thus, learners should be given the opportunity to research and source information for themselves (Brown & Mbatia, 2015).

Heutagogy, as a learning theory that supports e-learning, was discussed in section 2.5.3, as was constructivism in 2.5.1. However, guidance is required to safeguard learners from the effects of internet and information glut. Siemens (2005) asserts that connectivism is driven by the dynamic of information flow. However, this is one criticism against connectivism as a learning theory (see section 2.5.2). Interestingly, measures are available to protect learners from such harmful effects of information glut and the internet.

### **6.3.2 Category 1.2: Sporadic implementation strategies**

Despite the MoPSE efforts to approve digital content through private e-learning portals, donation of computers to schools and facilitation of internet connectivity by engaging internet services providers in some schools, teachers in the primary schools continue to use conventional methods of teaching. The study reveals that teachers were not yet ready for e-learning implementation, and needed to be prepared for it. This was confirmed by responses from the teachers as evidenced by their lack of competencies to use facilities like Google Docs to connect the whole class so as to monitor homework. It is true that change and innovation requires both technical and psychological preparation of the implementers. Many organisations are aware that change brings fear of the unknown, and is threatening as it pushes people out of their comfort zones. In the absence of training and other motivating factors, teachers would always adopt and use their traditional ways of teaching. The learners, as end users, would not benefit from these new teaching and learning interventions if facilitators lack the prerequisite competencies.

Teachers need to be prepared for e-learning implementation as noted in the reviewed literature in Chapter 2, which identified and stressed training as a success factor for effective implementation of e-learning. This preparation should go beyond the boundaries of the school. It should include parents as a community engagement strategy to bring awareness, ownership and overall support in the adoption and implementation of e-learning programmes in the school environment. It is common knowledge that, when parents are fully engaged, they would provide additional e-learning resources to be used by learners at home. It is known that schools cannot operate efficiently and effectively without parental as well as community support and cooperation.

For teacher e-learning up-skilling and re-skilling, schools have to appeal to the responsible ministry (MoPSE) for support. The training of teachers, specifically on technology use, ought to be regarded as a critical driving factor for quick adoption, integration and overall implementation of e-learning. As pointed out by Majoni and Majoni (2015), the effort to step up educational technology use in schools was demonstrated by the Presidential e-learning programme launched in 2011, and further support from the 'Connect-a-School' programme (2013). This 'Connect-a-School' programme was a community project to empower the previously disadvantaged schools with state-of-the-art technology. The MoPSE's new competence-based curriculum (CBC) prioritises the adoption of ICT, installation of e-learning content and the training of teachers on how to use and produce digital content in the classroom. Further to that, the government embarked on a teacher capacity building programme in partnership with universities like Zimbabwe Open University (ZOU), Great Zimbabwe University (GZU), University of Zimbabwe (UZ), Midlands State University (MSU), and teacher training colleges to teach ICT and its use as a pedagogical tool in the teaching and learning process. As an incremental strategy based on the available resources, few teachers benefitted from the programme given the overwhelming need for teacher capacity development in the use of ICTs for teaching and learning. This initiative was a direct response to the 21st-century focus on web-based, blended or hybrid learning.

The policy directives that promote e-learning in Zimbabwe schools are taking a snail's pace, especially in state schools as compared to private schools (MoPSE, 2016). In their research of the assessment of primary school facilities in Kenya, Tsindoli and Dishon (2018) identified lack of guidance in schools as one of the impediments to implementation

of e-learning programmes. To achieve real progress, e-learning development should tie back into the institution mission, and institutions must have strategies that are enterprise-wide in scope (Ngamau, 2013). Teachers require sufficient time to be oriented and prepared for integration into the new system of instruction through in-service programmes, but resources have always been a hindrance. It can be argued that, to address this problem, teachers need encouragement through pre-service training while they are still in colleges. General challenges, such as computer illiteracy and phobia, lack of computers and e-learning classrooms, lack and disruption of power supply, financing of e-learning programmes, sensitisation of stakeholders, accessibility and time for training, coupled with old age and negative attitudes; all militate against smooth transition from traditional mode of teaching to computer-based programmes.

Ouma, Auwor and Kyambo (2013) contend that e-learning implementation can be achieved using one of the three approaches. These include using technology to support or supplement the traditional face-to-face learning, integration of online learning with traditional learning, and total online e-learning as discussed in the reviewed literature.

## **6.4 THEME 2: INEFFECTIVE SCHOOL SYSTEM**

As a system, the school is made up of several elements that are critical to the effective adoption and implementation of e-learning. These include, among others, school leadership, resources and infrastructure, technical expertise and coordination, school policies, and many others. Ten such factors were identified and used to come up with categories in the analysis of data presented in Chapter 5.

### **6.4.1 Category 2.1: Curriculum support and integration**

The study examined the school vision and mission statements contained in the strategic plans to see how they embraced the adoption and implementation of e-learning. At school level, it was observed that the three schools had current strategic plans that indicated the need to implement e-learning. While School A's vision explicitly indicated the need for technology use in its articulation, Schools B and C had nothing explicit in the vision, mission statement, or core values. The researcher applauds the schools for, at least, having current strategic plans, which is not always the case with many schools. However,

the lack of a clear vision for the adoption and implementation of e-learning suggests, not just a lack of strategic direction, but also a lack in the type of leadership required for effective adoption and implementation of e-learning in the schools. Being a visionary is a key leadership issue that helps direct school activities in the direction meant to realise intended goals. Tarus, Gichoya and Muumbo (2015) assert that leadership and support from senior management are critical factors for successful implementation of e-learning.

Next to the vision statements, the strategic plans reflect the schools' commitment towards mobilisation and setting aside resources for effective implementation of e-learning. The five-year strategic plans of School A articulated the channeling of resources towards procurement of e-learning material and training of teachers. In its five-year school development plan, School B also indicated the issue of channeling resources towards teacher training on e-learning. The same is reflected in School C's strategic plan, where e-learning was highlighted as one of the focus areas of the school. From these strategic plans, the researcher observes that judging the intentions of the schools and their commitment to the adoption and implementation of e-learning merely from the vision and mission statements could be premature and harsh. It seems the real intentions of the schools towards the adoption and implementation of e-learning may be contained in others places and documents more than in the school's vision and mission statements. The implication of this is that the researcher has to be open-minded, patient and avoid being stuck in tools and frameworks.

#### **6.4.2 Category 2.2: Acceptable use policy**

The study observed that none of the participating schools had a customised, school-based acceptable use policy (AUP). This is despite the general knowledge of the provisions of the national ICT policy for the integration of ICTs in the school curriculum by the school leadership. It is this integration of ICTs that the researcher views as a gateway to e-learning. The two are intertwined. The schools seem laden with all sorts of policy documents guiding their general functioning, but none on e-learning implementation. The selected schools had the required Ministry of Primary and Secondary Education (MoPSE) and school policy documents (see section 2.2.2). The researcher also noted that, even the MoPSE did not have an e-learning policy, but a draft on ICT integration in schools.

The importance of policy cannot be overemphasised as it regulates and guides operations and behaviour of organisations. Its absence implies that there is no standard against which the actions of the schools in e-learning implementation can be judged. It is not possible to detect deviation from the norm in the absence of policy. The researcher noted the urgent need for action towards the development of appropriate policies to support the implementation of e-learning at both ministry and school levels.

#### **6.4.3 Category 2.3: E-learning network and equipment**

The evaluation question under this component focused on the management of ICT resources for e-learning in the school. It specifically focused on the existence of an inventory of existing ICT resources that could inform plans for the acquisition of new equipment. Generally, the three schools had a well-managed inventory system that tracked all ICT resources in the school, including their functionality. School A's system was more advanced and elaborate, including maintenance dates, faulty equipment, and reports on servicing. This is a positive development from the three schools as it reflects a great starting point for effective implementation of e-learning. E-learning equipment is expensive, quite sensitive, easily liable to pilferage and; hence, require proper management, which the schools seemed quite ready to offer. This finding converges with literature reviewed on theories that support e-learning. One such is connectivism. This theory, as propounded by Siemens (2005), avers that effective learning occurs when learners learn and work in a networked environment. In these environments, there is a need for regulation of e-learning, especially for young learners at primary school level. Primary school learners may not have the capacity to discern and separate right from wrong information (Banihashem & Aliabadi, 2017).

#### **6.4.4 Category 2.4: E-learning storage and maintenance**

Next to effective management of e-learning resources is the need for proper storage and maintenance of resources. The study established that the three schools had laid down procedures for servicing and maintenance of equipment. It was, however, observed that servicing of equipment was outsourced as the schools did not have a specialist IT technician. At the beginning, this may be the way to go. However, in the long run, employing IT technicians may actually turn out to be more cost effective.



#### **6.4.5 Category 2.5: E-learning coordination**

The assessment focused on the schools' technical capacity to handle e-learning equipment capacity needs. The specific question was whether the schools had a dedicated specialist teacher or group of teachers who assumed responsibility for developing e-learning capability within the school, and integration of e-learning in the curriculum. It was observed that all three schools had, at least, a specialist and qualified teacher for ICT, teaching computers as a subject in the school. School B had two such teachers, one for the ECD and infant classes, and the other for the junior classes (grades 3 to 7). All the four teachers had a special qualification in ICT and education from a college. This means the schools had potential leaders with the right technical know-how to support others for the successful adoption and implementation of e-learning.

#### **6.4.6 Category 2.6: E-learning professional development**

Three questions were used in the assessment of the school system under the component on staff development for effective implementation of e-learning. The questions sought to establish the level of staff knowledge/ expertise in relation to e-learning; the teachers' awareness of the most appropriate training programmes to support them in e-learning as a teaching and learning strategy; and whether the teachers received sufficient resources (time, training and support), to develop the skills and knowledge required to effectively integrate e-learning strategy in their teaching. Assessment of knowledge was based on the TPACK model that seeks to understand teachers' technological, pedagogical and content knowledge for effective implementation of e-learning in the schools.

Findings on these questions reflected varying levels of expertise from specialist to novice, as reflected in the teacher participant profiles. The gap in knowledge and skills between ICT specialist teachers, and the senior, mature generation of teachers; in terms of technological, pedagogical and content knowledge of ICT, was very wide. There was then a need for a proper ICT skills audit in the schools as a starting point for assessing their readiness for implementing e-learning. Some schools do not have the ICT expertise, particularly those in rural areas and other marginalised communities.

From interview data, specialist teachers showed their awareness of the existence of training programmes available to meet their capacity development needs for effective implementation of e-learning. This, however, was not the case with Teachers 4 to 9, who all relied on the school to identify the training programmes for them. This was a case of not knowing what one does not know, and relying on what others plan and give to you. It is imperative to have feasibility studies and train teachers in needs identification and analysis, as well as to tailor-make training programmes for the need

The question about resources explored, not just the material resources like ICT/ e-learning equipment, but also the school's commitment of financial resources to support continuing professional development of its staff. All this would help in the effective implementation of e-learning. The school budgets for School A and B showed that there was allocation of funds for teachers' training. In school B, 9 teachers out of 42 had been trained. School A had only one teacher whose in-service course on e-learning was being paid for by the school, whereas the others had been trained at school level. Teachers from Schools A and B had been sent to a local teachers' college for an in-service course in the use of technology such as computers and their application to teaching and preparing learning material.

On the question of resources to support the effective implementation of e-learning, the researcher noted that the three schools had procured computers. Teachers in School A and C had personal computers in their classrooms, but School B teachers did not. All the schools had laboratories with fairly good computers, which would facilitate effective knowledge and skills transfer. The schools' skills availability was different depending on their endowment with resources for e-learning implementation. It is assumed that policy makers must consider this reality, and ensure the need for applying positive discrimination in allocation and distribution of resources.

#### **6.4.7 Category 2.7: E-learning access**

Under this category, the researcher sought to find out whether all learners and teachers had opportunities to use the school's e-learning resources. This could be in a shared computer laboratory (for example, timetabled sessions) and/ or in individual classrooms (for example, on a rota basis). The biggest hindrance to access seemed to be the issue

of shortage of resources occasioned by large class size, with high student to machine ratio impacting negatively on learners' access to e-learning resources. Research indicates that availability of e-learning resources improves performance of learners (Ghavifekr & Rosdy, 2015; Arkoful & Abaidoo, 2014). If access to e-learning resources is increased, learners are most likely to improve in performance. Though learner performance was not the object of this study, studies have noted it. In their research, Lochner et al. (2019) established that using the adjunct model (online e-learning resources supplementing teaching in schools) in traditional classes enhanced learning experience and increased learners' engagement with the content (see section 2.6.1 on adjunct model of e-learning implementation).

