

**ACADEMIC USE OF SMARTPHONES AMONG SECONDARY SCHOOL
STUDENTS**



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requirements for the degree of**

DOCTOR OF PHILOSOPHY

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DECLARATION

I declare that this thesis is my original work and that all citations, references and borrowed ideas have been duly acknowledged. This thesis has not been submitted for any degree or examination at any other University.

Signed.....

Date.....

As the supervisor, I have agreed to the submission of this thesis.

Dr. Lester Brian Shawa.....

Date.....

ABSTRACT

This study explores the academic use of smartphones among secondary school students at Harare High School with the aim of contributing to new educational trends in Zimbabwe. It employs the interpretive paradigm and is informed by the Actor-Network Theory. It explores how students use smartphones for academic purposes, examining the various perceptions on academic use of smartphones, and analysing reasons for students at Harare High School to use smartphones for academic purposes the way they do. Qualitative research methods were employed using a case study research approach. Semi-structured in-depth interviews, questionnaires, an observation schedule, and documents were used to generate data. Questionnaires were also used for sampling purposes. Miles and Huberman Framework for Qualitative Data Analysis was used for analysis of data.

Findings reveal that students at Harare High School use smartphones for research, downloading and storage of learning materials, and collaborative learning. Most students perceive smartphones as convenient learning tools in view of the newly introduced education curriculum, which emphasises research and innovation. Students also use smartphones for social networking and entertainment. Challenges of distraction, abuse, addiction, and other behavioural challenges were revealed, raising the need for close monitoring by teachers and parents. This study recommends that: 1) the Ministry of Education in Zimbabwe should formulate a policy that makes it mandatory for schools to use smartphone technology, 2) schools should consult with ICT experts offering strategies that regulate academic use of smartphones, curbing abuse, 3) teachers should be trained to be smartphone-literate so that smartphone technology may be adopted as a compulsory learning tool, 4) teaching of media literacy and character education should be adopted to empower students to use smartphones profitably, and 5) schools should levy parents in order to raise funds to buy smartphones for students.

This study has added new knowledge to the understanding of the academic use of smartphones in the Zimbabwean context. It provides methodological and theoretical contributions through data-generation methods employed, and in its use of the Actor-Network Theory. In conclusion, despite the challenges mentioned, all Zimbabwe schools should embrace the academic use of smartphone technology because the benefits outweigh the challenges.

DEDICATION

This study is dedicated to my late father, Nicholas Shanya Mashonganyika, whose wisdom and philosophy of life was a great source of inspiration. He used to say, “Dzidzai vanangu kusvika zvikoro zvapera” (Acquire education, my children, until you reach the highest level of schooling).

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LIST OF ABBREVIATIONS

3G - 3rd Generation (wireless/mobile communications)

4G	-	4th Generation (wireless/mobile communications)
ANT	-	Actor-Network Theory
E-Books-		Electronic books
ECD	-	Early Childhood Development
E-learning-		Electronic learning
GPS	-	Global Positioning System
ICT	-	Information Communication Technology
PC	-	Personal Computer
PDA	-	Personal Digital Assistance
POS	-	Point of Sale
STEM	-	Science, Technology, Engineering and Mathematics
TV	-	Television
Wi-Fi	-	Wireless Fidelity
ZIMSEC-		Zimbabwe Schools Examination Council

CHAPTER ONE

Situating the academic use of smartphones in Zimbabwe

1.0 Introduction

This study explores the academic use of smartphones among secondary school students in Zimbabwe. In providing the background of the study, this chapter draws on the general understanding of the academic use of smartphones among students in secondary schools. Therefore, in this chapter, the study presents a critical exposé of smartphones use as a learning tool in secondary schools with Harare High School in Zimbabwe, Harare Metropolitan province in Mbare / Hatfield district, as a case study. It also outlines the background of the study. In doing so, an examination of the major components and traits of the concept of using smartphone technology for academic purposes is made. This scrutiny reflects upon the importance of using smartphones by students in secondary schools in enhancing teaching and learning experiences in a school. The study's location, statement of the problem, research objectives, and the research questions are well integrated into this chapter. The limitations and significance of the research are also briefly discussed in this chapter.

This study was conducted in Zimbabwe, at Harare high school, situated in the Harare central cluster schools. The school is a government-owned institution. It was chosen because it is among the pilot schools in which the school authorities provide Internet (Wi-Fi) services to promote e-learning among students. This study was conducted during a period when the country was undergoing some key changes in the primary and secondary education curriculum. The main thrust of this new education curriculum is to encourage the students (now called learners) to research broadly; therefore, it emphasises e-learning. To this effect, some schools in Zimbabwe have now introduced the use of smartphones by students in their learning processes. However, the challenge is that there seems to be a dearth of studies in Zimbabwe supporting the usefulness of smartphones in students' academic growth. Therefore, this study, with the aim of exploring the academic use of smartphones among secondary school students at Harare High School in Zimbabwe, is pertinent in addressing the knowledge gap.

1.1 Smartphones in perspective

Education is fundamental to personal and national development. It provides life opportunities and also supports the development of a highly skilled and innovative workforce which is crucial for the social, cultural, and economic growth of a country's sovereignty (West, 2013). Learning using mobile technology represents a way of addressing some of the problems faced in education (Atharizadeh, 2017). Smartphones permit innovation, assist teachers, students, and even parents to access digital information together with personalised assessment necessary for a post-industrial world (Rocha, Serrhini, & Felgueiras, 2017). These gadgets are important tools to enhance learning processes for students.

Portable phones have now become a common device that is used in our communities. In Zimbabwe, it has been generally acknowledged that the world has unified, through the intensification of its interconnectedness, resulting in improvements in the communication system. A research was conducted by Jairos Saunyama and reported in the Zimbabwean newspaper on the topic: "E-life phenomenon transforms lives in rural areas". This research indicates that Zimbabwe's rural population are not spared, and e-life has turned out to be the lifestyle in the homes, at the shopping centres, in the fields, as well as on the way to the dip tanks. The gap between rural folks and urban residents on information reception has ceased to be noticeably visible. Some applications on social media platforms can be a source of valuable information. Mobile devices have the potential to improve performance in education if they are used by students (West, 2013). In simply tapping one's smartphone, one can access the whole world. This includes e-health, online video chats, e-learning, e-commerce, together with all such astounding changes that the world has undergone over the previous twenty years. The rural population have also become part of this set-up.

It should be acknowledged that most of the students in Zimbabwe cannot access a computer or a laptop. Due to the high cost of computers, most schools cannot afford personal computers for all their students. According to West (2013), as smartphones become common and cheaper, mobile technology can improve teaching and learning, and provide students with digital information in a significant way. In addition, most students have shown great interest in mobile technology and they use it frequently for their personal needs (West, 2013). Therefore, it is not surprising that the youths prefer to use devices of mobile technology to make learning processes more interesting and to personalise it for their specific educational requirements.

Teachers, on the other hand, need to appreciate how mobile platforms and applications can be harnessed for instructional purposes and how they can be employed in order to boost teaching and learning processes. West (2013) argues that smartphone technology provides new educational material and it allows students to access information from wherever they will be located. According to him, smartphones allow, empower, and engage learning in a way that transforms the learning atmosphere for students inside and outside the school premises (West, 2015). Although the proliferation of mobile devices is a welcome technological progression, and some sectors have seen it as a positive development, on the one hand, others have seen it as a negative development. This is especially so when applied to the education sector (Son- Allah, 2017). Son-Allah (2017) argues that these new technologies also have potential drawbacks such as serving as a medium for distraction and reducing productivity.

Many countries are still debating on how schools should address the issue of mobile phone use by students in schools (Son-Allah, 2017). The two basic opposing views call either for banning or accepting mobile phones usage in schools. The above views have a bearing on the academic use of smartphones in the education system of Zimbabwe. Zimbabwe needs to produce a new generation of entrepreneurs, engineers, scientists, and inventors. However, not much research has been accomplished to assert the usefulness of these smartphones by students in their learning environment in Zimbabwe. This study should, therefore, explore ways in which the use of smartphones could be useful in improving learning in Zimbabwe.

1.2 Educational use of smartphone technology

Students of the 21st century need a wide range of skills outside the out-dated methods of writing notes in exercise books and reading books in the library. Students need to have the ability to be self-directed learners, who can explore and work independently while applying technology effectively. They should be adaptable to change, be able to create media products and be good digital citizens, among other attributes (Wojcicki, 2013). Learning can be transformed when all stakeholders in education embrace and institutionalise mobile technology. According to Wojcicki (2013), mobile technology will prove to be a catalytic agent for fostering impactful transformation in the prevailing education system. It is therefore critical for the development of students in the areas of collaborative learning and critical thinking. Young people need these skills in order to secure their places in the global economy which is highly competitive (West, 2013).

Mobile devices allow students to communicate, connect, and collaborate with others, through the

use of these rich digital resources such as smartphones. According to researchers, using smartphones for academic purposes allows for the extension of learning outside the physical boundaries of the school and outside the agreed period of the school day (Afolabi, 2016). West (2013) states that smartphones allow students to communicate with their teachers, access educational content from home, and use online platforms to work with others. In Zimbabwe, it is crucial that we educate a workforce that can fit in any international context and develop manpower that is adaptive to new roles and new jobs as change, for the growth of the country's economy.

As students undertake their research anytime and anywhere, the use of smartphones ought to enhance their learning process. In using smartphones, students are able to receive reminders from their teachers and alerts through WhatsApp platforms. Students' access to smartphones create an exceptional opportunity for schools and the teachers to extend the teaching and learning processes beyond the classroom, and allow parents to support and participate in their children's acquisition of literacy skills (Armstrong, 2014). As students gain support from teachers at school, they will also continue to gain support from their parents at home. However, the implementation success of mobile technology depends upon the teacher; therefore, the development of the teacher should be at the centre of educational innovation. Unless teachers believe that technology can improve instruction, they are less likely to accept these new approaches and effectively deploy them (West, 2013). Institutions must train teachers on the academic use of mobile technology in order to improve student outcomes and productivity. Teachers need training on possible ways technology can enhance teacher performance and promote educational attainment (Evans, 2013).

1.3 Nature of the study

This study is of a qualitative nature. Qualitative research is important for this research as it emphasises observation and interpretation of data. Using this methodology has enabled me to generate data within its natural occurrence. Qualitative research answers best the questions 'how?' and 'why?' It also focuses on a holistic view of the subject under review by using questionnaires, observations, documents, case histories, and interviews (Bryman, 2004). In this research, questionnaires were used as a sampling strategy. Forms were distributed to senior students (Forms 5 and 6) to assess and select fifteen (15) students based on their level of smartphone utilisation. All parents/guardians of the 15 students and five teaching staff who teach the 15 students were selected purposively and they participated in the questionnaire survey.