Apart from the large class sizes that act as impediments to access to technology in most schools, teachers bemoaned the lack of parental and community support in their effort to implement e-learning. It was observed that most parents did not support their children as they disallowed them to use cell phones at home for research. This point has already been discussed above, but is emphasised here for its connection with learners' access to ICT resources as a factor affecting effective implementation of e-learning (Espiritu & Budhrani, 2019). In the context in which it is raised here, one may argue that the issue of parents denying their children access to e-learning gadgets at home is not a factor of the school system. However, it is considered here from the view that it is the responsibility of the school to engage parents and raise their awareness on the trending teaching and learning approaches such as e-learning. Asking them to support their children is thus part of the school system.

This research advocates e-learning in whatever model because of the several benefits that are accrued by the users. These include enhanced learner performance, and ease of execution of teaching and learning. This converges with literature reviewed. Kintu, Zhu and Kagambe (2017) investigated the effectiveness of blended learning. Findings showed that positive attitude towards blended learning accounted for the learner's success and attainment of better learning outcomes (See section 2.6.2).

#### **6.4.8 Category 2.8: Planning for inclusion**

The absence of school-based e-learning policies in the three schools implies that this area was not given due attention. The researcher interpreted this as evidence of a serious deficit of due diligence for effective implementation of e-learning. The positive consequences of e-learning were experienced during the COVID-19 era as schools that had developed a culture of exposing their learners to e-learning continued their teaching and learning away from the confines of school premises. However, those that had completely nothing in place had to wait until the whole lockdown period was over. Their learners were therefore greatly affected as they lagged behind without covering content for that period. To make things worse, all learners got automatic promotion into the next grade level without considering the fact that the syllabus content had not been covered. The consequences were that inclusivity was compromised as some learners could not access learning material. A uniform or a planned approach or model of e-learning would have helped in the sense that, even if schools were shut down due to natural causes like pandemics, learning could have continued for all schools and learners regardless of location, gender, social and economic position. This is because all would have planned for bad or good times. Also, learning and teaching would have been guided by policies and statutes governing schools.

The issue of equality of educational opportunities for all learners cannot be underestimated as evidenced by definition of quality education in the Sustainable Development Goals (SDGs). This definition has inclusion and equality as precursors to it (see SDG 4). Research shows that using ICT with e-learning programmes may result in a more effective achievement of existing educational goals, especially in relation to children with learning difficulties (NCCA, 2005). With this in mind, the school ICT plan should include details on the integration of learners with special needs, and adequate support for their curriculum needs in relation to software, hardware, assistive technologies, and resources. Inclusion is not automatic. It is a deliberate, conscious planning process (Chauhan, 2017; Smith, 2017) that requires both the school leadership at a strategic management level, and the teacher at operational level to plan for it. The researcher notes that the craze about e-learning needs critical analysis, and to be considered from an inclusive education perspective thus ensuring that no learner is left behind.

#### **6.4.9 Category 2.9: E-learning health and safety**

Here, the study sought to establish whether the schools had a policy describing the support it offers learners in developing responsible and informed attitudes regarding their use of e-learning hardware and software in the school. Again, this is a critical factor addressed in a standard school-based e-learning or ICT policy, which all the 3 schools did not have. These are general, more practical considerations regarding both teachers and learners' use of e-learning gadgets.

Among other considerations, the NCCA (2005) lists the following examples of issues to consider:

- a) selection of the right desk and chair height for computer equipment to accommodate the needs of all children from infants to grade seven, including learners with physical disabilities,
- b) guarding against eyestrain through the use of anti-glare screens on computer monitors,
- c) development of guidelines or procedures for children and teachers on care of equipment, hardware, software, and peripherals, and
- d) promotion of a culture of 'best practice' among teachers and children when using e-learning equipment, such as not having food and drink near the computer or peripheral devices.

#### **6.4.10 Category 2.10: E-learning review and evaluation**

Finally, this category sought to assess the participation and involvement of the implementers (teachers) in periodic evaluation of the use of ICT in the school curriculum, and the subsequent modification or revision of the school plans. Findings showed that School A was quite advanced in the involvement of teachers in ongoing reflection and planning for e-learning programmes in the school curriculum. The school employed a decentralised planning system that ensured participation of all members of staff. However, in School B and School C, only the specialist teachers were involved in school-based evaluations and planning for the implementation of e-learning.

The participation of teachers in reflection and planning engenders a sense of belonging and ownership, which is a critical motivational factor. It is a typical mark of progressive leadership when implementers at the shop floor level are given opportunities to reflect and contribute to decision making. After all, as the implementers, they are expected to have better knowledge of the needs of the programme than those from offices.

## **6.5 THEME 3: TEACHER SKILLS AND COMPETENCES**

Pushpanathan (2012) is of the view that appropriate training of teachers to enable them to make the most of technology is one of the most important determinants of effective implementation of e-learning. A combination of connectivity, equipment and software does not achieve anything if people are not trained to use them (Du Plessis, 2017; Daniel, 2009). Some teachers are not trained to make use of some of the e-learning technologies, which is an impediment to their effort to implement e-learning.

### **6.5.1 Category 3.1: Knowledge (TPACK)**

This category lists the specific knowledge areas teachers need to have for effective implementation of e-learning. Technological knowledge refers to the use of technology in the education field. It refers to knowledge about various technologies, ranging from low technologies such as pencil and paper, to digital technologies such as the Internet, digital video, interactive whiteboards, and software programs (Shin, et al., 2009). Pedagogical knowledge (PK) refers to teaching methods (Brantley-Dias & Ertmer, 2013). This describes teachers' knowledge of the practices, processes, and methods regarding teaching and learning. Content knowledge (CK) describes the teachers' own knowledge of the subject matter. It is the combination of TK, PK and CK that makes a complete and effective teacher for the implementation of e-learning. Details of these knowledge combinations are covered in Chapter 3. Here, focus is on the interpretation and discussion.

The study revealed two categories of teachers who differ sharply in their knowledge levels of technology for effective implementation of e-learning. All the teachers who participated in the study were qualified and experienced teachers, with great mastery of content in their subject areas. However, major differences were noted in their knowledge of e-

learning technologies. The 'specialist' teachers were trained in ICTs, and had better knowledge at all three levels (TK, PK and CK) compared with the mature and senior generation of teachers. The obvious explanation for these differences was in the generation gap between these two categories of teachers; with the senior, mature group of teachers having taken their teacher training before the introduction of ICTs in education. While continuous professional development is a must for every teacher due to the dynamic nature of technology, the need for training of the senior and mature teachers seemed more urgent for them to salvage their careers before they are rendered redundant.

### **6.5.2 Category 3.2: Teacher continuing professional development**

The study reveals different types of teacher capacity development programmes for developing skills for implementing e-learning. The researcher observes that e-learning technology is too demanding to let teachers learn to use this technology only by experimenting. It is generally accepted that the e-learning competencies for teachers require a longer course on the technical use of the virtual learning environment. All participants in this research concurred that skills in computer use and other e-learning technologies were among the concerns that needed to be addressed before one could talk about e-learning implementation, and even the general use of electronic media in the classroom. A factor directly related to teacher confidence levels is that of teacher competence, which leads to high levels of motivation.

In order to achieve high levels of teacher competence in facilitating e-learning, there is a need to provide training and, perhaps unsurprisingly, there is a great deal of literature that suggests that effective training is crucial if teachers are to implement e-learning effectively in their teaching (Ghavifekr & Rosdy, 2015). If training is inadequate or inappropriate, then teachers will not be sufficiently prepared and, perhaps, not sufficiently confident to make full use of technology in and out of the classroom. Other researchers also observed a lack of computer skills on the part of teachers as an issue in the implementation of e-learning.

The Turkish example discussed in section 2.7.2 is one way the researcher views as a possible solution to training of teachers. In Turkey, e-learning in public primary schools

was implemented as early as 2007. The Centre for Digital Education rolled out the implementation in phases. It started as a pilot study. Teachers were provided with hands-on training through an Intel teacher programme. Schools gave their teachers time to learn about technology integration (Intel Corporation, 2008). The researcher marvels at and notes the huge support and investment in technology and teacher capacity development initiatives by Intel and partners as a key success factor in the implementation of e-learning. The multi-stakeholder approach (Intel, SMART Technologies, the Ministry of National Education, Schools and others) also accounted for the success.

The Turkish project findings diverge with the findings of this study in that, in the schools that were selected in this study, there was no profound support from multi-stakeholders for teacher capacity development as noted from the Turkish example cited in this study.

### **6.5.3 Category 3.3: Teacher attitude towards adoption of technology**

The study observed the issue of teacher attitude towards the adoption of technology as yet another critical factor in the effective adoption and implementation of e-learning. In particular, it was observed that the mature and senior generation of teachers were most likely to shun any opportunity for exposure to computers and technology in general. Part of the negative attitude seemed to have been triggered by the feeling of wanting to resist change, which seemed to have been imposed on them and not negotiated. The buy in and understanding of the initiative by teachers (as agents of change) is required for any new project to succeed, otherwise teachers would view initiatives as imposing, and would not want to renounce their traditional ways of teaching (Kaunda, Chembe, & Mukupa, 2018).

The issue of attitude could be linked to the technology acceptance model (TAM) model developed by Fred Davis in 1989 (Lai, 2017). The TAM is an information systems theory that models how users come to accept and use a technology. The actual system use is the end-point where people use the technology. Behavioural intention is a factor that leads people to use the technology. The behavioural intention (BI) is influenced by the attitude (A), which is the general impression of the technology. The model says that the adoption and implementation of a technology-based system such as e-learning is a response that can be predicted and explained by user motivation (Rauniar, Rawski, Yang,



& Johnson, 2014). This converges with findings of this research because teachers indicated lack of motivation, inability to use the technology, and inadequate training across all teachers of all grades in the primary schools. Despite their age, teachers are likely to accept a computer or technological device if they feel that it is useful to their work, it is easy to use, and they have a positive attitude towards the use of the technology (see section 2.6.4). Ease of use emanates from training as earlier alluded to.

In the next section, the researcher discusses the major findings and their relationship to literature reviewed. The researcher observed that there are factors that contribute to the successful implementation of e-learning, and these determine e-learning implementation. These are technological resources, teacher professional development, multi-stakeholder cooperation, political will, sensitivity to contextual differences, readiness to implement e-learning, the school system, and cultural issues.

## **6.6 FACTORS CONTRIBUTING TO THE SUCCESS OF E-LEARNING IMPLEMENTATION**

### **6.6.1 Technological resources**

In their study of e-learning implementation in the United States of America, Gray, Thomas and Lewis (2010) raised the issue of availability of requisite resources as one of the key factors for successful implementation of e-learning. Babic (2011) argues that successful e-learning implementation requires suitable e-learning environments and resources. E-learning resources come in different forms, with computers being a major part of these resources. They come in different types with different capabilities, as was demonstrated in the case of Turkey in which teachers were given different types of computers from those given to learners. The discrepancy was meant to meet the different functional needs of each group. In addition, internet connectivity is a crucial part of the resources needed for the effective implementation of e-learning.

The issue of adequacy of the right and functional technological resources for effective implementation of e-learning was also raised by Phiri and Mbobola (2018) in their study in Zambia. The study results revealed that there was only one pupil who had the required edition of the educational e-learning tablet in the whole school against a total population

of 406 pupils from grade one to grade seven. This represents a pupil-tablet ratio of 1: 406 if the tablet was to be used by all the grades equally, or 1: 58 if only grade six pupils were considered. Clearly, these are shocking ratios and do not favour effective implementation of e-learning in primary schools.

### **6.6.2 Teacher professional development**

Technology is dynamic and continuously changing. The skills needed for its effective use require continuous professional development. The need for teachers' professional development in the effective use of ICTs has been raised in the cases discussed above, with the Intel teacher training programme in Turkey serving as an example of such a training course. The study by Konyana and Konyana (2017) revealed that technology had not yet been embraced in the schools as teachers were not trained to use the new technology. This caused delay in teachers using computers and introducing it to learners (Konyana & Konyana, 2013).

Wangari (2016) notes the effective use of computers by teachers as one of the variables to interrogate in assessing the readiness of teachers for e-learning implementation. Effective use comes from a set of skills that can be acquired through training and exposure to computers.

### **6.6.3 Multi-stakeholder cooperation**

The case of Turkey highlights the importance of the cooperation of multiple stakeholders as a critical factor in the successful implementation of e-learning (Intel, 2008). This was demonstrated in the cooperation between schools with such big organisations as Intel, SMART Technologies Inc., the Ministry of Education and many others. The result of the cooperation was that there was division of areas of responsibility, each one giving the best from their area of specialisation. The researcher posits that critical stakeholders, who are the parents and guardians, should be actively involved for successful implementation of e-learning. Learners require the support of their parents and/or legal guardians to gain access and use e-learning technologies such as smart phones so that they access learning material posted to them at home. Phones are particularly useful for

supporting e-learning implementation, and yet they are sensitive, personal items hardly shared with anyone.

#### **6.6.4 Political will and commitment**

The case of Malaysia by Ghavifekr and Rosdy (2015) stresses the issue of political will and commitment as an indispensable factor for the successful implementation of e-learning. Not only did the government of Malaysia have a national vision for the adoption and implementation of e-learning across all sectors of the economy, but also went further to develop blueprints to guide its operationalisation. The government took responsibility for the provision of resources to schools and the needed teacher professional development in the use of ICTs. The broader vision for the adoption of e-learning should start at government level, and strategies for its operationalisation, including how it should be done in schools, must be inspired at that level. Government must be seen taking interest and supporting initiatives of private players towards supporting the implementation of e-learning in the schools. In Zambia, the government, parliamentary committee on education, Ministry of General Education in partnership with ischool.zm have approved and adopted the educational e-learning tablet to be used in all schools (Phiri & Mbobola, 2018).

#### **6.6.5 Sensitivity to contextual differences**

Phiri and Mbobola (2018) highlighted the issue of educational context when discussing the implementation of e-learning. The remark was made against the background that, provision of ICT resources in rural schools was done with tablets in Zambia, and must take into account the issue of power sources and internet connectivity. The study by Maloba, Cheluke and Wesonga (2015) on the implementation of e-learning in Kenya demonstrates the differences in urban and rural schools, and appeals to policymakers to be sensitive to the needs of the two categories of schools when planning for the implementation of e-learning. While the needs can be similar – such as shortage of resources and teachers' competences – the depth and form in which they manifest may be different. For instance, contrary to conventional belief, the case of Zimbabwe presents a paradox in which the majority of young, better qualified teachers in the use of ICT were found in rural schools; while the aged, less qualified teachers in ICTs were in urban

schools. In terms of endowment with ICT resources, urban schools had better facilities and ICT infrastructure than rural schools (Mavhemwa, Jekanyika, & Magomelo, 2017).

#### **6.6.6 E-learning implementation readiness assessment**

Wangari (2016) brings in critical factors to take into account when assessing e-learning implementation readiness among teachers. These include teachers' competences in the use of the e-learning technologies, their attitude and motivation towards the use of the technology, as well as their perception of how easy it is to use the technology. The list also includes teachers' views of how useful e-learning technology is to their work. An assessment of these factors prior to implementation helps to identify the necessary interventions to prepare teachers and lay the foundation for effective implementation of e-learning (Wangari, 2016).

#### **6.6.7 The school system**

The way the school is organised as a system, including its leadership and vision for the integration of ICTs in the curriculum, is considered a hugely critical factor for the successful implementation of e-learning. The NCCA (2005) stresses effective planning by the school as a key factor for the successful integration of ICTs in the school curriculum. It notes two levels of planning: school level planning by the school leadership, and classroom level planning by teachers. The NCCA (2005) posits that planning for ICT use in the primary school requires consideration for a number of mutually dependent factors.

Though planning starts with the curriculum, what may be achieved with the curriculum at school level is also affected by organisational, personnel and training factors (NCCA, 2005). Organisational planning at school level is concerned with ensuring successful and safe use of ICT to support teaching and learning within the school curriculum at the same level. Issues to be considered under organisational planning for E-learning in the school curriculum include a school-based acceptable use policy (AUP); a vision for the role of e-learning in supporting and enabling the school plan for curriculum, including outlining future e-learning development plans; e-learning network and equipment; e-learning

resources storage and maintenance; e-learning health and safety; teacher professional development; and e-learning coordination, among others.

Among the four factors raised as critical success factors from the case study in Australian schools, Broadley (2007) mentions leadership and coordination. Leadership is basically having a structure that takes leadership on e-learning related issues in the school and management, as well as at operational levels. Some schools in Zimbabwe have an ICT coordinator, which is a first step towards establishing such a structure.

### **6.6.8 Cultural issues**

A factor not necessarily highlighted in the studies, but important to highlight, particularly in African countries, is that the successful implementation of e-learning can be affected by cultural issues and general resistance to change. Kaunda, Chembe and Mukupa (2018) stress the need for buy-in and understanding of the initiative by teachers as a critical factor guaranteeing the success of any initiative. Once teachers view an initiative as foreign and imposed on them, they are likely to resist its implementation and stick to their traditional ways of going about their work.

## **6.7 SUMMARY**

In this chapter, three major themes and their categories derived from the findings and analysis of data were presented and discussed. In the discussion, what determines e-learning implementation was clearly spelt out in order to have a preliminary response to the main research question. Generally, e-learning is determined by the availability of resources, teacher training, model/ specificity in policy guidance, and planning for inclusion. The connectedness and relationship among the themes and their categories is further discussed in Chapter 7.

In the next chapter, the researcher addresses the main research question and sub-questions to come up with a holistic overview of the entire study. The chapter focuses on the summary, conclusions and recommendations of the study. The recommendations are

meant to improve the implementation of e-learning in primary schools based on experiences and lessons garnered in this study.

## CHAPTER 7

### SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

#### 7.1 INTRODUCTION

This study focused on the implementation of e-learning in primary schools in Zimbabwe by assessing the determinants of effective implementation of e-learning in primary schools, through the main research question: “What are the determinants of e-learning implementation in primary schools in Zimbabwe?” The study adopted a qualitative paradigm guided by the interpretivist philosophy and inductive approach

The universal and target population comprised teachers and school heads from three primary schools who were purposively selected from Harare Metropolitan Province participated in the study. The research tools, namely semi-structured interviews, non-participant observation, and analysis of existing documents and records, were the three methods used for data collection. This was done in three phases. First, the researcher analysed documents and records of e-learning implementation, including policies and reports. The researcher then held in-depth interviews with participants. This was followed by actual non-participant observation of lessons, which included assessing the schools’ resources, preparation and readiness for offering lessons through e-learning.

In this chapter, a summary and conclusions are drawn from the data presented and analysed, as well as being interpreted and discussed in Chapters 5 and 6. The conclusions were research related and were generated from the three sub-questions. These focused on the models used for e-learning implementation; the school system and its effects on implementation of e-learning; and the teacher competences needed for effective implementation of e-learning. The chapter starts with a summary of the study, followed by conclusions and recommendations based on the analysis and discussion of findings. The chapter closes with pointers and recommendations for further studies.

## **7.2 SUMMARY OF E-LEARNING IMPLEMENTATION RESEARCH FINDINGS**

The assessment of the implementation of e-learning implementation in primary schools in Zimbabwe can be considered an academic journey that sought to establish how e-learning was being implemented; the approaches and models being used as well as the specific competences needed in teachers for effective implementation. It also sought to examine the school system and its associated factors that may impinge on effective implementation of e-learning. The factors included school leadership (vision and mission towards the adoption and integration of ICTs in the school curriculum); resources and ICT infrastructure; the school plans for e-learning implementation as well as policy for ICT use. The thesis is in seven chapters whose contents are summarised below:

### **7.2.1 Summary: Chapter 1**

The rationale for this chapter was to situate the research problem by gap identification from reviewed literature. The general understanding of e-learning is brought to the fore so that independent variables and concepts are contextualised. The chapter introduced the study, stating the overall argument why the research was undertaken. The chapter started with background information motivating the study, highlighting the benefits of e-learning in education systems. The benefits were largely centred on improving the quality of teaching and learning, culminating in better learning outcomes. The problem statement, main research question, and sub-questions were also stated in the chapter. The main research question was: “What are the determinants of e-learning implementation in primary schools?” This was followed by the formulation of the aim and objectives of the study, and a discussion of the research methodology used to answer the research questions and achieve the research aim. The chapter ended with an outline of the thesis, and a summary of the main points raised in the chapter.

### **7.2.2 Summary: Chapter 2**

This chapter was a review of the literature on e-learning. Literature review shows gaps and opportunities through interrogating studies that have been carried out by other scholars on challenges and critical success factors in the implementation of e-learning programmes and projects. There is a greater need to evaluate implementation processes



and; hence, review the literature on current and topical trends in that specific area. This review should be based on a wider spectrum to ultimately help in making an informed comparative analysis of views and strategies. The chapter started with a historical perspective of the Zimbabwe education system so as to appreciate the context within which the programme being assessed is implemented. The recommendations of the Nziramasanga Commission of Inquiry into Education and Training (1999) were the major source of policy development for the introduction and implementation of e-learning in Zimbabwean schools. The chapter unpacked the concept of e-learning, starting with definition and a look into the various types of e-learning. Three theories of e-learning (connectivism, constructivism and heutagogy) were discussed, paving the way for a review of models for e-learning implementation. The models for the adoption and implementation of e-learning identified were the adjunct model; the blended model and the wholly online model. The technology adoption model was also introduced and discussed as a model that can be used in assessing teachers and heads' attitudes towards the adoption of technology as a critical factor affecting implementation of e-learning.

Next, the chapter solicited lessons from global experiences of implementation of e-learning through a presentation of various cases from different countries. The countries covered were the United States of America, Turkey, Australia, Malaysia, Kenya, Zambia, and Zimbabwe. An important observation made was the apparent dearth of literature on the implementation of e-learning in primary schools around the globe. The researcher considered this a vindication of the current study making it an important contribution to the body of knowledge on the implementation of e-learning in primary schools. The various cases reviewed presented success factors and challenges with the implementation of e-learning, which all guided the development of both the research questions and data collection instruments.

### **7.2.3 Summary: Chapter 3**

Ravitch and Carl (2016) assert that a theoretical framework is a guide for research. It serves to situate and contextualise formal theories in which a researcher engages with, integrates, and argues from existing formal theories. This leads to positioning their studies in the scholarly and academic field. Moreover, the theoretical framework is the

main target for the research and it is linked to the research problem under study. It guides a researcher's choice of research design and data analysis. This should be presented in the first section of all dissertations. It was presented as the structure that holds or supports a theory by introducing and describing what research problem exists, as well as aligning with one or two other complementing theories. The theoretical framework demonstrates an understanding of theories and concepts relevant to the topic of the research, while providing the broader areas of knowledge under consideration.

This section is of paramount importance as it connects the researcher to the existing knowledge through the lens of the relevant theory, and providing the choices of the research methods. It helps researchers to generalise the various aspects of an observed phenomenon from simply describing it, and also identifies their limits.

The theoretical framework guiding this study was based on the interpretivist paradigm. This was largely due to the qualitative nature of the study.

A theoretical framework is vital to all research, to clarify the implicit theory in a manner that is more clearly defined. It may also help researchers to consider their limitations and alternative theories that challenge their perspective. It is what all academic supervisors check in the first place to better understand the research problem. The study adopted the TPACK model as the guiding framework in assessing the teachers' capacity to integrate and implement technology in their teaching. The model shows the various combinations of knowledge a teacher must possess for effective implementation of e-learning, namely technological knowledge (TK), content knowledge (CK), pedagogical knowledge (PK), technological pedagogical knowledge (TPK), technological content knowledge (TCK), pedagogical content knowledge (PCK) and technological, content and pedagogical knowledge (TPACK)". All these various combinations are discussed in the chapter. Furthermore, the rationale for adopting the TPACK model as a theoretical framework for assessing the implementation of e-learning in primary schools in Zimbabwe was also discussed.

#### **7.2.4 Summary: Chapter 4**

The chapter discussed the plan used to carry out the study, and revealed information on how the researcher went about examining the implementation of e-learning. The rationale for empirical investigation was presented, then the research paradigm or the philosophical dimensions that the researcher felt comfortable with to address the research question. The research design for this study was an exploratory qualitative case study analysed through qualitative methods. The qualitative case study approach was adopted in order to exploit the demands of the research question fairly competitively. Methods for carrying out this study were discussed and justified. These included the selection of participants, data collection and analysis, and measures of ensuring trustworthiness in qualitative approaches. Procedural and situational ethical issues undertaken to make sure the findings were derived in an honest and truthful manner, were discussed. The researcher also looked at the population, sample and sampling procedures as critical components of the research methodology that clarified the research inquiry and why it was imperative. It helped clarify the implementation of e-learning in the Zimbabwean primary schools. The methodology ensured that the scientific process was religiously pursued by the researcher so that any researcher could trace the full process adopted.