Qualitative research falls within the interpretive paradigm. As a result, this study is conducted

using the interpretive paradigm, a method devoted to exploring the human occurrences in context (Angen, 2000). The research questions were answered through the use of the theoretical lens provided by the ANT (Jubien, 2013b). Data were generated using in-depth conversation (semi-structured interviews), and the subject (students) and I (as the researcher) were fully interactive (Whiting, 2008). To achieve credibility or rigour in this research, I conducted a pilot study using the questionnaire and in-depth interviews to the Form Four students at the same school, before engaging the senior students (Forms 5 & 6), who in this instance are the sole participants in the research.

The data were analysed concurrently with data generation (Rubin & Rubin, 2005), using the lenses of the Actor-Network Theory. The theory helped in understanding the research questions on the academic use of smartphones among secondary school students at Harare High School in Zimbabwe. All interview data were transcribed and I used the Miles and Huberman Framework for Qualitative Data Analysis. This framework allowed data to be organised in three stages, namely; data reduction, display of data, and conclusions drawing and verification (Miles & Huberman, 1994).

Ethical issues were also considered, and these included, among others, the acquisition of authority from the Ministry of Primary and Secondary Education, authority from the school administration, authority from parents with minor children (aged below 18 years) and authority from the University of KwaZulu-Natal for ethical clearance. On the issue of confidentiality, I used pseudonyms in place of actual names of students during the recording and analysis of data. Therefore, the responses of students are to be held in absolute confidence.

1.4 Background of the study

Presented in this background are the following aspects: the advent of ICT, the role of smartphones, educational policies on smartphone use, and embracing smartphone technology: the Zimbabwean situation. The above aspects are important as background to the academic use of smartphones because they provide an appropriate context of the problem as it relates to this research, give an outline of the root of the problem, and the extent to which preceding studies have investigated the problem of the research. The main problem underlying this research is that, although the Ministry of Primary and Secondary Education is advocating for the use of smartphones as learning tools, some schools are still sceptical about this new development. This

highlights the gaps that existed before, which have been addressed by this research.

1.4.1 Role of smartphone technology

Starting in the late 1990s, mobile phones have turned out to be an indispensable part of the lifestyle of most people because of their fast development in popularity (Ling, 2004). Smartphones are the new generation of mobile phones. As they have become more available, they are increasingly owned and used by teenagers (Rabiu, Muhammed, Umaru, & Ahmed, 2016). Smartphones have become the most common device within the communities and some applications of social media have turned out to be important sources of useful information. Mobile handsets are now loaded with more capabilities, such as; playing music, recording videos and accessing the Internet. As a result, teenagers and young adults now have a range of use for these devices. In this new era, in addition to texting and talking, mobile phones are also used to access the Internet and everything it can offer (Clark, 2013).

A survey conducted in 2010 in the United States of America shows that the most preferred means of communication for adolescents are these mobile phones (Jumoke, Oloruntoba, & Blessing, 2015). This has affected society's social activities, accessibility, protection, and coordination of business. Mobile phones have now become a part of the global culture (Rabiu et al., 2016). Most students in secondary schools are adolescents; hence, they are not spared from this advent of smartphone technology. According to Ling and Helmersen (2000), families and schools are the traditional agents of socialisation. Therefore, the need for highly skilled manpower has facilitated the extension of the education system, and schools are now taking greater responsibilities in socialisation (Ling & Helmersen, 2000).

A study conducted in India by Kumar (2011), indicates that Internet use has also become a lifestyle for most students and a means of accessing educational information when it is needed (Kumar, 2011). According to this research, smartphones use for accessing the Internet has become a daily routine. The number of consumers using mobile phones to access the Internet has also exceeded users of the fixed-line Internet (Kibona & Mgaya, 2015). People now use mobile phones as devices of interaction. This is achieved through the generation, exchange of information, and sharing of ideas in their networks and in virtual communities (Blumenstock & Eagle, 2010). Mobile phones are also used for storage of various contents in their internal phone memory or on the micro SD cards (Rabiu et al., 2016).

Technology has also become more and more important in the lives of young people in Zimbabwe. Young people are becoming heavy operators of these new mobile communication applications like; uploading and downloading, browsing, e-mail, instant messaging, text messaging, and games (Subrahmanyam & Greenfield, 2008). Owing to the use of mobile phones, there is a rise in numbers of people accessing Internet sites like social media platforms, blogs, YouTube and other sites for sharing ideas.

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1.4.3 Educational policies on smartphone use

Professional learning communities have emerged among the most popular philosophies in education nowadays (Thompson, Gregg, & Niska, 2004). According to the definition by Thompson et al. (2004), the philosophy of professional learning communities applies to adults who are committed to speaking about learning or teaching collaboratively, and thereafter implement these actions in the classroom to improve educational processes and performance of the student. Schools are now working towards becoming professional learning communities. Although the perceptions of administrators, teachers, and parents of the worth of these professional learning communities are imperative, the underlying question is whether this form of education reform can help the learning and motivation of students. Throughout the years, Zimbabwean educators have implemented many educational reforms. Some were successful, but others have failed. The modern trends in the reformation of education focus on the use of mobile devices for learning purposes. The teachers and students can now use social networking platforms for collaborating with others outside their teaching space (Piotrowski, 2015).

Over the past years, research has shown the important role played by the Ministry of Primary and Secondary education in Zimbabwe as they made efforts to advance the learning and teaching processes. According to the Nziramasanga Commission report, a proposal was made to overhaul the education curriculum in Zimbabwe at all the levels of education, and make it more appropriate

to the requirements of the individual student and the nation (Nziramasanga, 1999). Key among the strategies for achieving this was the need to develop skills essential to make the most out of the information and communication technologies. This proposal is now being implemented through the recent introduction of the Education Curriculum. It is noteworthy that the government of Zimbabwe, through this new curriculum, has urged teachers to scientifically ground themselves, employing various possibilities of integrating technology into their teaching (The herald Newspaper 22 September 2017).

1.4.4 Embracing smartphone technology: The Zimbabwean situation

The use of smartphones by students in schools has become a controversial issue in Zimbabwe. To some sectors of the populace, smartphones are seen as a blessing, but some have questioned the integrity of allowing students to use smartphones in schools, expressing fear that students may end up abusing the devices, compromising their learning efforts (Madden, Lenhart, Cortesi, & Gasser, 2010). The former Minister of Primary and Secondary education in Zimbabwe, Dr. Lazarus Dokora, was quoted in the Herald newspaper of Zimbabwe urging schools to allow students to take smartphones to class so that they can familiarise themselves with mobile technologies. He articulated that he saw no problem with allowing pupils to use their cell-phones in school. The minister stressed that “we are at a time of technological advancement, and pupils should be allowed to use smartphones” (Ndlovu, 2015). This statement proved controversial, not only from the public perspective but also from legislators in the parliament of Zimbabwe. The public was hesitant about whether sufficient research and consultations had been conducted with the concerned students, parents, school authorities, and other stakeholders before this statement was issued. The Minister was also requested in parliament to explain what he meant by the published statement. He clarified his comment, stating that pupils should only be permitted to use smartphones to access the Internet to research for the purposes of learning. To this effect, pupils are prohibited to use ordinary mobile phones at school. This parliamentary debate indicates that even the government of Zimbabwe at that moment had not yet adopted a clear position on whether to allow students to use such devices in school.

As a researcher, I am aware of the fact that despite the statements made by the former education minister, some schools in Zimbabwe, especially Mission (church-owned) schools, still do not allow students to bring smartphones to school. Only some government and private schools in larger cities such as Harare and Bulawayo allow students to use smartphones at school for

learning purposes. This shows the kind of mystification existing in the education sector. While this remains a contested matter, it is unsurprising that research on the academic use of smartphones in Zimbabwean schools has not yet been given enough attention. It is therefore upon this basis, that I have committed myself to explore the use of smartphones for academic purposes among secondary school students.

1.5 Location of the study

This study was carried out in Zimbabwe, at Harare High School, which is situated in Harare Metropolitan Province, Mbare/Hatfield District. The school is a government-owned institution. It was chosen because it is among the pilot schools at which school authorities provide Internet (Wi-Fi) services to promote e-learning among students. E-learning was introduced some years ago in an effort to encourage schools to adopt current trends in education. This study was done at a period when the country was undergoing certain political and economic challenges that could have affected the students and their teachers in the learning and teaching resource materials. The researcher was also impacted in terms of the availability of financial resources to conduct the research.

1.6 Statement of the problem

Mobile phones have gained inestimable ground in students' lives worldwide (Rabiu et al., 2016). However, the use of smartphones by school-going children in Zimbabwe has become a controversial issue, to the extent that some parents and some authorities in certain schools and in government have questioned the usefulness of the device. In some private and government schools, students are allowed to come to class with their smartphones and make use of them during lessons; while other schools prohibit the use of these devices. Those schools which permit the use of smartphones may have experienced and accepted the academic benefits of using smartphones. However, there seems to be no evidence of any study undertaken to explore the benefits realised through the academic use of smartphones by students, especially in the context of the Zimbabwean secondary schools, hence the need for conducting this research.

In this thesis, I have observed that many schools have introduced Wi-Fi facilities into their schools for access to the Internet. What is not clear is whether these facilities are indeed being accessed by students, or how the students are using these facilities in this era of e-learning. The main

objective of this study, therefore, is to explore the academic use of smartphones by secondary school students, with special reference to Harare High School as a case study.

1.7 Objectives and research questions

Any research of note will be guided by the key research question and the subsequent research questions. It is only when these are fully answered that I can conclude that this research has achieved its purpose. This study explored the academic use of smartphone technology among students at secondary school. The key research question sought to examine the ways in which smartphones are used for academic purposes among secondary school students at Harare High School in Zimbabwe. The research focused on the interpretive paradigm and Actor-Network Theory in answering the research questions.

1.7.1 Objectives of the study

This study intended to accomplish the following objectives:

1. To explore the academic use of smartphones by secondary school students at Harare High School;
2. To examine the various perceptions of the academic use of smartphone technology by the students at Harare High School; and
3. To analyse ways in which students at Harare High School use smartphones.

1.7.2 Key research question:

The overarching research question for this thesis is:

In which ways are smartphones used for academic purposes at Harare High School in Zimbabwe?

1.7.2.3 Sub-questions

The guiding sub-questions are:

1. How do students at Harare High School use smartphone technology for academic purposes?

2. What are the different perceptions of students on the academic use of smartphones at Harare High School?
3. Why do students at Harare High School use smartphones for academic use the way they do?

1.8 Limitations of the study

The outcomes of this study are based entirely upon the case study conducted at Harare High School in Zimbabwe as a pilot school for e-learning. Therefore, these outcomes may not be applied directly to some other schools with different set-ups. This is attributed to the contextual factors and their socio-cultural diversity, such as not participating in the pilot study.

Owing to constraints of time and financial resources, this research only focused on the academic use of smartphones. Nonetheless, topics such as ‘use of smartphones for academic achievements or academic performance’ could not be covered. An in-depth analysis may be further taken up to ascertain the role of smartphones in academic achievement.