#### **7.2.5 Summary: Chapter 5**

When the researcher has collected the data, there is a need to simplify it by presenting it using either the qualitative narrative or a report from quantitative data, depending on the data type. From the researcher's point of view, data analysis is a way to study and analyse huge amounts of data as it makes studying data simpler and more accurate. It also helps the researchers to interpret the data for decision making, and for efficient and productive use by the end user. End users like Ministry of Education, policy makers or parents ought to make informed decisions on what needs to be done to address the initial research problem. The aim of this chapter was to report on the findings of the assessment of e-learning in primary schools. Findings from document analysis, observations and interviews with teachers and school heads, as the implementers of e-learning, were given. These responded to the key research question on the determinants of e-learning

implementation and, in particular, the three e-learning questions on. the models being used in the implementation of e-learning in the schools, how the school system affects teacher implementation of e-learning, and the competences needed for effective implementation of e-learning.

### **7.2.6 Summary: Chapter 6**

When data has been presented and analysed, there is a need to review the data based on the different analytical techniques employed so that it can be categorised, manipulated and summarised. This helped to answer the initial critical questions, which were the basis for undertaking this research. This chapter on interpretation and discussion of data ensured that the thesis was put into major themes and categories derived from the findings and analysis of presented and discussed data. The reviewed data helped the researcher to generate meanings and arrive at relevant conclusions. Determinants of e-learning implementation were clearly spelt out in order to have a preliminary response to the main research question. The discussion paved the way for the drawing of conclusions and recommendations in the next chapter.

## **7.3 CONCLUSIONS AND RECOMMENDATIONS OF THE ASSESSMENT OF E-LEARNING IMPLEMENTATION IN PRIMARY SCHOOLS**

This section identifies the major conclusions of the study in relation to the research questions as stated in Chapter 1. The study was an assessment of the implementation of e-learning in primary schools in Zimbabwe. The main research question was: “What are the determinants of e-learning implementation in primary schools?” The three sub-questions from which the thematic areas were derived were:

- i) What models are teachers using in the implementation of e-learning in Harare Metropolitan Province primary schools?
- ii) How is the school system affecting the teacher implementation of e-learning in primary schools?
- iii) What teacher competencies are required for an effective implementation of e-learning in primary schools?

### 7.3.1 Conclusions based on Question 1

#### **Question 1: *What models are teachers using in the implementation of e-learning in Harare Metropolitan Province primary schools?***

Several documents; reports, policies, circulars and other instruments, for example, from government or the Ministry of Primary and Secondary Education and Presidential Commission of Inquiry into Education and Training (1999), laid the groundwork for the adoption and implementation of e-learning in the schools in Zimbabwe. The schools draw their mandate from these instruments. However, beyond these documents, there is no specific guidance and support from the MoPSE on the operationalisation of the policies and recommendations contained in the Commission reports. There is no specific model(s) suggested for the implementation of e-learning. This means the “how” question of e-learning implementation has not been answered at the strategic level of educational leadership. The consequence of this has been that individual schools have had to come up with their own interpretation of e-learning, and how they would operationalise it.

Emerging technologies have hugely shifted the behaviour of learners, reshaped teaching methods, and challenged traditional learning structures. The influx of technology in schools is non-negotiable. However, the education sector, consisting of major stakeholders including teachers, parents, heads and MoPSE, has been extremely slow in adapting the emerging technologies into learning before COVID-19 struck. Consequently, e-learning did not take off. If learners are to fully benefit from e-learning and what emerging technologies can offer. All stakeholders need to be involved in cultivating an e-learning culture as early as primary school.

In the absence of guidance, the implication is also that there is no local standard for assessing the e-learning implementation process. Any effort can count as success (or even lack of it). Against this background and conclusion, the following recommendation is made.

### **7.3.1.1 Recommendation: Need for further guidance and support**

The Ministry of Primary and Secondary Education should provide further guidance on the implementation of e-learning in the schools. It can also be considered the work of development or cooperating partners to further support the operationalisation of initiatives of the ministry, for the adoption and implementation of e-learning in the schools. This can be realised through exploring the various models with the implementers, and leaving them with clear, justifiable options to select from.

### **7.3.2 Conclusions based on Question 2**

#### **Question 2: *How is the school system affecting the teacher implementation of e-learning in primary schools?***

The school is a complex system comprising many elements and factors to be considered in assessing the effectiveness of the implementation of e-learning. Some conclusions are made based on certain specific elements of the school.

#### **7.3.2.1 Recommendation: Leading change and innovation**

A visionary and supportive school leadership is a key factor for the successful adoption and implementation of e-learning in schools. The vision can either be in the leader or shared with everyone in the school. The latter is a better approach as it guarantees vision ownership and continuity, in the event of the school leader deciding to part ways with the school.

It is recommended that, for sustainability, change in the school be led and supported by the school leadership. The implication of this is that school leadership should never be left out in capacity building initiatives, aimed at curriculum change and innovation. In other words, school leaders may require some orientation or capacity building for transformative school leadership (skills and practices) in general, and e-learning in particular.

### **7.3.2.2 Recommendation: Need for e-learning coordination structure**

While school leaders provide leadership at strategic level – such as general visioning and providing direction for the school in terms of its long-term development with e-learning – there is need for technical ICT leadership and coordination. This is provided by a trained and qualified ICT person or team. As shown in the three schools that participated in this study, successful implementation of e-learning requires this structure. It is responsible for operational planning, implementation, monitoring and evaluation of the programme. They stand between the school staff and leadership, providing the necessary technical advice for the advancement of the programme.

It is recommended that every school have an individual or team of trained and qualified staff in ICT, responsible for the coordination of the e-learning implementation programme. They plan and rollout the implementation of the programme, supporting both staff and learners on how to exploit resources and opportunities available through e-learning.

### **7.3.2.3 Recommendation: School policy on e-learning**

Schools do not have a domesticated, school-based ICT policy to guide the integration of ICTs in the school curriculum. The significance of such a policy cannot be overemphasised. In general, the policy guides operations and regulates the use of ICTs in the school. It is an instrument for safeguarding and protecting learners against potential harmful use of ICTs in the schools and guarantee healthy and safe use of ICTs by both staff and learners.

It is strongly recommended that all schools develop school policies on e-learning, such as the acceptable use policy (AUP), to guide and regulate the use of ICTs in the school by both staff and learners. An e-learning environment can either be partly or wholly virtual, and both learners and staff may be exposed to harmful practices such as cyber-bullying, which need intervention. An AUP would come in handy with appropriate solutions to support the victim in the event of such happening.

#### **7.3.2.4 Recommendation: E-learning resources, their use and management**

Successful implementation of e-learning requires the right and functional ICT resources, both hardware and software, and strong internet connectivity. However, it has also been learnt that some offline solutions do exist for e-learning. An investment into the acquisition of these resources requires deliberate planning and mobilisation of resources by school leaders. Regular maintenance to keep the equipment functional is important, as is looking for replacement of ageing equipment. It is also important that learners and staff access these resources. Otherwise, it is useless to have them.

It is recommended that the school plans and acquires the necessary resources for e-learning to create the best environment conducive to e-learning. The school must plan for and manage access to the resources by both staff and learners and, in the process, manage potential conflicts. It is also important that the e-learning equipment be kept functional, with a proper e- equipment maintenance plan in place.

#### **7.3.2.5 Recommendation: Planning for inclusion**

One of the goals of quality education provision is ensuring no learner is left behind. E-learning environments have the highest possibility of excluding some learners for various reasons, especially in the wholly online model. Both the school and the teacher have the responsibility to plan and develop clear strategies for inclusion of all learners, despite their socio-economic backgrounds as well as any form of disability. The school and teachers implementing e-learning must be conscious of the possibility of some learners being excluded.

It is recommended that the schools develop plans and strategies for including every learner.



### **7.3.3 Conclusions based on Question 3**

#### **Question 3: *What teacher competencies are required for an effective implementation of e-learning in primary schools?***

Arguably, the teacher is the main driver of the e-learning implementation programme. Their knowledge (technological, pedagogical and content) is critical for the successful implementation of e-learning. Most teachers who have gone through teacher training would normally have content and pedagogical knowledge. However, it is often the technological knowledge that is lacking. In particular, finding the appropriate balance and mix of pedagogical, content and technological knowledge is not easy for many teachers. The dynamic nature of technology makes it even more challenging. Knowledge needs continuous updating. It is this nature of technology that is frightening to some, leading to the ill-disposed attitude towards it.

#### **7.3.3.1 Recommendation: *Relevant continuing professional development (CPD)***

It is recommended that both the school and the MoPSE organise, motivate and support teachers to take up relevant CPD to update their knowledge and skills in ICT for the effective implementation of e-learning.

## **7.4 RECOMMENDATIONS FOR FUTURE RESEARCH**

There are two possible areas recommended for further inquiry:

- i) This study focused on three purposively selected schools in Harare where the researcher knew there was some e-learning taking place. This selection does not give a completely true picture of e-learning implementation in primary schools, as it excludes other categories of schools such as rural schools, peri-urban schools, satellite schools in resettled communities, and many others. For a fair representation of the implementation of e-learning in primary schools in Zimbabwe, some randomisation method of selection of participants, particularly stratified random sampling, could yield interesting results and generate new insights.

- ii) The global Covid-19 pandemic led to an accelerated implementation of e-learning as one of the measures to keep access to education going. One of the known effects of the pandemic is how it exposed the inequality gap between the rich and the poor, the have and the have-nots. Apart from that, there is still much to be learnt about both the e-learning implementation process and the outcomes. Educational policy formulation arising from this could benefit from the evidence generated. Both a process and outcomes evaluation of the accelerated implementation of e-learning in primary schools in Zimbabwe is recommended for further research.

## **7.5 SUMMARY**

The current chapter concludes the whole research process and gives research-related conclusions from the summary of key empirical research findings. A sizeable number of conclusions are made on e-learning implementation challenges, and possible solutions and recommendations to the Zimbabwean Ministry of Education and other stakeholders. The chapter also provides answers to initial research questions, and gives research conclusions and recommendations. More research needs to be done in this area, and areas for further study are also recommended.

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## APPENDICES

### APPENDIX A: ETHICAL CLEARANCE CERTIFICATE

#### ETHICAL CLEARANCE CERTIFICATE

*UNISA*



#### UNISA COLLEGE OF EDUCATION ETHICS REVIEW COMMITTEE

Date: 2019/03/13

Ref: **2019/03/13/61264245/19/MC**

Name: Mrs D Chikanyawu

Student: 61264245

Dear Mrs Chikanyawu

**Decision:** Ethics Approval from  
2019/03/13 to 2024/03/13

**Researcher(s):** Name: Mrs D Chikanyawu  
E-mail address: 61264245@mylife.unisa.ac.za  
Telephone: +263 77 239 3452

**Supervisor(s):** Name: Dr A Setlhako  
E-mail address: setlhama@unisa.ac.za  
Telephone: +27 12 429 6121

**Title of research:**

**Assessing the implementation of E-learning in primary schools: a case study of Harare Metropolitan Province.**

**Qualification:** D. Ed in Curriculum and Instructional studies

Thank you for the application for research ethics clearance by the UNISA College of Education Ethics Review Committee for the above mentioned research. Ethics approval is granted for the period 2019/03/13 to 2024/03/13.

*The **low risk** application was reviewed by the Ethics Review Committee on 2019/03/13 in compliance with the UNISA Policy on Research Ethics and the Standard Operating Procedure on Research Ethics Risk Assessment.*

The proposed research may now commence with the provisions that:

1. The researcher(s) will ensure that the research project adheres to the values and principles expressed in the UNISA Policy on Research Ethics.



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Pretter Street, Madsheuk Ridge, City of Tshwane  
PO Box 392 UNISA 0003 South Africa  
Telephone: +27 12 429 3111 Facsimile: +27 12 429 4150  
[www.unisa.ac.za](http://www.unisa.ac.za)

2. Any adverse circumstance arising in the undertaking of the research project that is relevant to the ethicality of the study should be communicated in writing to the UNISA College of Education Ethics Review Committee.
3. The researcher(s) will conduct the study according to the methods and procedures set out in the approved application.
4. Any changes that can affect the study-related risks for the research participants, particularly in terms of assurances made with regards to the protection of participants' privacy and the confidentiality of the data, should be reported to the Committee in writing.
5. The researcher will ensure that the research project adheres to any applicable national legislation, professional codes of conduct, institutional guidelines and scientific standards relevant to the specific field of study. Adherence to the following South African legislation is important, if applicable: Protection of Personal Information Act, no 4 of 2013; Children's act no 38 of 2005 and the National Health Act, no 61 of 2003.
6. Only de-identified research data may be used for secondary research purposes in future on condition that the research objectives are similar to those of the original research. Secondary use of identifiable human research data requires additional ethics clearance.
7. No field work activities may continue after the expiry date **2024/03/13**. Submission of a completed research ethics progress report will constitute an application for renewal of Ethics Research Committee approval.

Note:

The reference number **2019/03/13/61264245/19/MC** should be clearly indicated on all forms of communication with the intended research participants, as well as with the Committee.

Kind regards,



**Prof AT Motlhabane**  
**CHAIRPERSON: CEDU RERC**  
motlhat@unisa.ac.za



**Prof V McKay**  
**EXECUTIVE DEAN**  
Mckayvi@unisa.ac.za



Approved - decision template – updated 16 Feb 2017

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## APPENDIX B1: RESEARCH PERMISSION LETTER FROM MOPSE

All communications should be addressed to  
"The Provincial Education Director"

Telephone : 339334  
Fax : 339518  
E-mail:  
hararemetropolitanprovince@gmail.com



ZIMBABWE

Ministry of Primary and Secondary Education  
Harare Provincial Education Office  
P. O. Box CY 1343  
Causeway  
Zimbabwe

10 May 2019

Doit Chikanyawu  
No. 62 Flat C, Gope Court  
Eastlea  
Harare

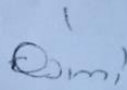
Dear Madam

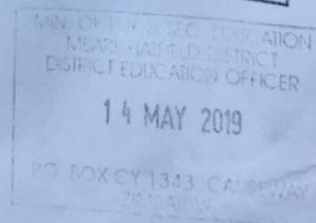
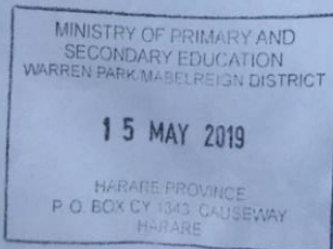
**RE: PERMISSION TO VISIT SCHOOLS FOR DOCTORAL RESEARCH IN HARARE PROVINCE: WARREN PARK/ MABELREIGN DISTRICT: HAIG PARK: NORTHERN/ CENTRAL DISTRICT: AVONDALE: MBARE/ HATFIELD DISTRICT: DAVID LIVINGSTONE PRIMARY SCHOOLS: HARARE METROPOLITAN PROVINCE**

Reference is made to your application to carry out a research at the above mentioned schools in Harare Metropolitan Province on the following research title:

**"ASSESSING E-LEARNING IMPLEMENTATION IN PRIMARY SCHOOLS: A CASE STUDY OF HARARE METROPOLITAN PROVINCE."**

Please be advised that the Provincial Education Director grants you permission to carry out our research on the above mentioned topic. You are required to supply the Provincial Office with a copy of your research findings soon after the completion of your research.

  
For the Provincial Education Director  
**Harare Metropolitan Province**





All communications should be addressed to  
"The Secretary for Primary and Secondary  
Education  
Telephone: 794895/796211  
Telegraphic address : "EDUCATION"  
Fax: 794505



ZIMBABWE

**Reference: C/426/3 Harare**  
Ministry of Primary and  
Secondary Education  
P.O Box CY 121  
Causeway  
**HARARE**

17 April 2019

Doit Chikanyawu  
No.62, Flat C, Gope Court  
Eastlea  
Harare

Re: **PERMISSION TO VISIT SCHOOLS FOR DOCTORAL RESEARCH IN  
HARARE PROVINCE: WARREN PARK MABELREIGN DISTRICT: HAIG  
PARK: NORTHERN CENTRAL – AVONDALE: MBARE HATFIELD - DAVID  
LIVINGSTONE PRIMARY SCHOOLS**

Reference is made to your application to carry out research at the above mentioned schools in Harare Province on the research title:

**"ASSESSING E-LEARNING IMPLEMENTATION IN PRIMARY SCHOOLS: A  
CASE STUDY OF HARARE METROPOLITAN PROVINCE"**

Permission is hereby granted. However, you are required to liaise with the Provincial Education Director Harare Province, who is responsible for the schools which you want to involve in your research. You should ensure that your research work does not disrupt the normal operations of the schools. Where students are involved, parental consent is required.

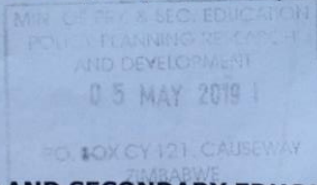
You are also required to provide a copy of your final report to the Secretary for Primary and Secondary Education.

A handwritten signature in black ink, appearing to read 'T Thabela'.

T Thabela (Mrs)

**SECRETARY FOR PRIMARY AND SECONDARY EDUCATION**

cc: PED – Harare Province



**APPENDIX B2: REQUEST FOR PERMISSION TO CARRY OUT RESEARCH TO  
MOPSE**



Number 62, Flat C, Gope Court  
Eastlea  
Harare  
Zimbabwe

16 April 2019

The Secretary for Primary and Secondary Education  
Ministry of Primary and Secondary Education  
PO Box CY 121  
Causeway  
Harare, Zimbabwe  
Tel:  
Email:

Dear Sir/Madam

**RE: REQUEST FOR PERMISSION TO CONDUCT RESEARCH AT HAIG PARK  
PRIMARY SCHOOL-WARREN PARK MABELREIGN DISTRICT, AVONDALE  
PRIMARY SCHOOL- NORTHERN CENTRAL DISTRICT AND DAVID LIVINGSTONE  
PRIMARY SCHOOL – MBARE HATFIELD DISTRICT IN HARARE METROPOLITAN  
PROVINCE SCHOOLS.**

Title of the research: Assessing the implementation of e-learning in primary schools: A case study of Harare Metropolitan Province.

I, Doit Chikanyawu, am doing research under supervision of Dr M.A. Setlhako, a senior lecturer in the Department of Furthering Teacher Education towards a Doctoral Degree at the University of South Africa. I write to request for permission to carry out research in the above listed districts and schools.

The aim of the study is to assess e-learning implementation in primary schools.

The schools have been selected because of the following:

- Training that teachers received at school level/ cluster level on e-learning implementation
- Your teaching staff have or are undergoing some training at Morgan ZINTEC toward an ICT diploma which is sponsored by UNESCO on the implementation of e-learning in their teaching responsibilities;
- Proximity of the schools to the researcher and
- Availability of ICT infrastructure and e-learning technologies and platforms in the school.

The study will entail interviews with heads of schools, deputy heads and TICs then three teachers who will be purposefully selected from ECDA TO Grade 5 by virtue of them implementing the new curriculum which advocates for the adoption of e-learning technologies in curriculum delivery.

The benefits of this study are that the findings will help to assess the degree to which the Harare Schools have been able to fit in the information society theory and how they can overcome challenges that impede successful implementation or a full-fledged e-learning implementation in primary schools. Also the findings will help the policy makers and curriculum reviewers to make informed decisions when reviewing policies and curriculum delivery mode systems in schools.

There are no risks that are anticipated because the nature of the study does not hinge on sensitive topics and neither does it directly seek to get data from humans under 18 years of age.

There will be no reimbursement or any incentives for participation in the research.

Feedback procedure will entail presentation of the finding at a dissemination workshop, a copy of the thesis submitted to your office and simplified version of the findings prepared for the participants to read.

Thank you in advance for your cooperation and support

Yours Faithfully

Signature:

Doit Chikanyawu

Position: Researcher



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**APPENDIX B3: PERMISSION TO CARRY OUT RESEARCH TO HARARE PROVINCE**



12 January 2019

The Provincial Education Director

Ministry of Primary and Secondary Education

PO Box CY1343

Causeway

Harare

Tel:

Email:

Dear Sir/Madam

**RE: REQUEST FOR PERMISSION TO CONDUCT RESEARCH AT HAIG PARK PRIMARY SCHOOL- WARREN PARK MABELREIGN DISTRICT, AVONDALE PRIMARY SCHOOL- NORTHERN CENTRAL DISTRICT AND DAVID LIVINGSTONE PRIMARY SCHOOL – MBARE HATFIELD DISTRICT IN HARARE METROPOLITAN PROVINCE.**

Title of the research: Assessing e-learning implementation in primary schools: A case study of Harare Metropolitan Province Schools.

I, Doit Chikanyawu, am doing research under supervision of Dr M.A. Setlhako, a senior lecturer in the Department of Further Teacher Education towards a PhD at the University of South Africa. I write to request for permission to carry out research in the above listed districts and schools.

The aim of the study is to assess e-learning implementation in primary schools.

The schools have been selected because of the following:

- Training that teachers received at school level/ cluster level on e-learning implementation
- Your teaching staff have or undergoing some training at Morgan ZINTEC toward an ICT diploma which is sponsored by UNESCO on the implementation of e-learning in their teaching responsibilities
- Proximity of the schools to the researcher and
- Availability of ICT infrastructure and e-learning technologies and platforms in the school.

The study will entail interviews with heads of schools, deputy heads and TICs then ten teachers who will be purposefully selected from ECDA TO Grade 5 by virtue of them implementing the new curriculum which advocates for the adoption of e-learning technologies in curriculum delivery.

The benefits of this study are that the findings will help to assess the degree to which the Harare Schools have able to fit in the information society theory and how they can overcome challenges that impede successful implementation or a full-fledged e-learning implementation in primary schools. Also the findings will help the policy makers and curriculum adjuster make informed decision when reviewing polices and delivery modes systems in schools. There are no risks that are anticipated because the nature of the study does not hinge on sensitive topics and neither does it directly seek to extol data from humans under 18 years of age.

There will be no reimbursement or any incentives for participation in the research.

Feedback procedure will entail presentation of the finding at a dissemination workshop and simplified version of the findings prepared for the participants to read.

Thank you in advance for your cooperation and support

Yours Faithfully

Signature:

Doit Chikanyawu

Position: Researcher



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**APPENDIX B4: REQUESTS FOR PERMISSION TO CARRY OUT RESEARCH IN SCHOOLS**



Number 62 Glenara, South Avenue  
Eastlea  
Harare

16 May 2019

The Head  
B Primary School  
P.O. Box  
Tel: + .....  
Email: [.....](mailto:.....)

Dear Madam

**RE: REQUEST FOR PERMISSION TO CARRY OUT RESEARCH IN YOUR SCHOOL**

I, Doit Chikanyawu, am doing research under supervision of Dr M.A. Setlhako, a senior lecturer in the Department of Further Teacher Education towards a PhD at the University of South Africa. I write to request for permission to carry out research in your school. I am also inviting you to participate in a study entitled: Assessing e-learning implementation in Primary Schools: A case Study of Harare Metropolitan Province.

The aim of the study is to assess e-learning implementation in primary schools.

Your School has been selected because of the following:

- Training that teachers received at school level/ cluster level on e-learning implementation
- Your teaching staff have or undergoing some training at Morgan ZINTEC toward an ICT diploma which is sponsored by UNESCO on the implementation of e-learning in their teaching responsibilities;
- Proximity of the schools to the researcher and
- Availability of ICT infrastructure and e-learning platforms in the school.



The study will entail interviews with you, and 3 teachers from your school. I will need to first observe the three teachers teach. I also need to look at the following documents; Schemes of work for those teachers and your school development plan or strategic plan.

The benefits of this study are that the findings will help to assess the degree to which your school fits in the information society theory and how you can overcome challenges that impede successful implementation or a full-fledged e-learning implementation in primary schools.

There are no risks that are anticipated because the nature of the study does not hinge on sensitive topics and neither does it directly seek to source data from humans under 18 years of age.

There will be no reimbursement or any incentives for participation in the research.

Feedback procedure will entail presentation of the findings at a dissemination workshop and simplified version of the findings prepared for the participants to read.

Thank you in advance for your cooperation and support.

Yours Faithfully

Signature:

Doit Chikanyawu



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## **APPENDIX C1: LETTERS TO TEACHERS AND SCHOOL HEADS WITH RETURN SLIPS**

Date: xxxxx

Title: **Assessing the implementation of e-learning in primary schools: A case study of Harare Metropolitan Province Schools.**

### **DEAR PROSPECTIVE PARTICIPANT**

My name is Doit Chikanyawu and I am doing research under the supervision of Dr M.A. Setlhako, a senior lecturer in the Department of Further Teacher Education towards a Doctoral Degree at the University of South Africa. I am requesting you to participate in a study entitled: Assessing the implementation of e-learning in primary schools: A case study of Harare Metropolitan Province.