As already stated, this research was conducted during a period when Zimbabwe was going through economic and political challenges. I, as the researcher, was not spared on the impact. I therefore, had to choose a school near to my workplace in order to cut down on travelling and other related costs. The research was funded entirely from my personal savings.

1.9 Significance of the study

This research adds new knowledge to our appreciation of the use of smartphones in the educational context in Zimbabwe as well as in developing countries with similar contexts. Furthermore, the study is unique in its use of the theoretical frames of ANT. With a combination of data-generation methods, the study adds to methodological knowledge.

It is hoped that the study will be of great benefit to the following:

1. The Ministry of Primary and Secondary Education in Zimbabwe – the government of Zimbabwe has developed and introduced a new education curriculum, in which the use of smartphones is fundamental. The findings of this study may add usefully to the implementation and review of this new curriculum.
2. Teachers – the academic use of smartphones by students can only be effective when

students are fully supported by their teachers and parents. Therefore, the findings and recommendations of this study may equip the teachers with the necessary knowledge on how best to engage smartphone technology in their teaching methods, assisting students to use smartphones effectively for academic purposes.

3. Parents – the outcomes of this research will help parents to become acquainted with the ways in which their children are using smartphones. This knowledge will equip parents with the necessary strategies to execute their parental role in supporting the use of smartphones for academic purposes.
4. Students – students should be able to gain sufficient knowledge on how they can fully benefit from the academic use of smartphones. Students will be able to address the challenges associated with smartphone usage.

1.10 Study outline

Chapter one has focused on introducing the academic use of the smartphones within Zimbabwean Secondary Schools. Aspects like the nature of this study, background, and location of the study have been described in this chapter. The chapter also outlines the statement of the research problem, objectives, the research questions, and concludes with the limitations and the significance of the study.

Chapter two deals with the review of the literature. Using literature, the pertinent arguments regarding the use of smartphones are presented. The general argument in this chapter is that the following factors are very important in analysing the use of smartphones: the school environment, teacher commitment, and parental involvement. These are key to understanding the academic use of smartphones. The first part of the review of literature deals with the academic achievements of students who use smartphones in their learning processes. Literature also indicates that smartphones use by students alone may not produce substantial improvement in their academic performance. There are other contributing factors which determine the academic achievements of a student. Therefore, the success of the academic use of smartphones cannot be directly measured by academic achievement because of the many factors surrounding it. The participation of parents in the teaching and learning of their children also plays a pivotal role as far as the academic achievements of secondary school children are concerned. The use of smartphones by students requires parental guidance and assistance in monitoring all learning achieved by their children. Provision of Wi-Fi by parents at home or purchasing of data bundles for those without

Wi-Fi facilities will add value to the teaching and learning of their children. Literature has established that smartphones are commonly used in colleges and universities where the users are more mature. There is little or no need to monitor students at that level; however, with secondary-school students, many of whom are teenagers, some supervision must be afforded to avoid abuse of the device.

Chapter three provides the research methodology and design. The chapter systematically provides a detailed exposition of a qualitative study compared with quantitative methods vis-à-vis the research paradigm, theoretical framework, generation of data, and the data analysis methods. It also addressed the ethical issues. This chapter argues that the research methodology and design are important in the understanding of the academic use of smartphones, in that they give guidance to the process of generation of data, which illuminates answers to the research questions. This study is of a qualitative nature, which is based on theoretical and empirical methodology. The research questions were answered using the ANT. Some of the theoretical tenets used to analyse data were also discussed. Data were produced using four methods of data generation, namely; in-depth interviews, observation schedules, questionnaires and school documents. Data were thereafter analysed using the Miles and Huberman Framework of Qualitative Data Analysis, which allows data to be organised in three stages namely; data reduction, display of data, drawing and verification of conclusions (Miles & Huberman, 1994).

Ethical issues were considered, and all essential key processes were observed. This included acquiring informed consent, authorisation by the relevant ministries, and endorsement by the University's Local Research Ethics committee. Confidentiality of participants was also respected, and the use of pseudonyms was adopted.

Chapter four provides a detailed account of the findings of the research which comprises the data generated from the observation schedule, questionnaires, semi-structured in-depth interviews and the data generated from school documents. Data were analysed concurrently with data production. The Miles and Huberman Framework of Qualitative Data Analysis were used, which allowed data to be organised in three stages namely; data reduction, display, and drawing and verification of the conclusions (Miles & Huberman, 1994). This chapter argues that the success of this research depends entirely upon the quality of data generated. Therefore, the data generation and analysis methods used in this study are critical in exploring the academic use of smartphone technology by secondary school students.

Under the observation schedule, time was taken to observe the school environment and examine their facilities and policies especially on the use and availability of the smartphone. The second method was the use of questionnaires, in which forms were distributed to all form five and six students for the sake of screening them to fifteen students, based on their level of smartphone utilisation. Parents of the fifteen children, and the five teachers who teach the fifteen students participated in the questionnaires. The information obtained from the teachers and parents was also recorded. The third method of data generation was on individual interviews. Fifteen students who were selected participated in semi-structured in-depth interviews. I carried out a pilot study on the Form Four students using the same instruments, before engaging the fifteen students. This was done in order to sharpen the instruments. All the interviews took place on the Harare High School premises. Data from individual interviews on the voice recorder was transcribed. Of the students who were interviewed, some expressed certain personal views in the vernacular; and the process of translating into English was conducted.

Data were analysed concurrently with data generation (Rubin & Rubin, 2005). Using Miles and Huberman's Framework for Qualitative Data Analysis, the data were reduced through the process of coding and memoing. The data generated from these processes were then displayed under themes and sub-themes, according to the three research questions, a process known as coding. Some of this data were displayed as charts and graphs. The fourth method employed was the use of documents such as the historical and administrative documents relating to the establishment of Wi-Fi facilities; and regulations relating to the use of smartphones by students.

Chapter five has focused on the discussion of findings. The major outcomes of this research are discussed based on the three objectives and the corresponding research questions. The lens of ANT has been used in answering the research questions. Three main themes were therefore developed. These are; the academic use of smartphones, perceptions of students on the use of smartphones for learning purposes, and the analysis of reasons for students at Harare High School's use of smartphones for learning purposes. Under academic use of smartphones, findings of this research indicated that students use smartphones for research, downloading and storage of academic material, and for collaborative learning. The students expressed three different perceptions. However, the majority perceive smartphones as a good learning tool; although there is a need for strategies which restrict and monitor their use to avoid abuse and to ensure the safety of the students. On analysis of the academic use of smartphones, students have demonstrated that they also use the technology for socialising. The academic use of smartphones brought with it

some challenges which must be addressed to ensure that the device is used effectively as an academic tool. Therefore, the roles of the school, teachers, and parents were discussed as they support the academic use of this device. Students have also provided recommendations to ensure the effective academic use of smartphones. The views of teachers and parents were used to complement the students' views.

Chapter six reflects on the whole study, highlighting the main findings as they are given in Chapter Five. The findings are that the students use the smartphone as a tool for research, downloading academic materials, and for sharing notes and assignments through discussions in academic chat groups. Most students perceive the smartphone as an ideal tool for learning. They also use the smartphone for social networking and entertainment activities. Challenges of distraction and abuse of these devices were also highlighted. The role of schools, teachers and parents in promoting the academic use of these smartphones was emphasised. Students recommended some precautions to consider for effective academic use of smartphone technology. The chapter has also highlighted on how this study has contributed to new knowledge, with special focus on the content, theoretical, and methodological contributions to the study. The chapter provides a conclusion; and the research gaps were identified, with some recommendations for further research.

1.11 Summary

This chapter presented an overview of the academic use of smartphone technology with special reference to the Zimbabwean context. Various perspectives on smartphone use were highlighted. This chapter has provided a summary of information on the academic use of smartphones. Such information may help the reader to better understand the position of Zimbabwe in embracing smartphone technology in the teaching and learning processes. It also gave an outline of the nature of this research. The study is qualitative in nature and was conducted within the interpretive paradigm, with the theoretical lenses of the ANT being used to answer the research questions. The analysis of the data was done using Miles and Huberman Framework for Qualitative Data Analysis. This chapter also gave an exposé of the background to the study, addressing the gaps that existed before this study. It has articulated the aspects of the location of the study, statement of the research problem, study objectives, and research questions. In conclusion, the chapter concluded by outlining the significance of the research and its limitations.

CHAPTER TWO

Literature review

2.0 Introduction

The emphasis of this chapter is on the review of the literature on the academic use of smartphones by students in secondary schools, as well as its role in teaching and learning processes. It gives a description of the smartphone which distinguishes it from other mobile devices and makes it a more preferred technology than computers, laptops and Ipads. Factors affecting academic performance such as the school environment, effectiveness of the teacher, and parental involvement, were discussed as they relate to the academic use of smartphones. This chapter also highlights the role of mass media in education and raises the need for schools to teach media literacy. The chapter concludes by giving details of the major benefits realised, and challenges associated with the adoption of smartphone technology in education.

2.1 Characterisation of a smartphone

Research has established that there is no universal definition of a smartphone (BinDhim & Trevena, 2015). A smartphone may be defined as a device for computing with a screen, small enough fit in one's hand and should support telephone calls, Wi-Fi and cellular connectivity, and be able to download, install and run applications (Catharine, 2013). It is a portable device for communication that accesses the Internet. In another definition, smartphones are defined as mobile handsets with advanced software and hardware capabilities allowing them to make some complicated functions that are comparable to those of laptops and computers (Usaini, Abubakar, & Bichi, 2015).

Bindhim et al. (2014) argue that a mobile phone can only qualify to be a smartphone when it possesses certain key components. Firstly, it should connect to the Internet in an unrestricted and in a constant way, allowing the user to generate data and exchange on-the-go (Zullig, Koopman, Patton, & Ubbes, 2010). It should also be able to install different applications from sources that are external, for example, an 'app store'. The last component (which can be optional) is that it should have a high-resolution screen, should also be large, with a camera of high-definition which can facilitate video-conferencing of high-quality.

Smartphones can be considered as the new generation of mobile phones (Kibona & Mgaya, 2015). These devices have replaced several items used in our lives. Owing to the use of smartphones, people no longer use paper maps or compasses to navigate to unfamiliar places. Smartphones can also be used to store people's to-do lists. This includes keeping a record of their scheduled programmes and organising functions, alarms, and any reminders, *inter alia*. Smartphone users can also download applications from app stores using the smartphones' advanced functionalities (Usaini et al., 2015). These apps can be compared to those that run on personal computers (PCs), enabling smartphones to effectively substitute laptops or PCs in most tasks, such as document processing, web browsing, task managing, video and music playing, as well as video-game playing. Smartphones also provide quick access to banking facilities that fall under internet banking. They facilitate immediate payments with simple clicks, and there are various apps available for making online payments through mobile devices (for example, POS or electronic payment, Internet banking) (Nath & Mukherjee, 2015). The use of smartphones allows citizens to benefit from services such as mobile tracking services, mobile TV, and affordable international calls.