### **WHAT IS THE PURPOSE OF THE STUDY?**

This study is expected to collect important information that could help in giving a picture that helps the education system, teachers to corroborate with the current trends in technology use in teaching and learning as spelt out clearly in the new curriculum and as was recommended by the Inquiry into Education and Training in 1999, now commonly referred to as the Nziramasanga Commission. If there are any setbacks, these will be closely assessed and recommendations made to the authorities that there be for an improved teaching and learning that makes use of technologies. Teaching with technology has a plethora of benefits both to the school, teacher and the learner.

### **WHY AM I BEING INVITED TO PARTICIPATE?**

You are invited because you are the implementer of e-learning in the school. If you read your new curriculum frame work and your syllabi, there is mention of the use of e-learning technologies as media.

I obtained your contact details from the school authorities because I had sought authority from the Ministry of Primary and Secondary Education head office as well as the Provincial Education Director, then from the District Schools Inspector and finally from the Head of your particular school. I need ten teachers from this school in order for me to interview on the above topic.

## **WHAT IS THE NATURE OF MY PARTICIPATION IN THIS STUDY?**

Describe the participant's actual role in the study.

The study involves semi-structured interviews and focus group discussions so actual role is to answer question that I will be asking as truthfully as possible. I kindly ask you to allow me to record the proceedings of the interviews. I guarantee you anonymity and the recordings will be kept in secured files so that I can use the information to analyse data. Some of the questions that will be asked are attached here and the interview or discussion will take 30 to 45 minutes. I do not have to interfere with your normal teaching time so the interviews will be done after school. I will request that we finalise the exact time and date after you have consented to this.

## **CAN I WITHDRAW FROM THIS STUDY EVEN AFTER HAVING AGREED TO PARTICIPATE?**

Participating in this study is voluntary and you are under no obligation to consent to participation. If you do decide to take part, you will be given this information sheet to keep and be asked to sign a written consent form. You are free to withdraw at any time and without giving a reason.

## **WHAT ARE THE POTENTIAL BENEFITS OF TAKING PART IN THIS STUDY?**

Participation in this research is purely voluntary and there are no incentives in monetary form that will accrue to you as a participant. Arguably, professionally you will be able to get insight into the value of e-learning technologies as you get involved in the discussions. Education has vital role in building the society. It is one of the most important needs for the well-being of individual and the society. Quality education helps to empowering the nation in all aspects. There are many ways to increase the learner's knowledge, and technology is the most effective way. So as a professional in the realm of facilitating learning, this area of study will be beneficial to you.

## **ARE THERE ANY NEGATIVE CONSEQUENCES FOR ME IF I PARTICIPATE IN THE RESEARCH PROJECT?**

This study, does not have foreseeable negative consequences. The schools, heads of schools, deputy heads, TICs and teacher will be protected by using pseudo names.

**WILL THE INFORMATION THAT I CONVEY TO THE RESEARCHER AND MY IDENTITY BE KEPT CONFIDENTIAL?**

Your name will not be recorded anywhere and no one, apart from the researcher, will know about your involvement in this research. Furthermore, your name will not be recorded anywhere and no one will be able to connect you to the answers you give. Your answers will be given a code number or a pseudonym and you will be referred to in this way in the data, any publications, or other research reporting methods such as conference proceedings. Photographs of e- learning technologies will not have any identifiable information. A report of the study may be submitted for publication, but individual participants will not be identifiable in such a report.

While every effort will be made by the researcher to ensure that you will not be connected to the information that you share during the focus group, I cannot guarantee that other participants in the focus group will treat information confidentially. I shall, however, encourage all participants to do so. For this reason I advise you not to disclose personally sensitive information in the focus group. Such information will be disclosed in individual interviews.

**HOW WILL THE RESEARCHER(S) PROTECT THE SECURITY OF DATA?**

Hard copies of your answers will be stored by the researcher for a period of five years in a locked filing cabinet at the UNISA office for future research or academic purposes; electronic information will be stored on a password protected computer. Future use of the stored data will be subject to further Research Ethics Review and approval if applicable. After five years hard copies will be shredded and electronic copies will be permanently deleted from the hard drive of the computer through the use of a relevant computer software programme.

**WILL I RECEIVE PAYMENT OR ANY INCENTIVES FOR PARTICIPATING IN THIS STUDY?**

There is no form of payment or incentives that will be given for participating in this study.

### **HAS THE STUDY RECEIVED ETHICS APPROVAL**

This study has received written approval from the Research Ethics Review Committee of the College of Education at UNISA. A copy of the approval letter can be obtained from the researcher if you so wish.

### **HOW WILL I BE INFORMED OF THE FINDINGS/RESULTS OF THE RESEARCH?**

If you would like to be informed of the final research findings, please contact Doit Chikanyawu on +263 772 393 452 or email [doitchikanyawu@gmail.com](mailto:doitchikanyawu@gmail.com). The findings are accessible for five years.

Should you have concerns about the way in which the research has been conducted, you may contact Dr M A Setlhako at (phone number) or at (email address)

Thank you for taking time to read this information sheet and for participating in this study.  
Thank you.

---

Signature

Doit Chikanyawu

**APPENDIX C2: SAMPLE CONSENT TO PARTICIPATE IN THIS STUDY (RETURN SLIP)**

I, \_\_\_\_\_ (participant name), confirm that the person asking my consent to take part in this research has told me about the nature, procedure, potential benefits and anticipated inconvenience of participation.

I have read (or had explained to me) and understood the study as explained in the information sheet.

I have had sufficient opportunity to ask questions and am prepared to participate in the study.

I understand that my participation is voluntary and that I am free to withdraw at any time without penalty (if applicable).

I am aware that the findings of this study will be processed into a research report, journal publications and/or conference proceedings, but that my participation will be kept confidential unless otherwise specified.

I agree to the recording of the interview.

I have received a signed copy of the informed consent agreement.

Participant Name & Suriname (please print)

\_\_\_\_\_

\_\_\_\_\_  
Participant Signature

\_\_\_\_\_  
Date

Doit Chikanyawu

\_\_\_\_\_  
Researcher's signature

\_\_\_\_\_  
Date

## APPENDIX D: LETTER REQUESTING PARENTAL CONSENT TO OBSERVE THEIR CHILD'S TEACHER FACILITATING E-LEARNING



### Dear Parent

Topic: Assessing E-Learning Implementation in Primary Schools: A Case Study of Harare Metropolitan Province Schools.

I am undertaking this study as part of my doctoral research at the University of South Africa. The purpose of the study is establish whether there is e-learning implementation in schools and the possible benefits of the study are the improvement of curriculum delivery through the use of ICTs .I am asking permission to observe your child's teacher facilitating e-learning .

If you allow me to observe your child's teacher, I shall request your child to be part of the class that I will observe being facilitated by your child's teacher in using e-learning technologies.

Any information that is obtained in connection with this study and can be identified with your child will remain confidential and will only be disclosed with your permission. His/her responses will not be linked to his/her name or your name or the school's name in any written or verbal report based on this study. Such a report will be used for research purposes only.

There are no foreseeable risks to your child by participating in the study. Your child will receive no direct benefit from participating in the study; however, the possible benefits to education are that the authorities will be made aware of the challenges and possible solutions that will help in improving the integration and ICT usage in school. Neither your child nor you will receive any type of payment for participating in this study.

Your child's participation in this study is voluntary. Your child may decline to participate or to withdraw from participation at any time. Withdrawal or refusal to participate will not affect him/her in any way. Similarly, you can agree to allow your child to be in the study now and change your mind later without any penalty.

The study will take place during regular classroom activities with the prior approval of the school and your child's teacher.

In addition to your permission, your child must agree to participate in the study and you and your child will also be asked to sign the assent form which accompanies this letter. If your child does not wish to participate in the study, he or she will not be included and there will be no penalty. The information gathered from the study and your child's participation in the study will be stored securely on a password locked computer in my locked office for five years after the study. Thereafter, records will be erased.

The benefits of this study are to improve the e-learning as a delivery mode suitable 21<sup>st</sup> century learners and to help policy –makers make informed decisions on implementation of programmes in schools and thus improving the systems.

There are no potential risks in this study, I only need to observe you child 'teacher facilitating e-learning. There will be no reimbursement or any incentives for participation in the research.

If you have questions about this study, please ask me or my study supervisor, Dr M A Setlhako, Department of Further Teacher Education, College of Education, University of South Africa. My contact number is 0772 393 452 and my e-mail is [doitchikanyawu@gmail.com](mailto:doitchikanyawu@gmail.com). The e-mail of my supervisor is [setlhm@unisa.ac.za](mailto:setlhm@unisa.ac.za). Permission for the study has already been given by the Ministry of primary and Secondary Education, the School Head and the Ethics Committee of the College of Education, UNISA.

You are making a decision about allowing your child to participate in this study. Your signature below indicates that you have read the information provided above and have decided to allow him or her to participate in the study. You may keep a copy of this letter.



Name of child:

Sincerely

Parent/guardian's name (print)

Parent/guardian's signature:

Date

Researcher's name (print)

Researcher's signature

Date:

1/06/2019

**DOIT CHIKANYAWU**



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## APPENDIX E: GUIDING INTERVIEW QUESTIONS FOR SCHOOL HEADS

For this purpose, a set of 15 self-made questions has been prepared giving due attention to the research question and objectives of the study.

Heads of Schools

Biographical Information

Gender: Male Female

Name of the school:

.....

Qualifications:

.....

Teaching experience: ..... Years

Subjects

taught:

.....

Grade(s):

.....

What are the determinants of e-learning in primary schools?

1. How many classrooms do you have in the school?
2. How many technologies have been installed in each of the classroom? E.g. computers, projectors, e-library
3. May you please briefly describe e-learning technologies that are in your school
4. Who uses the e-learning technologies?
5. Any programs, software installed or teachers design content on their own.
6. Taking each of the listed technologies that you have mentioned that exist in the school, can you briefly describe how they are used by your teachers to facilitate learning
7. Modes of e-learning implementation (train of trainer, learner centred  
Do you think that the different modes of e-learning is an important tool for effective teaching at the primary school level?
8. Are the technologies used within lesson delivery or after probably school or both and how.(Explain your strategy for e-learning in this school)

Teacher competences

**9.** Are your teacher well equipped to facilitate e-learning

School system and how it affects e-learning

**10.** Does the school have an ICT policy?

**11.** Are all teachers and your core administrators aware of the use of e-learning technologies?

**12.** What is the school in conjunction with the parents body planning to do with regards to the setbacks you have listed above?

**13.** Do you think that the e-learning infrastructures and resources available in the school is enough to impart quality education?

**14.** In regard to provide e-learning facilities and technologies, do you think that your school has various agendas for future programs to initiate e-learning to the next level. State the reason

**15.** Swot analysis – What strengths and weaknesses within the school can you pin point with regards to e-learning? What opportunities and threats does the school face?

## APPENDIX F: GUIDING INTERVIEW QUESTIONS FOR TEACHERS

### Interview schedule for teachers (to be used flexibly)

#### Biographical Information

Gender: Male  Female

Name of the school: .....

Qualifications: .....

Teaching experience: ..... Years

Subjects taught: .....

Grade(s): .....

#### Model used in the school

1. Do you have e-learning technologies (computers, projectors, interactive boards) within your classrooms?

Yes  No

If yes, list them and tell me how you use each of them

2. Which software and other helping technologies do you have in the classroom?

3. Do you have a computer lab in the school?

Yes  No

If yes please explain how you make use of the laboratory.

4. Are you satisfied with the e-learning facilities that are provided in your school/classroom?

5. In which learning areas do you use the e-learning technologies?

6. Which type of e-learning are you using?

#### School system and the enhancement of e-learning

7. Do you regard using e-learning as having any benefits?

Yes  No

8. What support is the school system giving in pursuit of e-learning in the school?

9. Do all teachers at your school use the e-learning technologies in their teaching activities?

Yes  No

Explain

If not all teachers, in which subjects are the e-learning technologies used for the facilitation of teaching and learning?

10. Do you have all the necessary application software such as word processor, database, etc. required for the facilitation of teaching and learning?

Yes

No

Explain:

11. Do you use these e-learning programs in teaching your subject to provide new ways of enhancing learners' experiences of acquiring knowledge?