The demand for education in Africa continues to increase (Baehr & Boone, 2007). This calls for the need to look for cheaper means to access the opportunities offered by some teaching and learning methods. The smartphone is among the new technologies that are most rapidly spreading in the world. Research conducted in the US in the year 2001 indicated that cell- phone users in the whole world were below a billion, with most of these users coming from the industrialised countries (Falayi & Adedokun, 2014). The same research indicated that cell-phone subscribers had reached five billion by the end of 2010, with subscribers from developing countries being more than those from the developed countries. Obviously, Zimbabwe is among the developing countries and is not excluded (Mokhlis & Yaakop, 2012).

Advancement in ITC has seen rapid development in mobile phones such as smartphones. These devices may ease the processes of learning and teaching of students in schools if the school authorities can make effective use of smartphones. According to Armstrong (2014), the supporters of the usage of the smartphone in classrooms specified that the teachers should first see the usage of smartphones beyond the social connections to their potential use as tools for teaching and learning. He further argues that educationalists know that when it comes to students, smartphone use is unavoidable, so why can't we put these devices to productive use? (Armstrong, 2014).

Education should be taught with a focus on core values centred on both character and academics (Shriver & Weissberg, 2005). The literature on the use of the smartphone is currently available, but most of the research looks at the devices and their applications as they are specifically used by students in universities and colleges. Some researchers admit that students are using smartphones in high schools. However, the question that has not been adequately addressed is that of what the students are reading or accomplishing on these devices (Kibona & Mgaya, 2015).

There are two contradictory scenarios in the Zimbabwean context: those schools allowing their students to use smartphones at school for learning purposes, and those that do not tolerate the use of smartphones by students. Based on these two opposite stances, this research has tried to get to the bottom of the issue in as far as the use of smartphones is concerned among students in secondary schools in their learning experiences. This study explores the academic use of smartphones among secondary school students in the Zimbabwean context, with the view of establishing its role in the education of the students. The Zimbabwean education system is also being reviewed and smartphone use in the learning and teaching processes is topical. The findings from this research may be useful in policy formulation and review of the Zimbabwean education curriculum.

2.1.1 General advantages of using smartphones

It should be noted that smartphone technology has its strengths and limitations. Smartphone use has brought with it some considerable advantages over computer technology, which are worth noting. With a smartphone, one can connect to the Internet from virtually anywhere when using a smartphone. One can also send emails, look up information, navigate highways, take pictures and play music. Smartphones are more compact and do not require the provision of large amounts of power and cooling that more powerful processors demand (Nath & Mukherjee, 2015). However, although it is technically possible to write a 20-page document using a smartphone, people would not wish to use it for this purpose. The smartphone is ideal for some tasks, and for some, it is just capable. However, there are certain tasks it simply cannot do. It is important for users to appreciate the weaknesses and strengths of this device in order to use the devices appropriately.

Below are the reasons why smartphones are a preferred choice for mobile computing as compared to laptops or tablets, as argued by Nath and Mukherjee (2015).

i. Always available

A smartphone is there wherever you go. It is lightweight, and can fit into a purse or pocket with ease (Nath & Mukherjee, 2015); it can sit on a bedside table at night. The smartphone is almost always within the arm's reach when surfing the Web, checking emails or the weather, or making a call. In all probability, a smartphone will accompany a person even when taking a laptop or tablet.

ii. Connectivity

Jumoke et al. (2015) highlighted the fact that a smartphone has made the Internet more affordable and accessible than before, and this has given the users the ability to speak on the Internet. Smartphones, being mobile phones and portable computing devices, have the technology that enables them to connect to cellular networks (Jumoke et al., 2015). Although Wi-Fi networks seem to be ubiquitous, some areas still have no wireless network. However, the smartphone can still obtain a 3G or 4G signal. Some of these smartphones can also be used as Wi-Fi hotspots, allowing users to connect to the Internet from virtually anywhere with laptops or tablets as they can share the cellular data connection.

iii. Voice calls

Although people can make Google or Skype voice calls from a tablet or a laptop, the smartphone stands alone as a communications device among these three as it is capable of making or receiving calls from virtually anywhere. One can travel the globe and still connect with one's family using a smartphone. Through a smartphone, communication between people has become faster, easier, and cheaper, especially among people in different countries. One can send videos and pictures, which enables others to feel part of one's life. Use of smartphones can help to narrow the distance between individuals for purposes of doing business. Important events such as meetings and discussions may be held per mobile phone, making this much more efficient and cost-effective (Nath & Mukherjee, 2015).

iv. Text messaging

Smartphones enable people to communicate through text messaging. Text messaging is faster than sending emails, but it is less intrusive than voice calls. Smartphones work virtually anywhere without requiring the user to be logged in to anything in particular (<https://www.technobezz.com/the-advantages-and-disadvantages-of-smartphones/>).

Smartphone communication is a convenient means of keeping others informed, and for eliciting

solutions to some simple questions. One may accomplish this with a few taps and swipes, compared to having to boot up a computer.

v. Versatility

A smartphone does a little bit of everything (it is often referred to as the new Swiss Army knife). Just like a Swiss Army knife, it can do some things better than others; it is an excellent knife, but makes a questionable pair of scissors or saw. The smartphone has the capabilities of displaying photos, playing games, and playing videos. It features navigation, email sending and receiving, audio playback and recording, a built-in camera, wireless Internet, built-in applications for social websites and surfing the Web, and much more (Nath & Mukherjee, 2015). Therefore, the device may be used as a phone, a GPS device, a camera, an e-reader, a portable music player, or almost anything else that one needs it to be. A smartphone also comes with various utility software such as; a calculator, a memo, and a calendar, inter alia. The camera light may also operate as a torch. A comes in handy as a calculator to make the life of the user easier. The calendar may be deployed in planning one's schedule and the radio used to listen to the news A smartphone may not be the best at some of those functions, but it is almost guaranteed to be the most convenient and available tool for mobile computing. However, there are many other tasks for which a tablet or a laptop makes more sense. Smartphone technology devices are fashionable and they depict a sense of efficiency and professionalism (Nath & Mukherjee, 2015).

2.3 Academic Achievements

The major reason for educating children is for them to learn the skills needed so that they may follow the career path of their choice. Young people acquire knowledge at school and learn how to apply this knowledge, how to make arguments using historical events, and how to think and reason with numbers. The success of educating a child is measured through the child's academic achievements, that is, the marks gained in examinations. Therefore, it may be difficult to talk about the academic use of smartphones without mentioning the ultimate goal of academic achievements. However, it should be noted that the success of the academic use of smartphones cannot be directly measured by the academic achievement level of a child. There are many other aspects that may influence a child to pass or fail in academic performance (Usaini et al., 2015).

Academic achievement may be defined as the success of a child in meeting long- or short- term goals in education (Bossaert, Doumen, Buyse, & Verschueren, 2011). It can also mean earning a degree or simply completing high school. Some scholars define students' academic achievements

as a high performance in any given learning area (Fan & Chen, 2001). If a student earns good marks in science, he/she has achieved academically in the field of science. According to scholars like Good (2009) academic achievement is defined as the skills developed or knowledge attained in different learning areas. It is usually determined through marks or test scores assigned by the subject teachers (Hong & Ho, 2005). Mehta (1996) has defined academic achievement as “academic performance includes both curricular and co-curricular performance of the students ...” (Odeh, Oguche, & Ivagher, 2015). Students’ academic achievement is measured by students’ individual grades and scores obtained in their learning processes, outcomes of the learning processes that change the behaviour pattern of the student in different learning areas (Sephania, Too, & Kipng’etich, 2017).

2.3.1 Factors affecting academic achievement

Certain factors contribute to the poor academic performance of students in their learning areas. Such factors include unconducive school climate, shortage of available resource materials, poor study habits, and inadequate learning and teaching facilities, indiscipline, and ineffectiveness of the teachers. The learning environment and the teaching methods available for both the students and their teachers are critical factors linked to risks preventing students from achieving expected results (Ajewole & Okebukola, 2000).

2.3.2 School environment

The terms ‘school climate’ and ‘school environment’ have been used interchangeably in this chapter. In his article titled “Hints on teaching practice and general principles of education”, Akanke claims that learning occurs through one’s interaction with the environment (Hong & Ho, 2005). The learning environment determines how students react to the situations and conditions surrounding them (Tsavga, 2011). This suggests that humanity is influenced by the environment. The environment, in this case, refers to the available facilities that promote the learning outcomes of students. This includes learning materials like; audio-visuals, books, and the information technology such as software and hardware (Owoeye & Yara, 2011). In the context of this study, smartphones are part of the hardware and software technology that is used by students today.

If the school fails to provide students with a supportive environment for the teaching and learning processes, students may fail to achieve positive results. Blum (2005) admits that a school climate that is positive and respectful provides a solid basis for the development of positive attitudes and behaviour and promoting students’ academic performance. Learning communities that work

collaboratively, create a safe and supportive environment for students, increased job satisfaction and teacher morale, leading to the retention of the experienced teaching staff. This promotes active learning and teaching processes to occur, resulting in higher academic performance by students (Blum, 2005). In such environments, the introduction of the use of smartphones for academic purposes will be accepted without much resistance. Previous studies show that schools with better learning environments produce students with better educational attainments and healthier socio-emotional aptitudes (Lester & Cross, 2015).

The learning environment can regulate the behaviour and interactions of a student. In other words, the students' learning environment can mould the behaviour of students as they attempt to encounter the difficulties of life, either positively or negatively (Angreranti & Malihah, 2018). School programmes and policies often dictate the climate of the school (Lickona, 2009). According to research on school climate, ideal learning opportunities and positive interpersonal relationships can reduce high-risk behaviour and raise performance levels for students in most demographic environments (Eliot, Cornell, Gregory, & Fan, 2010). Students who are connected to their school engage in fewer risk-taking behaviours since they experience less distress (Blum, 2005). Connectedness refers to instances where the students perceive to be close to people in their school, see themselves as being treated fairly by their teachers, feel safe, perceive to be a part of their school community and are happy to be in school. In this respect, students who use smartphones for academic purposes at school will feel safe when consulting their teachers on how to use their devices to maximise their potential, should the school environment promote (authorise) the use of smartphones.

School facilities are a potent factor in providing quality education. Therefore, emphasis should be on the provision of these facilities to learning and teaching, and the establishment of instructional facilities that are adequate for teaching. The statement that "teaching is inseparable from learning but learning is not separable from teaching is that teachers teach to make the students learn, but students can learn without the teachers" (Hong & Ho, 2005). The school environment is very important in shaping and re-shaping the intelligence of students. A supportive school environment equipped with adequate learning facilities encourages students to concentrate more on their learning activities, resulting in improved academic achievements (Rabiu et al., 2016). Supportive school environments foster positive performance by creating students' sense of connectedness, belonging, or community (Usaini et al., 2015). Any student that perceive his/her school to be a caring community turn out to be more engaged and motivated in their learning.