Yes  No

Explain:

12. Do learners learn better as a result of using e-learning technologies in teaching your subject matter?

Yes  No

Explain:

13. How do you use e-learning technologies to cater for learners' learning needs?

14. Do you use the computer and the internet to update your subject knowledge?

Yes  No

Explain:

15. Do you give learners tasks which prompt the use of the internet?

For which subjects do you use the internet?

16. Do you use the email to post homework to your learners?

17. What other methods do you have to facilitate learning even away from school to your learners?

Yes  No

Explain

18. The Zimbabwe new curriculum framework posit that e-learning technologies should be used across all subjects in all schools, do you think this is possible?

If the answer is yes, please explain:

If the answer is no, give reasons why:

Yes  No

19. Do you think that the various e-learning facilities such as interactive boards, software, etc. have become a reality of primary education?

20. What changes are needed for maximal use of e-learning technologies and plat forms as well as software in teaching and learning?

### **Teacher competencies in the use of technology like computers**

21. What is your level of expertise in using computers, internets?

22. Do you have any training in the use of ICTs? If yes give detail of levels acquired.

23. Do you think you have the necessary skills to integrate these e-learning technologies in your daily teaching responsibilities?

Yes  No

Explain:

24. Do you have training programs in the school or at cluster level, for teachers and administrators to provide knowledge about the use of e-learning facilities?

25. Have you received any training on the integration and implementation of e-learning technologies in your teaching activities?

Yes  No

Explain:

26. How confident are you about your ability to use computers and other e-learning instruments for teaching and learning?

Explain:

27. Do you have internet access?

Yes  No

Explain:

28. Do you use the internet to update your professional development?

Yes  No

Explain

29. What challenges do you encounter in the implementation of e-learning in your responsibilities?

30. Is there a website in this school?

THANK YOU FOR PARTICIPATING IN THIS INTERVIEW I MIGHT CALL YOU FOR CLARIFICATION OF SOME OF YOUR RESPONSES IF NEED BE.

## Appendix G: Observation Guiding Schedule ( Physical Attributes)

Name of School:

Date.....

Time:

Name of teacher:.....

Age: .....

Gender:.....

Teaching experience:.....

ICT Course held:.....

ITEM	YES	NO	COMMENT
1. Available functional e-learning technologies			
2. Computer laboratory			
3. E-learning state of the classroom, i.e., interactive boards, internet connectivity etc.			
4. Availability of e-learning technologies for teacher and learners			
5. Classroom set up which promotes e-learning implementation			
6. State of the infrastructure in general			
7. Does each learner have a computer?			
8. The teacher's ability to facilitate the ICT usage and e-learning			
9. Subject/learning area being taught			
10. Is there observable impact of the technology used			

## APPENDIX H: LESSON OBSERVATION GUIDING SCHEDULE

**Comments on observed lessons.** *Since the interview is based on the lessons observed, its substantive content and scope is best formulated after the lesson observations.*

In this part of interview, I am making a follow-up from the lessons I observed you teach. Please think back to those lessons and kindly share with me some thoughts on your enhancing teaching and learning through e-learning.  
For the lesson on

With \_\_\_\_\_ on \_\_\_\_\_ 2019.

1. What did you want your learners to get out of the lesson? (**Probe:** The goals vis-à-vis their alignment to teaching approach)

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2. Tell me any two reasons for using e-learning method that you used in the lesson.

(a)

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(b)

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3. What would you do differently if you had a chance to reteach the lesson and why?

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4. In your opinion, under which what circumstances do you think your learners learn best? (**Probe:** Teacher-directed lesson, learner-centred lesson etc. Explain your response.).

5. Does the approach you used represent your normal instructional approach or a departure from it? Please explain. (**Listen for:** teacher understanding of the change, persistence of habits, etc.).
6. As a teacher teaching in the 21<sup>st</sup> century, what are you expected to do during the teaching learning process? (**Probe:** What is the teacher's role? Has that (your) role teacher changed, if at all, with the introduction electronic material and gadgets?
- 7.
8. Let us talk about your lesson with respect to the following processes; that is whether these were either part of the lesson or not? How much of the following processes could you say were part of your lesson? Please kindly explain your response.
  - Guided by how learners expected to acquire knowledge. (**Probe:** Method and processes used).
  - There was active learning/ it was an interactive lesson.
  - Relationships, i.e., between learner and teacher and, between learners themselves showed mutual respect.
  - Learners were allowed a sense of autonomy/decision making.
  - Opportunities to reflect on teaching and learning were given in the lesson.
  - Learners were allowed to show responsibility and accountability.
  - Emphasis was on deep learning and understanding.
9. Describe how you enabled your learners to cope with the e-learning technology
10. **Listen for:** teacher-initiated adjustments or changes to curriculum, methods etc. to suit learners).
11. In your opinion, what factors promote or can promote the use of learner-centred instruction in e-e-learning? (**Prompts:** dominant teacher beliefs, nature teacher training, calibre of learners, availability of teaching-learning materials, etc.)
12. In your opinion, what factors militate against the smooth/wholesale use of learner-centred instruction in an e-e-learning scenario? (**Prompts:** dominant teacher beliefs, nature teacher training, calibre of learners, availability of teaching-learning materials, etc.)
13. If you were to advise the authorities (school level or other) on the implementation of e-learning in the curriculum delivery, what would you say?
14. Please comment on any other issues about the implementation of e-learning in the curriculum which we have not touched on but you feel should be discussed.

**Thank you very much for your valuable contribution and the time you have spared to answer my questions.**



## APPENDIX I: CODES AND THEMES FROM DATA ANALYSIS

### APPENDIX FOR CODES AND THEMES

QUOTES	CODES	EMERGING THEMES
<p><i>“Zimbabwe new curriculum framework posit e-learning technologies should be used across all subjects in all schools but this is not possible since we have problems of resources such as computers, interactive boards to mention a few”</i></p> <p><i>“I have my cell phone and my laptop, If funds permit we need more labs and devices “</i></p> <p><i>“We are still on experimental basis for example right now we go for 12 hrs. without electricity.”</i></p>	<p>Lack of financial resources to purchase hardware and software</p> <p>Power cuts</p>	<p>Insufficient e-learning infrastructure</p>
<p><i>“For now It is not possible to say implement e-learning well ,power cuts and lack of resources and most facilitators are not well versed, we are 52 teachers in this school and a few have been send to train in the use of ICT In</i></p>	<p>Technology acceptance by parents</p> <p>Lack of training of teachers</p>	<p>teacher competences in the use of e-learning technologies</p>

<p><i>teaching and learning, I think by 2020.”</i></p> <p><i>“The administrators need to prioritise and give preference to e-learning.”</i></p> <p><i>“Yes, but maintenance is the biggest challenge, if something has broken down like my overhead projector , They have to repair it as soon as possible but right now it’s almost 2 years now. You can see how I am struggling.”</i></p> <p><i>“The challenges that I have so far are power cuts, shortage of resources and limited time with learners to do our practical lessons.”</i></p> <p><i>“Partially. I do not think having one lab is enough, have 54 learners and to attend to them in 30 minutes is not feasible. We need more time to interact</i></p>	<p>IT personnel and lack of back up parts for the e-learning devices.</p> <p>School priorities</p> <p>Lack of school policy to determine the implementation of e-learning</p> <p>Time allocated to the lessons</p> <p>Teacher pupil ratio too high</p> <p>Lack of parental support</p>	<p>School systems and educational policies guiding the implementation of e-learning.</p> <p>e- readiness</p>
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<p><i>with e-learning technologies.”</i></p> <p><i>“Yes we have computer lab, and we use it once a <b>week</b> for 30 minutes. I am not satisfied with the e-learning technologies that we have in the school, we only have one lab and I have 54 learner in a class so to attend to the in 30 min it’s not adequate I need more time.”</i></p> <p><i>“We do not use cell phones, our parents have not yet accepted the use of cell phones they think it is a waste of money to buy e-learning gadgets for grade 1 pupils.”</i></p>		
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## APPENDIX J: TEACHERS' INTERVIEW TRANSCRIPT

### Biographical Information

Gender: Female

Name of the school: –school B

Qualifications: BED ECD; Certificate in computers.

Teaching experience: .6 Years

Age: 58 years

Subjects taught: Mathematics and Science, Shona, English, Family and Heritage Studies, Visual and Performing Arts, Physical Education, Mass Displays.

Grade(s): ECD B (4 to 5 year olds)

### Model used in the school

**Interviewer:** Do you have e-learning technologies (computers, projectors, interactive boards) within your classrooms? If yes, list them and tell me how you use each of them

**Interviewee:** Yes we have the laptop, desktop, projector, interactive board and the white board.

**Interviewer:** What is the use of all those e-learning technologies that you have listed that are in here in your classroom?

**Interviewee:** we use the laptop to research and beaming information for the children on the white through the projector. The desktop is used their spare time to do their researches as the projector is connected to projector. Interactive learning on the board.

**Interviewer:** Do you have a computer lab in the school? If yes please explain how you make use of the laboratory.

**Interviewee:** Yes Learners go to the computer laboratory for their computer lessons they also do research we also have a printer there we print what we want in bulk.

**Interviewer:** Are you satisfied with the e-learning facilities that are provided in your school/classroom?

**Interviewee:** Yes

**Interviewer:** Do you think that the different modes of e-learning are an important tool in the primary school learning.

**Interviewee:** Yes it allows for learners centred approach.

**Interviewer:** What do you mean? Can you please elaborate?

**Interviewee:** It promotes discovery learning. Learners get a chance to do their own things on their own.

**Interviewer:** In which learning areas do you use the e-learning technologies?

**Interviewee:** In all the learning areas that I teacher at ECDB level that I have mentioned earlier on.

**Interviewer:** As digital age children, do you allow them to use their smart phones for learning?

**Interviewee:** Not yet in school, but we have their tablets kept in the computer laboratory where they are secured.

**Interviewer:** Do you regard e-learning as having any benefits?

**Interviewee:** Yes to the learners, we are producing 21<sup>st</sup> century learners who are it compliant, problem solvers, discovery; learners

### SCHOOL SYSTEM AND THE ENHANCEMENT OF E-LEARNING

**Interviewer:** Do you regard using e-learnings as having any benefits?

**Interviewee:** Yes

**Interviewer:** What support is the school system giving in pursuit of e-learning in the school?

**Interviewee:** Procurement of tablets, access to internet, training of teachers, provision of software.

**Interviewer:** Do you have all the necessary application software such as word processor, database, etc. required for the facilitation of teaching and learning?

**Interviewee:** Yes, we have Ms Word package.

**Interviewer:** Do you use these e-learning programs in teaching your subject to provide new ways of enhancing learners' experiences of acquiring knowledge?

**Interviewee:** Yes

**Interviewer:** Do learners learn better as a result of using e-learning technologies in teaching your subject matter?

**Interviewee:** Yes

**Interviewer:** Do you use the computer and the internet to update your subject knowledge?

**Interviewee:** Yes, for instance when I want to do researches for information probably, when I want to clarify on something.

**Interviewer:** Do you give learners tasks which prompt the use of the internet?

For which subjects do you use the internet?

**Interviewee:** Yes, in science, Maths, SS. We have a software Dare Redzidzo. We use that one. All learning areas are covered

**Interviewer:** What is the role of the teacher?

**Interviewee:** To guide and provide more information and add on to what is there.

**Interviewer:** Is it in line with the syllabi you are supposed to teach?

It is a Zimbabwean thing, so yes it is.

**Interviewer:** Is it aligned to the updated curriculum?

**Interviewee:** Not quite sure but you can pick some information there.

**Interviewer:** Do you use the email to post homework to your learners?

**Interviewee:** No

**Interviewer:** What other methods do you have to facilitate learning even away from school to your learners?

Research type of homework-on internet.

**Interviewer:** Do you use Google Docs?

**Interviewee:** No we are not yet to that level.

**Interviewer:** The Zimbabwe new curriculum framework posit that e-learning technologies should be used across all subjects in all schools, do you think this is possible?

If the answer is yes, please explain:

**Interviewee:** Yes it is possible, but not in all schools because some schools are in poor environments even those that are here in Harare. They do not have internet, the school may have only one dongle used by the head only in his or her office.

**Interviewer:** Do you think that the various e-learning facilities such as interactive boards, software, etc. have become a reality of primary education?

**Interviewee:** No, not all schools can afford it's a mirage at the moment.

**Interviewer:** What changes are needed for maximal use of e-learning technologies and plat forms as well as software in teaching and learning?

**Interviewee:** We need maximum cooperation from all stakeholders like parents, business community, and private sector and so on to chip in and support with provision of infrastructure and bandwidth.

#### TEACHER COMPETENCIES IN THE USE OF TECHNOLOGY LIKE COMPUTERS

**Interviewer:** What is your level of expertise in using computers, internets?

**Interviewee:** I know I am good at us did not write the examinations it is in the pipeline.

**Interviewer:** Do you have any training in the use of ICTs? If yes give detail of levels acquired.

**Interviewee:** Like I said I have a certificate and also training from the school. We have Digital skills passport training still to sit for the examinations the school is working on that.

**Interviewer:** Do you think you have the necessary skills to integrate these e-learning technologies in your daily teaching responsibilities? Do you have training programs in the school or at cluster level, for teachers and administrators to provide knowledge about the use of e-learning facilities? Have you received any training on the integration and implementation of e-learning technologies in your teaching activities?

**Interviewee:** Yes, as a school we were trained in Intel teaching, we have certificates to that effect.

**Interviewer:** Who sponsored that?

**Interviewee:** The school

**Interviewer:** How confident are you about your ability to use computers and other e-learning instruments for teaching and learning?

**Interviewee:** Very prepared and confident.

**Interviewer:** Do you have internet access?

**Interviewee:** Yes, the whole school has access.

**Interviewer:** Do all teachers at your school use the e-learning technologies in their teaching activities?

**Interviewee:** Yes all teachers because all classrooms are equipped with the gadgets.

**Interviewer:** What challenges do you encounter in the implementation of e-learning in your responsibilities?

**Interviewee:** Power supplies there are lot of interruptions on power supply.

## APPENDIX K: SCHOOL HEAD INTERVIEW TRANSCRIPT-HEAD Y

### Interview with Head of school B

**Gender:** F

**Qualifications:** Diploma in education; Diploma in special education; Master of Education in Educational administration, Planning and Policy Studies.

**Work experience as head:** 13 years.

**Interviewer:** How many classrooms do you have in the school?

**Interviewee:** 31 classrooms

**Interviewer:** How many technologies have been installed in each of the classroom? E.g. computers, projectors, e-library

**Interviewee:** No technologies in the classrooms as yet that have actually been installed but we have mobile trolley of laptops that teachers take from one class to the other.

**Interviewer:** May you please briefly describe e-learning technologies that are in your school

**Interviewee:** We have used the e-learning platforms like Ruzivo. You submit children's names, each child is given a password. Access will be on any gadget as long as you have internet connectivity and a gadget. This is done by interested children. We also have Dare Dzidzo but then when it came we had part of the new curriculum. They were offering old curriculum staff. So the school had to pay for the installation of Dare reDzidzo e-learning platform for the tutorials that they offer. Their content was solely old curriculum when the school was adopting the competence based updated curriculum for some of the grades. So it was value for money that we considered and stopped the payment to the organisation. It was affordable though. They offered tutorials in English, Mathematics, and Shona. The content was aligned to the old curriculum syllabi and much better than Ruzivo Digital content platform.

**Interviewer:** Who uses the e-learning technologies?

**Interviewee:** Teacher could use the content if they wanted. We even asked the more knowledgeable teacher the ICT teacher to assist teachers. The implementation of such e-learning activities have been mullied with **ignorance. But we have some like X, Y and Z they can assist children to access e-learning facilities. The above mentioned teachers have a positive attitude. Age also plays a part. The younger the better. Older teachers mostly above 40 have a problem, they have a difficulty in accepting the new innovations, like the use of ICTs as these are used in e-learning by teachers to assist learners.**

**Interviewer:** For how long has the school been using those platforms of e-learning you are talking about?

**Interviewee:** about 4 years but *As I have said earlier on so far we have been able to pay college fees for about 9 members of teaching and 2 deputy heads but you find that the use of even a computer is a taboo in the classroom. So, how then can they help learners to access the digital platforms that we wanted to pay for like Ruzivo? I have tried that with the computer teacher we had but then she transferred to a school nearer her place of residence due to hikes in transport fares currently prevailing in our nation. She could no longer afford transport from XXXXX to this school. Her replacement, Mrs ZZZZZZZZZZ, I haven't seen her keenness to help learners access the digital content because for a school to use Ruzivo Digital content platform, a teacher should help to monitor learner use of the content. There are passwords to that effect*

**Interviewer:** Any programs, software installed or teachers design content on their own.

**Interviewee:** We need a robust program, whilst we thought we could take advantage of electricity, we need to go solar and also have a larger bandwidth to allow for quicker **internet access**

**Interviewer:** Taking each of the listed technologies that you have mentioned that exist in the school, can you briefly describe how they are used by your teachers to facilitate learning

**Interviewee:** Teachers use them to help learners by facilitating the tutorials each learner needs to use for a particular topic being taught that week in conjunction with what the teacher have planned for that week from the relevant syllabi.

**Interviewer:** What is the school vision?

**Interviewee:** To be the best school in respect of building maintenance, academic work results, grounds maintenance, sporting activities and socially developed beings

**Interviewer:** Do you think the vision is well aligned to the dictates of the current learner and the competence based updated curriculum?

**Interviewee:** Can you help me find a facilitator to come up with a well-crafted and well thought out vision for the school? I found this vision in the school. I came here in 2013 so I can see now that it needs to be well said so as to spell out where I as the school Head intends to take the school especially with the demands of the curriculum and the global village.

**Interviewer:** Are there any setbacks that you are facing? What are you doing to overcome them?

**Interviewee:** No desktops, no server, no technologies in the classrooms. This is still a pipe dream. Right now we do not have an interactive board in the computer lab. Economic challenges in the nation is the main threat. Lack of ICT knowledge on the part of the teachers. Teacher capacity development needed. Three years ago the then Minister of Primary and Secondary Education had put aside a fund to capacitate teachers on various areas including the use of ICTs. But of late the programme has since been aborted. I do not know why. I think its lack of national budget on education with regards to teacher capacity development. I think the programme is not bankable. Solutions: -Budget allocation to buy equipment over time would bring success to e-learning in the school.

**Interviewer:** Are the technologies used within lesson delivery or after probably school or both and how. (Explain your strategy for e-learning in this school)

**Interviewee:** During we cannot give learners to take them home. We keep our computers in the school lab where there is security.

**Interviewer:** Are your teachers well equipped to facilitate e-learning?

**Interviewee:** No proficiency in the use of ICTs. We asked the computer teacher to train teachers in the afternoon after lessons so that at least as school our teachers can have ICT proficiency. But she would stay the whole afternoon alone, no teacher would pitch up for such programs- **resistance to change on the part of the teachers**

**Interviewer:** Does the school have an ICT policy?

**Interviewee:** We do not have a school policy that govern the implementation of e-learning but we merely take call to use ICTs from the Education act, the Nziramasanga Commission recommendation of 1998, the national ICT policy. Can we have someone to come into the school to help us come with a policy because as a ministry we do not have a clear cut policy even though e-learning is the way to go?

**Interviewer:** Are all teachers and your core administrators aware of the use of e-learning technologies?

**Interviewee:** No, our TIC we even tried to send to Morgan Teachers' College for the training but she did not complete the course, she is 63 now, like I told you earlier on age has a bearing on technology acceptance.

**Interviewer:** What is the school in conjunction with the parents body planning to do with regards to the setbacks you have listed above?



**Interviewee:** What we have in mind is like involving the parents to buy gadgets for their children, introduce a special levy for computers, sourcing donations, the current SDC has written letters to seek for donations from various organisations, hope it will materialise. We are also thinking of going solar due to power cuts challenges.

**Interviewer:** Do you think that the e-learning infrastructures and resources available in the school is enough to impart quality education?

**Interviewee:** Not at all; it's almost like nothing at all to say the least.

**Interviewer:** In regard to provide e-learning facilities and technologies, do you think that your school has various agendas for future programs to initiate e-learning to the next level. State the reason

**Interviewee:** Budget allocation; special levy; source for funding outside the school like from NGOs and other well-wishers and from government. For instance at the moment we have been given donations by a company that has assisted us to have a school website. We have been promised in the presence of the District schools Inspector 30 desktops, 7 tablets, 6 laptops an interactive board for the laboratory and

**Interviewer:** Swot analysis – What strengths and weaknesses within the school can you pin point with regards to e-learning? What opportunities and threats does the school face?

**Interviewee:** Gender – women are better, they are more willing to learn than the gentlemen that we have in the school. One advantage that we have is that our staff compliment is mainly women. We have a staff compliment of 37 and only 3 are male while the rest are females. However the inside weakness is that our age range of teachers is that about 25 of them are above 40 years. We have 4 retiring next year and 2 retiring in 2021 and 3 in 2022.

## APPENDIX L: DOCUMENTS AND DATA ANALYSED

DOCUMENTS	DATA ANALYSED
The Education Act Curriculum Framework for Primary and Secondary Education 2015 -2022	What does it say about techniques of education delivery? How should e-learning be implemented?
National ICT policy document	What does government policy say about e- learning?
ICT draft for primary and secondary education	What does the relevant ministry says about e- learning?
School Vision, Mission Statement and Core Values	What is the school's vision on embracing technologies and implementing e-learning?
School Budgets	What are the school priorities that relate to e- learning?
Schools Strategic plans/development plan	What have the schools planned for with regards to e-learning implementation?
Supervision Instruments	How do the instruments cover the supervision of delivery of lessons by e-learning?
Subjects syllabi	How do the syllabuses embrace use of technology in teaching and learning?
Teachers' schemes	Presence of time allocated of e-learning Do the activities indicate the use of electronic content?
Installed educational content	Availability, alignment and usability
Asset registers	Availability and number of e-learning equipment
	How does e-learning come into play?

## APPENDIX M: FRAMEWORK FOR EVALUATING THE SCHOOL SYSTEM IN SUPPORTING THE IMPLEMENTATION OF E-LEARNING

COMPONENT OF THE SCHOOL SYSTEM	EVALUATION QUESTIONS
Curriculum support and integration	Does the school have a vision for the implementation of e-learning as part of the overall school plan?
Acceptable Use Policy	Does the school have an Acceptable Use Policy (AUP) in relation to the use of ICT for e-learning?
E-learning network and equipment	Does the school have an inventory of existing e-learning resources that can inform plans for the acquisition of new equipment?
Equipment E-learning storage and maintenance	Does the school have procedures in place that ensure the safe storage of e-learning equipment and software, and provide for routine maintenance and repair of equipment?
E-learning co-ordination	Is there a recognised teacher or group of teachers who assume(s) responsibility for developing e-learning capability within the school and integration of e-learning within the curriculum?
E-learning professional development	<ul style="list-style-type: none"> <li>• What is the level of staff knowledge/expertise in relation to ICT and e-learning?</li> <li>• Are the teachers aware of the most appropriate training programmes to support them in incorporating e-learning into their teaching?</li> <li>• Do teachers receive sufficient resources (time, training and support) to develop the skills and knowledge required to effectively integrate e-learning in their teaching?</li> <li>• Do teachers have specific training needs in relation to supporting learners with special needs?</li> </ul>
E-learning access	Do all learners and teachers have opportunities to use the school's e-learning resources whether in a shared computer lab (for example, timetabled sessions) and/or in individual classrooms (for example, on a rota basis)?
Planning for inclusion	Are policies and procedures in place to support equality of access to e-learning resources for all learners irrespective of gender, age, cultural background, Special Educational Needs, learning support needs etc.?
E-learning health and safety	Does the school have a policy describing the support it offers learners in developing responsible and informed attitudes regarding their use of E-learning in the school?
E-learning review and evaluation	Are opportunities provided for teachers to evaluate periodically the use of ICT in the School Curriculum, and to modify or revise the school plan accordingly?

## APPENDIX N: EDITOR'S LETTER



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09 October 2022

### RE: CERTIFICATE OF LANGUAGE EDITING

To whom it may concern

I hereby confirm that I have proof read and edited the following THESIS using Windows 'Tracking' System to reflect my comments and suggested corrections for the author(s) to action:

**Assessing the Implementation of E-Learning in Primary Schools: A Case Study of Harare Metropolitan Province**

#### Reference

- Author(s): Dolt Chikanyawu
- Student Number: 61264245
- Affiliation: University of South Africa

Although the greatest care was taken in the editing of this document, the final responsibility for the product rests with the author(s).

Sincerely

09.10.2022

\_\_\_\_\_  
SIGNATURE

This certificate confirms the language editing I have done in my personal capacity and not on behalf of SPU

APPENDIX O: TURNITIN REPORT

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