Rabiu et al. (2016) further state that the development of an educational process occurs in social, physical, psychological, and cultural environments. A proper and adequate school environment is essential to the fruitful learning of the child.

A school can either close or open the doors that lead to academic success depending on the prevailing environment (Kennedy, Judd, Churchward, Gray, & Krause, 2008). The school environment influences the growth and education of students, including their emotional, ethical and social progression. Students, who perceive the environment of their school to be supportive and caring, will in most cases not engage in problematic behaviours like violence and substance abuse (Olsen, Lodwick, & Dunlap, 1992). Research conducted in high-risk urban environments on the influence of school climate has indicated that a culturally conscious, positive, and supportive school environment can determine the level of success in academic performance experienced by urban students in a more significant way (Kutsyuruba, Klinger, & Hussain, 2015). Researchers also found that a positive school environment is an important protective aspect for boys; high-risk students are guaranteed of a learning environment which is supportive, yields healthy growth, thereby avoiding antisocial behaviours (Angreranti & Malihah, 2018).

The schools' geographical location also influences the performance of students in their school work (Wood & Roach, 1999). Students learning in cities and towns have a benefit of improved educational conditions that can increase success in their academic endeavours (Usaini et al., 2015). A school climate that is favourable provides an opportunity for learners to work hard to improve their academic performance. The physical structures of school buildings and the students and teachers' interactions also inspire students to perform well academically. Consequently, the influence of the school climate on the success of the students cannot be overemphasised. Learners require schools with good facilities for learning in order for them to perform well. In other words, when a school environment is developed with modern teaching and learning facilities, it can promote effective learning. The type of school, public or private, and the class size are two critical aspects of the school's structural or physical facilities. Private schools tend to have fewer students in their classes and better funding when compared to public schools (Lickona, 2009). This additional funding in private schools promotes better academic performance as it provides for access to more learning resources like computers, laptops, and even smartphones; and these have been shown to improve academic performance (Makuvaza, 1996).

Schools should, therefore, avail adequate instructional facilities which have the potential to

motivate students and stimulate interest for them to work harder. Eniayewu (2005) recommended the use of teaching aids for instructional delivery as it helps learners to attain more knowledge and improve academic standards (Olayinka, 2016). Ajayi and Ayodele (2001) also recommended the use of instructional materials in teaching for effective educational delivery and in the school systems supervision (Ajayi & Ayodele, 2001). By using instructional materials, learning becomes more enjoyable to the students. These materials offer a reality of experience and arouse self-activity and imaginings on the part of the learner (Howard, Berkowitz, & Schaeffer, 2004). The use of smartphones provides a technological solution to the issue of instructional aids.

2.3.2.1 Effectiveness of the teacher

Good relationships among staff members and the students will lead students to attain better results in their learning processes. When students use smartphones at a school with a sound climate and favourable conditions for learning, they can easily be monitored by their teachers and parents. When students connect actively with their teachers, and particularly, when they observe that their teachers care for them, they will be inspired in their engagement and their effort. A positive relationship between the students and their teachers can bring about a supportive school environment for the learners. This will promote the smooth flow of academic activities which results in better academic performance (Chukwuemeka, 2013). Teachers can, therefore, assist students to effectively utilise their smartphones, ensuring that they gain the maximum benefits from using these devices for learning purposes. A cordial relationship among the school administrators, students and teachers create a favourable environment for learning: learners are listened to, and discussions are encouraged. In such environments, all members are considered significant in the process of decision-making. This often encourages learners to be self-controlled and to have an optimistic attitude towards academic work (Rabiu et al., 2016). Administrators and teachers should, therefore, know that they have a significant influence on the performance of students in their academic results.

The teachers' attitude directly affects the students' attitude. The qualities of a teacher can be strong determining factors for students' academic performance in secondary schools (Korir & Kipkemboi, 2014). Poor academic achievements of students have been attributable to the high level of indiscipline among teachers (Blum, 2005). Academic achievements and discipline are at the centre of education nowadays. It has become noticeable recently that some schools have downgraded discipline, leading to poor academic achievement of students (Angreranti & Malihah, 2018). Chichi (2001), defines discipline as the act of compliance and orderliness. With

discipline, teams maintain appropriate subordination amongst themselves; it is a restriction on the freedom of individuals (Hong & Ho, 2005). It can be defined as the training that corrects, strengthens, and moulds the individual behaviour. Indiscipline among teachers may be classified as any actions or behaviour that negatively affects teaching and learning, resulting in retarding students' academic performance (Angreranti & Malihah, 2018).

Effective discipline is critical in schools for better academic performance, especially in this era of technology where students can now access all sorts of information on the Internet. The use of smartphones requires that the students be sufficiently disciplined to know what to view and what not to view on the Internet. If teachers are not disciplined at school, students are likely to emulate their attitude. Some researchers argue that senior secondary school students (Forms Five and Six) are mature students who need only minimal supervision. However, if the teachers, who are the custodians of these students, fail to display high standards of discipline, students will also be undisciplined. Therefore, the use of smartphones among students at school calls for disciplined teachers to give guidance and to monitor the students as they use these devices at school. Effective discipline in schools and in the classrooms promotes effective teaching and learning (Odeh, Oguche, & Ivagher, 2015).

2.3.2.2 Parental involvement

Students' academic achievement does not depend on the quality of the teachers and the school environment only but is also influenced by the involvement of parents. The role of parents in influencing the academic results of their children is vital (Rabiu et al., 2016). Parents' involvement in children's learning processes, together with economic and environmental factors, influence their development in areas like language, social skills and cognition. Previous research findings indicate that parental participation during the course of a child's education can improve his / her academic performance (Fan & Chen, 2001), (Driessen, Smit, & Slegers, 2005), (Hong & Ho, 2005). Children are likely to have improved behaviour and attain higher academic performance levels when their parents are actively involved in their learning processes (Bryan, 2005).

According to Annunziata, Houge, Faw, and Liddle, (2006), academic failure has been directly linked to risky behaviour and other negative consequences like behavioural and emotional problems including delinquency and substance abuse (Rafiq, Fatima, Sohail, Saleem, & Khan, 2013). It is important to note that many studies in the area of parental involvement were conducted

mainly on elementary school pupils (Bailey, Silvern, Brabham, & Ross, 2004); (Marjoribanks, 2005). However, currently, there are limited and inconsistent facts regarding nature and extent to which the involvement of parents affects the educational results of students in secondary schools (Jeynes, 2007). The involvement of parents in the education of their children's has now become a fundamental issue in studies and policies related to education. Most of the research findings on secondary school education so far indicate a positive relationship between educational success and parental involvement, (Wilder, 2014).

Parents play a key role when it comes to the education of a child both at home and at school (Desforjes & Abouchaar, 2003). Various studies carried out in sociology by researchers in education have shown that when parents get involved in their children's studies, their academic performance is enhanced (Dresselhaus & Shrode, 2012). This has been realised mostly with children who enrol in programmes that are more challenging, which require better behaviour, more persistence in academic work, better social skills, and improved attendance; reduced school drop-out rates were observed when parents closely monitored their children (Henderson & Mapp, 2002). Parental involvement can further mitigate the high level of students' failure in public examinations thereby reducing wastage of parents' own resources and public expenditures used in supporting formal education in schools. Parental participation in the children's educational activities may save public and personal spending and the quality of education would also improve both at the national and individual level (Nasser, 2014).

If parents were conscious of the influence of their participation in school activities on their children's future and learning ability, they would more actively participate in their children's education. Educators, with the assistance of parents, should be advised to promote those practices likely to improve full participation of parents in children's learning processes. Schools need to take advantage of what is already being done by parents and empower them to interact with and assist their children at home; they should emphasise on learning activities that strengthen what the teachers will be teaching at the school. Schools need to aim at increasing parents' level of appreciation of the school programme and the skills that their children need to promote at each of the stages of a learning process. Parents should be notified of the schools' tracking systems on students as they use the smartphones; this will enable parents to make decisions in the best interests of their children (Brewster & Railsback, 2003).

When leaders, schools, families, and community organisations work together, students' academic

results become supreme. In these instances, better chances of attaining knowledge and for relating the knowledge gained at school to real-world events are provided to the children (Rafiq et al., 2013). Using smartphones to access the Internet will expose students to various platforms over which many of these students have no control. The involvement of parents becomes paramount, especially when students interact with persons, other than their teachers and parents, who can reinforce different ideologies of learning. Such may contradict the values and traits of their society (Epstein, 1995).

Communication between teachers and parents is one strong component of effective parental involvement (Rabiu et al., 2016). In many cases, parents prefer to engage in informal relationships with teachers who teach their children. The personal contact of parents with their children's teachers is the one outstanding factor for enhancing their academic results. According to Epstein (1995), the family, community and the school, are crucial environments that can influence the children's development. The development of children's education is improved when the three environments operate in collaboration towards a common goal (Rafiq et al., 2013).

Parental involvement tends to differ from society to society, and from culture to culture (Rafiq et al., 2013). However, it should be noted that the expectations of parents have a greater impact on students' educational results. Parental involvement can take different forms, which may have a differing influence on the children's academic performance. Some scholars have categorised involvement of parents into four components, namely; participation of parents in children's school events, participation of parents in children's learning activities at home, direct participation of parents in the children's learning activities and indirect participation of parents in the children's learning activities (Desforges & Abouchaar, 2003).

2.3.2.2.1 Involvement of parents in children's school activities

Parents are important partners in the teaching and learning processes of children (Annunziata, Hogue, Faw, & Liddle, 2006). Their role involves working in partnership with teachers and their support in school events. Parental involvement is critical in learning activities done at school. This may involve communicating with the teachers, confirming if the child has attended school, monitoring their activities at school, and inspecting progress reports (Rafiq et al., 2013). Parental involvement in school-based activities promotes the development of community partnerships, the school, and family. These partnerships can provide family services and support, improve school programmes and school climate, and increase parental skills in assisting their children, and in

leadership. This will also connect families with others in the community and in the school. The purpose of forming these synergies is to support students so that they may be successful in school and in their future (Epstein, 1995).

2.3.2.2.2 Involvement of parents in children's learning activities at home

The learning process begins at home as the child interacts with his / her family. It is true that the levels of involvement of parents may vary from one parent to the other (Desforjes & Abouchaar, 2003). For example, the involvement level of a mother of young children may differ from that of the mother of secondary-school children. The father's involvement level with children's learning activities differs from that of the mother in a family set-up. Educated or uneducated parents' levels of involvement with their children's education also differ. The family's economic status, family background, and social environment also dictate the level of the parents' involvement.

Participation of parents with their children from early stages of their development equates to improved results; especially in developing their personalities (Rafiq et al., 2013). Children try to emulate their parents because they are their primary guides, considering them always to be right, therefore, parents can greatly mould their lives. Parental involvement can have a positive bearing on children's success, even after background aspects like family size and social class have been considered (Desforjes & Abouchaar, 2003). In this research, parents play an important role, which is to monitor their children as they use their smartphones for their learning process.

2.3.2.2.3 Direct involvement of parents in academic activities of children

Parents are the initial teachers of any child (Rafiq et al., 2013). Parental involvement includes activities like; monitoring children's outdoor and indoor activities, helping them in reading, helping children with homework, or also encourage them to work independently when doing their homework (Wilder, 2014).

2.3.2.2.4 Indirect involvement of parents in academic activities of children

Parents can assist their children indirectly by outsourcing coaching services from specialised personnel in improving their learning in different learning areas. Some of the students lack the required skills to efficiently utilise smartphones. It is the responsibility of the parents to assist their children possibly by assigning them the relevant tutors (Lee, 2010). In Zimbabwe, students are now required to carry out tasks and projects in the new educational curriculum that require them to do field research or surveys, interviewing people from different cultural backgrounds. Parents should be concerned about the evolving learning opportunities being provided by

secondary schools; hence the need for their involvement at every level of their children's learning process. As children graduate from the primary to secondary school grades, parents should become more and more worried about the further education of these teenagers' and about how the programmes of secondary education may affect the prospects of post-secondary education (Catsambis & Garland, 1997). The learning opportunities, however, come with financial demands which must be fulfilled by the parents. The need for parents to purchase the appropriate smartphones for use by their children in school cannot be overemphasised.

2.4 Mass media

Education is not an isolated sub-system closed exclusively in its internal components. It is influenced by many processes that bring change to societies and to knowledge. The introduction of media and technology into schools is attributable to the assumption that this technology may have progressive effects on teaching and learning of students (Vijaykumar, 2014). Therefore, as one examines the academic use of the smartphone as a technology, one may have to discuss mass media, since the two operate as one. In fact, a smartphone may be referred to as incorporating media technology.

Nowadays, social and technological changes are taking place rapidly throughout the world, owing to the expanding world of information. The world is experiencing an explosion of knowledge. As additional knowledge frontiers open up, the horizon of human understanding and knowledge is also expanding rapidly (Selvam, 2016). Mass media is a collection of applications that are Internet-based and are founded on the technological and philosophical fundamentals of Web 2.0. Mass media permit user-generated information to be created and exchanged (Kaplan & Haenlein, 2010). It is the knowledge projected to influence mass viewers and listeners (Bhatt, 2017). This is the principal method of communication used to spread information to the public. Media include diverse systems such as graphics, print, animation, together with motion and audio images (Vijaykumar, 2014). The Internet, television, radio, newspapers, and magazines are the most common platforms for mass media. The public depends on these mass media platforms to deliver information on entertainment, social issues, political issues, and news. Through mass media, news channels have a central influence on the general public, and a key impact on the public view of certain matters (Bhatt, 2017). Mass media is in many cases, the only source that the public generally relies on for news updates.

2.4.1 The role of mass media in education

Mass media is one of the aspects that influence education both positively and negatively. It is indeed crucial to categorise the role of mass media so as to evade the harmful media effects on education. Media can change or transform users and can impact positively through informing, educating, entertaining, and persuading people to adopt more responsibility. The fast development of the mass media as a chief information delivery channel and dominant socialisation agents and the advancement of communication technologies have threatened the role of traditional schooling. Mass media can be described as a sort of “parallel school or second educator” (Lee, 2010). Students in schools are caught in a tight web of messages and information of all kinds, and of diverse origins, which they do not always manage to control.

Researchers have raised two main methods of using media technology in the area of education. The first method is when students acquire knowledge from media and technology. The second method is when they acquire their knowledge using media and technology (Meti, 2014). When students learn from media and technology, it is often called an integrated learning system. When they learn with media and technology, it is referred to as a constructivist learning environment (Reeves, 1998). In education, students and teachers use media to represent facts, while the media technologies represent the learning tools that permit them to share knowledge with others. In the context of this research, the Internet represents media, while the smartphone symbolises the technology.

Learners are supposed to function as designers using media and technology as tools for organising their personal knowledge, retrieving and interpreting information, investigating the world, and representing their knowledge to others (Jonassen, 1994). The major question raised by some scholars is how education can utilise, exploit, and master the countless messages and items of information disseminated by the media, making them truly educational, while at the same time doing its part, where necessary, to counteract any adverse influence such may have on students’ outlook and behaviour.

The use of technology such as smartphones in mass media communication is a complex matter. It is one that deserves attention now that we are fairly and squarely in the communication society in which our children live, and will continue to live without so far having been prepared for it (Wiest, 2016). There is lack of clear evidence and scientific description for direct effects of media, however, some observers of popular culture, social critics, and much of the general public

continue to refer to the supremacy of the press.

Some researchers point out that media is mostly used for intra-personal needs rather than interpersonal factors. Information for intra-personal reasons is information for private consumption or information that satisfies one's curiosity (Wiest, 2016). Information for interpersonal reasons is information that is shared with other people or used to show up others. People stubbornly put to their personal use, the media content they freely choose to pay attention to, for their own gratification. People selectively use media content in front of them. It is against the background of this assumption that I explored the use of smartphones to access academic information by secondary-school students.

People speculate and present an assortment of hypotheses on the power of the mass media, yet there is a need to examine this empirically, and not in piecemeal fashion. Long-term studies on this topic are called for so that people are able to observe changes and the influence of mass media on students in secondary schools. Such a period could cover the whole term or even a year. As this research unfolds, recommendations will be given as to how smartphones may be used for mass-media communication, and how students may make use of such platforms at their disposal.

2.4.2 Teaching media literacy

Researchers indicate that the press, radio, television, the cinema, posters and the Internet amongst others, are not simple communication vehicles. Media constitutes a real setting which conditions thought and very often controls behaviour (Wiest, 2016). Therefore, the education system should account for the invisible curriculum of mass media. Researchers argue that education systems will have to be clearly defined in the face of these phenomena and their development, which is going to continue influencing students (Baehr & Boone, 2007). Media education is regarded as important in training independent and critical media consumers. Media-literacy education is the process of learning and teaching about mass media (Buckingham, 2013). Individuals are taught how to understand the techniques, impacts, and nature of media productions and messages. Therefore, the main objective of teaching media literacy is that it enables individuals to communicate, retrieve, analyse and evaluate information in its diverse forms (Lee, 2010). As students use these media platforms on their smartphones, they need to focus on those platforms that are necessary for academic improvement, while avoiding or minimising those media platforms only for social functions.

Technology is now transforming students or learners into explorers, while teachers have taken the role of guides (Thompson, 2016). Armstrong (2014) asserts that before this change can take place, students need training on the skills required to use the Internet. These include recognising reliable sources of information, discriminating the unimportant information from the important, and being determined to search until they get the material they require. These skills are not easy to impart. Learners should be taught to evade the intrinsic sense of instantaneous pleasure provided by online search engines (Armstrong, 2014). Armstrong later states that the limitless data sources offered online require students to learn how to push their way through the pages of the returns search of each and determine the credibility of sources and sites. Although technology is supposed to primarily inspire learners to do their assignments, teachers should encourage students to think analytically to perform quality research (Vanwelsenaers, 2012). This research will focus on the Zimbabwean context in which there is not much research carried out on the academic use of smartphones among secondary schools. However, there are now a good number of schools that have embarked on the use of smartphones for educational purposes.

2.5 The adoption of smartphones for academic purposes

The first electronic media was first implemented in schools about a century ago using machinery such as radio and film. From the 1990s, the advent of the Internet introduced new methods of distributing teaching and learning content to teachers and students. This has given opportunities for learning to be done in and out of the classroom; a process called e-learning (Vanwelsenaers, 2012). The new mobile technologies which can access the Internet have empowered communities to change from the formal learning within a professional school arrangement to numerous other types of socio-technical inventions for educational practices. The use of smartphones will not limit students as they can continue their studies even at home (Dresselhaus & Shrode, 2012).

The combined effect of social media and technology-enhanced learning for educational purposes is critical in enhancing innovation, collaboration, creativity, and knowledge in the classroom for today's students; and for them to apply such skills when they get employed (Vanwelsenaers, 2012). A research was conducted by McNeill et al. (2011) exploring the use of technology in students' daily lives at school and outside the school, to support their learning. The study revealed that students spent most of their time using phones for video games, digital music playing and engaging on social platforms (McNeill, Ming Diao, & Gosper, 2011). This information suggests that the current generation of students' desire active learning than passive learning. They access information by using communication technologies (Kennedy et al., 2008). This research,

however, questions the evidence on the quality of education that results from using learning technologies. We admit that, although the teaching and learning tools may transform, learning per se has not changed.

Twum (2011) reiterates that mobile phones are prevalent among youths, and are now common in our educational institutions (Rabiu et al., 2016). For contemporary digital communities, pencils, textbooks and paper, are now insufferably old-school (Armstrong, 2014). A touchpad or keyboard can possibly stimulate an encouraging attitude in students. Armstrong (2014) conducted a research in the US Department of Education which revealed that teachers admitted that the use of tablets and smartphones by students improved class participation. Such research may still be conducted in the Zimbabwean context. Some schools, such as Harare High School, Vinona High, St George High, and Prince Edward High, to mention but a few schools, allow their students to use smartphones for academic purposes. Researchers acknowledge that technology is a primary means of empowering learners to control their own education. Instead of only paying attention to teachers disseminating information while they dutifully take notes, students prefer to actively search for information from the Internet (Armstrong, 2014).

Students enjoy a range of creative choices which improve their learning experiences through the use of smartphones. These include accessing the Internet to view and reply their emails, to do research, and be able to take a short video of key lecture moments, or a photo of the daily assignments written on whiteboards or on paper (Nath & Mukherjee, 2015). Smartphones enable them to browse full websites with huge amounts of data; appearing just as it does on the computer or laptop. Some applications on smartphones allow students to create Microsoft Office documents and edit them. They have GPS which very useful in locating places that are not known to students. A smartphone can also send email messages and also text messages. Some smartphones depending on the model and make can support multiple accounts.

Dewey (1944), in the article “New technologies in the classroom” was quoted as saying; “if we teach today’s students as we taught yesterday’s, we rob them of tomorrow” (Pilgrim, Bledsoe, & Reily, 2012b). Students are now in the era of technology in which they now use smartphones as sources of information in their learning experience. Westera (2012) further states that Internet services such as MySpace, YouTube, and Facebook, set the ideals for speedy, flexible, and quality facilities that educational institutions pursue. Therefore, the use of mobile technologies in education can offer unlimited prospects for learners and educators.

Technology creates opportunities for educators to engage learners in the form of education that is relevant to applications of the real-world (Pilgrim, Bledsoe, & Reily, 2012a). While it is hard to keep abreast with the developing technologies, educators need to work hard to fit in information technologies into classroom teaching; the use of smartphones is one major step in that direction. Pilgrim, et al. (2012), imply that when integrating technology into teaching, learners are able to utilise technology to improve their intelligence and to solve problems.

West (2013) concurs with this thought when he states that smartphone use by students facilitates information access wherever a student is located. Use of smartphones engages, enables, and empowers education in ways that change the educational environments for learners in the classroom and outside the school (West, 2013). The introduction of the new educational curriculum in Zimbabwe by the Ministry of Primary and Secondary Education has brought with it demands that I view as a challenge necessitating the use of smartphones. Learners are now required to carry out certain tasks and projects for their continuous assessment, which oblige them to conduct research. The use of a smartphone for accessing the Internet and collecting data from field surveys, or for documenting findings for tasks and projects, will alleviate their challenges.

While some scholars recognise the potential of a smartphone as a tool for libraries, they have not yet addressed the current use of these devices by secondary-school students. Several scholars have endorsed the potential for smartphone services in the university setting, however, they have done very little to investigate the actual use of the technology (De La Puente, Balmori, & Garcia, 2007; Ezemenaka, 2013; Blass, 2004). For libraries to maintain their relevance to students their facilities should be obtainable from where learners access information; otherwise, the smartphone will take over all the services for the libraries. Catharine (2013) pointed out that smartphones, as compared with other devices like computers, which also use specialised applications, require a single hand to operate; hence they have convenience of use.

The current generation of youths differs from those that came before them in their use of technology (White, 2010). Jumoke et al. (2015) specify that the use of portable devices in education is not a new practice. Graphics calculators which were a revolutionary addition to the learning environment a few decades ago is now often used for business and statistics classes. The current generation's expectations are to have their wants and needs answered immediately. Technology use in schools, classrooms, in particular, has rapidly changed ways in which the

learning of students occurs. Armstrong (2014) insists on asking the question of how effective it is, what the costs are and what benefits students have in using smartphones compared with learning without these devices.

A survey conducted by Armstrong (2014) indicates that most students already own smartphones and have developed skills to use them. In her analysis, the researcher articulated that students using smartphones in the classroom as a learning tool show a firmer interest in science subjects, especially STEM subjects when compared to students not using these devices for learning purposes. Some researchers also claim that the use of smartphones can involve learners in ways that textbooks and lectures do not because it encourages them to work together with their teachers and team-up with other students and to explore the Internet as an authentic source of knowledge. Such use will lead to better academic performance by students (Vanwelsenaers, 2012). It should be noted that technology also comes with its challenges.

Previous studies show that students who use technology regularly for learning are aware of new learning tools like; visual recordings, audio, text, and illustrations (West, 2014). These tools allow children to have an all-inclusive learning experience. Smartphone use should assist teachers to be innovative and think about new classroom models and to build critical skills for students in their classrooms (Billieux et al., 2015). The technology should also encourage students to be more accountable for their own learning. This will result in a more sustaining educational collaboration for both teachers and students.

Smartphone use of by students at home should allow parents to be involved in supporting their children's acquisition of literacy skills (Wiest, 2016). Brindley et al. (2009) indicate that embracing and institutionalising smartphone technology can transform learning. Smartphone technology can be a catalyst for generating a powerful transformation in the existing education systems which is critical for student growth in the areas of collaborative learning and intelligence (West, 2015). Teenagers need these skills so as to safeguard their place in the global economy that is highly competitive. Most employers require workers with strong collaboration and communication skills, therefore electronic collaboration certainly prepares graduates for the workplace (Rabiu et al., 2016).

The use of smartphone technology improves mobility and access (Wiest, 2016). Chen and Denoyelles (2013) comment that using smartphones will allow users to consume, to explore and

to produce content. In doing so, they continue to transform the ways in which students learn while influencing their learning preferences, both within and outside the classroom. They further noted that the use of smartphones provides convenience, flexibility, engagement, and interactivity; hence, it becomes more attractive to students (Falayi & Adedokun, 2014). Some research suggests that there is a need to support students on how to use mobile technologies for learning. The need for promoting digital literacy curriculum or training among colleges that train teachers cannot be sufficiently stressed (Said, Firmawan, Purwaningsih, & Sujana, 2011). Such training will help teachers to adopt knowledge and learning practices from training colleges so that they can engage them with digital media in the teaching of students when they go to schools to teach, once qualified.

Students get mobile entrance into the various education-enhancing facilities as offered by Internet-connected computers instantly through the use of modern smartphones. These include retrieval of online information, sharing of files, and networking with fellow students and teachers (Ahmed, Opoku, & Aziz, 2016). Not all schools can afford to buy computers for all their students, hence, some of the students in these schools have no access to a computer, and. However, most young people have cell-phones of which many are smartphones; these will provide a real opportunity to transform instructions. Education authorities, therefore, need to find means of harnessing those mobile devices for instructional purposes, employing them to improve teaching and learning methods (Rabiu et al., 2016). Research has already established that there is a link between access and economic development using smartphones (West, 2013). It is crucial to avail digital infrastructure that can boost productivity in academic performance and propel economic development. If students have their own smartphones, rather than shared devices, they acquire more reliable and better access to education. Schools should take advantage of such a scenario and customise instructional content for different students. The problem, however, is that teachers work with classes of very diverse learners. Students learn in unique ways because they come from diverse backgrounds, and they often have divergent interests, (Vanwelsenaers, 2012).

Some scholars have pointed out that schools should not view education as an activity that takes place within schools from Mondays to Fridays, between 8:30 am to 4:00 pm, when schools are in session, rather, they should consider education as an individualised and year-round activity (West, 2013). This is only possible when students use smartphones. Learning material need to be customised and ubiquitous to allow students to pursue their learning passions (West, 2015). Some research conducted in the United States successfully employed smartphones as data-collection

tools for field projects (West, 2013). Teachers created quests for students to gather data from field trials and to document their findings for the projects (West, 2014). However, some studies in the US indicated that students who use smartphones predominantly as social networking tools are in many instances limited in their use of the same device for educational purposes (Vanwelsenaers, 2012). This research, therefore, intends to find matters to further explore the students' usage of smartphone technology in their learning, on or off school grounds.

Most research relating to the use of smartphones by students was conducted in the European context, which differs in many ways from the African context, in terms of culture and level of technological advancement. Research conducted in Nigeria focused mainly on the colleges and universities in which there are more mature students than in secondary schools (Osang, 2012). However, the application of mobile learning in African countries is not the same, owing to the proficiency in the new technology, availability of infrastructure, the level of awareness of the technology, and the willingness of the users to apply the expertise for learning purposes. These differences may have varied effects on the way in which students respond to the use of smartphones, especially in their academic processes. In the Zimbabwean context, the use of smartphones in the processes of learning and teaching has not yet gathered much momentum, because some parents are still pessimistic or hesitant owing to the social, moral, and even health challenges perceived to be associated with the academic use of these technologies. A sizable number of schools have now adopted the use of smartphones by students in their teaching and learning processes. However, some research has to be conducted to ascertain the usefulness of these devices by students in their learning environments. There is no research that I know of or have come across that discusses or explores the use of smartphones in Zimbabwean schools, let alone for academic purposes. This study will be unique as it focuses on the Zimbabwean high school context.

2.5.1 Benefits of smartphone use for education

Zimbabwe, as a country, is developing the next age group of workers, and students for the 21st century in teamwork, collaboration, synthesis, analysis, and higher order thinking skills (Carr, Éireann, Cliath, & Rúnaí, 2008). There are many sterling influences of media technology on students; some students have developed positively through the academic use of smartphones. Mobile phone technologies offer numerous advantages on learning, and these include motivation, collaboration, portability, and enhancing the education system for students, parents, and teachers (Barker, Krull, & Mallinson, 2005). Some authors have identified six major benefits of using

smartphones for academic purposes, namely, portability, interest, collaboration, students and teachers' engagement, automated assessment, and improved feedback (Seppälä & Alamäki, 2003).

2.5.1.1 Portability

Some scholars admit that the portability nature of mobile phones enables ubiquitous learning for students, in retrieving course information: students carry their mobile phones from class to class (Barker et al., 2005). The portability of a smartphone makes it suitable for an array of learning situations like the classroom set-up, outside the school, or a field trip. Smartphones or tablets are less bulky and lighter for storing notes and e-books than carrying bags full of textbooks, papers, and files or a laptop. According to Osang et al. (2013), a classroom can easily accommodate many mobile devices than desktop computers. The use of smartphones by students allows them at any time to search for any information (Myers, 1997). They can consult their phones on whichever new and current information as and when they wish; this will increase students' interest in using the device. The use of smartphones allows learning processes to be done outside the physical limits of the classroom and outside the traditional times of a school day (West, 2013). In this case, learners can work with other students online, communicate with their teachers, and access content from home (Kaur & Mathur, 2015).

2.5.12 Interest

Students who may have lost interest in education nevertheless often enjoy working with smartphones on games, jokes, horoscopes, music, or phone, TV content and advertising (Osang, 2012). Gaming, according to Osang (2012), has become pervasive within the upcoming generation. However, for all its perils, teachers can take advantage of this and introduce learning games on the smartphone. Smartphone technology allows users to develop individual relationships with available Internet materials; mobile learning serves learners in a peculiar way. The educational experience becomes unforgettable as the technology links or relates the current information retrieved to the ancient information which the user already knows.

The use of smartphones by students will raise their interest. As such, they will wish to continue using the smartphone even for academic purposes. As the students continue to use their chat groups, they encourage and assist one another on the use of smartphones. The use of smartphones by students in a class will allow them to be in competition. As a result, they increase the chances of academic achievements. Students who may be having challenges in buying textbooks may

benefit because information and resources can now be shared through mobile phones. The sharing of information through social platforms motivates students while being interesting.

Jumoke et al. (2015) concede that in the classroom smartphones promote learner-centred participation as they inspire students to be more involved in the lecture. This shows the dynamic support brought by smartphones to the students' learning process. According to Deetz (1996), due to the fact that technology is perceived to reinforce students' inspirations and to validate the importance of learning to its outcomes, mobile learning can possibly have a direct positive influence on learning. Jumoke et al. (2015) concur and state that smartphones in education enhance the students' drive to learn, and they initiate the use of the device as a tool for learning.

With mass media, learners can improve their understanding because they can visualise, hear, and acquire knowledge in a more stimulating way. Mass media makes concepts clearer to students. It simplifies and it gives vividness for explanations. For example, the use of a dictionary on the smartphone as an essential classroom tool has capabilities beyond the paper dictionary. In addition to the definitions, there is a sign of a microphone on the screen; upon touching this sign, the device will read the word aloud. This helps the person who reads to hear the pronunciation of the word (Pilgrim et al., 2012a). Smartphone technology allows students to access resources and digital textbooks that contain interactive media and provide immediate feedback compared to opening a hard copy textbook for the class.

2.5.1.3 Collaboration

Pilgrim et al. (2012) state that, although the non-academic use of smartphones by students does exist, there are many opportunities presented by the use of smartphones which promote collaboration for educational purposes. Students engaged in collaborative learning grow advanced intellectual skills as they share knowledge among themselves as a way to achieve common learning goals (Wiest, 2016). When students access social network platforms such as Twitter and Facebook on their mobile phones they can create groups to share information with ease. They can also distribute and collate their knowledge. Collaborative efforts can yield better prospects for learners (Leeh, 2015).

Students share notes through WhatsApp groups. Each student can research on a different topic assigned by the teacher. In class, each student may make his or her presentation to the whole class. Students who face challenges in their research are able to consult with other students or to ask the help of the teacher through their social platforms such as Facebook or WhatsApp.

Collaborative learning can assist learners with high-learning achievements. Students are not limited by space and/or time as they are able to communicate with classmates on their social platforms at any time.

A study carried out by Jumoke et al. (2015), revealed that the use of smartphones can enhance the involvement of parents in the learning processes; thereby guiding their children's learning and capabilities. The participation of parents in the education of their children is most welcomed in most schools as it allows room for parents to monitor the teaching and learning of their children. It also allows time for parents to be close to their children and to understand their plight in education.

Students tend to be more involved in the processes of learning when mobile phones are integrated into a large classroom. As the new education curriculum begins to take shape in Zimbabwe, there is a provision that requires students to use mobile phones in some of their learning areas. Since it is a new venture, students are encouraged to collaborate with both parents and teachers and among themselves to achieve the intended goals.

Mass media, especially the Internet, has also become a well of knowledge. Most of the learning books and researches are available on the Internet for students to access. Students can also engage in e-learning and improve understanding of some topics in addition to attending lessons in class. Mass media brings the whole world to the classroom or to the individuals. It reinforces interpersonal communication and group dynamics through the use of smartphones.

2.5.1.4 Students' and teachers' engagement

A study carried out by West (2013) indicates that both students and teachers respond positively to the impact of learning using smartphones. The device encourages problem- solving and critical thinking as students take ownership of their personal learning and apply their intelligence to practical challenges. Students and their teachers can work as a group and share assignments, using short messaging or the infrared capabilities of a wireless network like Bluetooth. Teacher-student engagement improves communication, thereby allowing the students to seek guidance in times of need.

Students who rely on a smartphone in school can control the capabilities of the device and personalise their learning. In summary, smartphones help students to undertake research anytime

and anywhere they can receive reminders and alerts. They aid in collaboration with peers and teachers, organising their schoolwork assignments, and allowing them to access their school networks from home (Said et al., 2011).

2.5.1.5 Automated assessment

This is the use of smartphones to assess students, their progress, participation, and achievements in their learning processes. Automation of assessment on students reduces the workload on the teachers, giving them time for more effective teaching. According to Seppala and Alamaki (2003), students' assessment is a critical exercise in education as it is a valuable tool which measures the level of understanding of the students and their thinking. Teachers are able to assess their students even when at home, as long as they are connected through their smartphones. This method encourages students to work hard, knowing that their teachers will be assessing them at any time. This method is usually not being maximised, owing to the pressure of other processes and the demands it puts on time for script marking, records analysis, and producing reports by the teacher. The assessment covers a very broad class of systems, and it is applicable in principle to all knowledge domains (Bryman, 2001).

The process of automated assessment helps students to solve elaborative problem tasks by being given feedback on their mistakes. The teacher is able to give the feedback immediately, allowing the student to work on the corrections. Teachers can easily build new complex interaction with their students and be able to assist them in solving their problems in learning. The teacher proposes certain tasks to students even in chat groups or through students' emails, thereafter guiding, assessing, and providing feedback throughout the resolution process (Bryman, 2001). The automated process permits both the learner and the teacher to deal with all the tasks (basic and complex), while a simple structure is kept at the concept level. The use of smartphones in assessments allows the student to share their progress with their parents at home and be able to gain assistance from them. They can share amongst themselves their problem tasks. The process is an open system which helps to enhance learning to take place all the time.

2.5.1.6 Improved feedback

A platform for mobile learning provides feedback to the teacher, the learner, and the parent that is immediate. As teachers will be assessing the students, they can even give feedback to the

parents of the students using their smartphones. Feedback should be given to both parent and student. This will help the parent in areas they need to assist their children to improve in their academic performance. This encourages prompt correction of gaps, thereby encouraging better performance. Users of the smartphone can download applications, for immediate use. Applications are mini-software programmes that do not have to boot up. They provide information in seconds (Pilgrim et al., 2012a). Many of these apps could be beneficial for learners and educators.

Students can submit their assignments through the email to the teacher, gaining instant feedback. As students use smartphones at school and at home, feedback becomes a continuous process. Students, amongst themselves, share notes and assignments through their social communications before they even send their work to the teacher. This will encourage them to produce quality work before sending it for marking.

2.5.1.7 Challenges of using smartphones

The use of technology for learning has rapidly transformed teaching methods and the learning processes, as well as the way schools and institutions, spend their resources (Noor-Ul-Amin, 2013). The use of smartphones has grown widely in some secondary schools in Zimbabwe that participated as pilot schools for e-learning; so, the research relating to the use of these devices in secondary schools is long overdue. It makes no sense for people to assume that the use of smartphones in schools has no bearing on the academic growth of students. It is high time that researchers started to research the effects of the use of these devices from the primary level since these students are always interacting with the devices every day. The major questions should be: how effective is the use of such devices? What are the benefits, the costs, and the consequences, if we do not prioritise or fail to invest in technology in education?

Focusing on the gap that technology has restored, it must be distinguished that smartphones use is not envisioned to cause any adverse effects, yet, the time and attitude focused on these tools has incarcerated many students, often making them addicts (Ezemenaka, 2013). Again, there is a high temptation for learners to interact with their smartphone during the lessons in class, to either browse the Internet or respond to received messages. This can cost the student's level of concentration dedicated to the lectures. Therefore, the time that should be dedicated to studying and other beneficial academic endeavours is spent in dribs and drabs (Grosbeck, Bran, & Tiru, 2011).

Armstrong (2014) observed that, even though smartphones may originally motivate students to do their assignments, teachers should ensure that maximum benefits are derived from this technology, by monitoring their use. Research by Bull and McCormick (2012) argues that smartphone use encourages sedentary behaviour, and disrupts physical activities (Bull & McCormick, 2012). Lepp et al. (2015) concur with the above in part of their study which revealed that smartphone use may also interrupt behaviour conducive to academic accomplishment (Lepp, Barkley, & Karpinski, 2015). Current studies have established a negative association between the use of social media platforms on smartphones, for instance, MySpace, Twitter, Facebook, and academic performance (Chen & Denoyelles, 2013). The attitude and time channelled towards the use of smartphones have enslaved most of the students in schools making them addicts. A research made by the University of Navarra affirms that the teenage group admitted being addicted to their cell phones (Ezemenaka & ICT, 2013). The use of smartphones by students causes distraction; it pulls students away from their focus. The students' ability to focus and engage in the actual task at hand is disconcerting. Incorporating purposeful smartphone use into classroom activity can be especially challenging to students with low literacy skills and the frequent urge to multitask on social media or entertainment. In these instances, the potential advantage of the tool often goes to waste.

Several studies have demonstrated that the mere presence of a smartphone diminishes attention (Thornton, Faires, Robbins, & Rollins, 2014). High levels of smartphone use by teens often have proved to have a detrimental effect on achievement, because the ways in which they use their phones is dominated by entertainment and not learning applications.

Naismith et al. (2005) highlighted some problems faced when implementing smartphone technology in education, such as mobility, insecurity, ownership, technical challenges, affordability, acceptability; character, health, and addiction challenges.

2.5.1.8 Mobility

The anywhere, anytime abilities of smartphone devices permit learning experiences beyond an environment that is teacher-managed, leading to abuse of Facebook, YouTube, WhatsApp, Skype, even to watching pornographic videos (MacCallum & Jeffrey, 2009). The situation can get worse owing to the ignorance and irresponsible attitudes of some of the parents who are careless about their teenagers' challenges and needs. In addition, guidance and counselling services are sometimes not there or are not active in most schools, and the schoolteachers are not serving the situation. These students should be given guidance as they interact with technology

every day.

The Zimbabwean legislators questioned the Minister of Primary and Secondary Education on how teachers can monitor students if they can use smartphones anywhere and anytime. They argued that this can strain the teachers, who will have to work overtime in trying to help students. Technology development seems to be very fast-paced, and yet some of our students are failing to catch up with it, leading to many challenges. The other contributing factor is the ignorance of some institutions who do not wish to move with the times. Leaders of institutions should always keep pace with the changing times.

2.5.1.9 Insecurity

The usage of the wireless Internet with lack of supervision may entice the learners to access undesirable material, such as pornographic pictures and videos, or join bad groups which might threaten the safety of the learners. According to Naismith, Sharples and Ting (2005), the prevalent kidnapping cases and the publicised Nigerian students' death prompted social media use clearly underlines the grave dangers that careless students can get exposed to at the hands of the abusers of technology (Naismith et al., 2005). In Zimbabwe, technology has been used to discuss and share issues of politics; and, as such, communication of that category is not beneficial to students who may be used by politicians to spread important and confidential information.

Owing to growth in Internet use and development of smartphone technology, everyone is now affected in one way or the other by cyber-security threats. An outbreak in one country can spread to other countries. Threats can come from numerous sources, starting with corrupt employees, competitors in business, hackers, and illicit groups, to external territories involved in information warfare and espionage. These sources vary depending on the actors' capabilities, their motives, and their willingness to act, which ranges from monetary gains to political advantage, among others. Students can be easy targets, as criminals take advantage of their vulnerability. Other potential offences committed under cybercrime include: illegally accessing a device, interfering with data, sharing access codes, altering or destroying a password or PIN code, data espionage, and computer-related forgery. There are also some computer-related terrorism activities, pornography, identity theft, racist/xenophobic/tribalism insults, spam, and online harassment among other issues.

2.5.1.10 Ownership

One of the important considerations for smartphone use is the ownership of the device (Osang,

Ngole, & Tsuma, 2013). According to MacCallum & Jeffrey (2009), there are some physical and non-physical benefits that accumulate through the usage of mobile phones. One of the non-physical benefits is having a sense of ownership of the device (Naismith, Sharples, Vavoula, & Lonsdale, 2004). One important question is: who provides the devices; students or schools? Therefore, if the institution is the one that provides the smartphone, the students may not handle such devices with as much care as they would their own property. If smartphones are bought by the school, this means that there is a limitation on the use of smartphones at home, since these devices will be secured at school.

One major disadvantage is that some students do not have their own smartphone devices. Smartphones that are more durable are expensive, to the extent that some families may be unable to afford the device required for learning purposes. Teachers may be concerned that some students who do not have smartphones will feel out of place and fail to be connected with other peers. This problem can only be circumvented by way of collaborative learning groups.

2.5.1.11 Technical challenges

Lack of technical support, software, funding, bandwidth, mobile devices, institutional policies and teacher acceptance, are some of the reasons why many students are failing to use smartphone technology at school more often (Armstrong, 2014). Since students are allowed to acquire various types of smartphones for use at school, there may be issues with maintenance and implementation costs, instructional differences, device limitations, training, security, and safety. There are many types of smartphone that may be bought by students; however, some of these devices are not durable, and others are not suitable for learning. Some smartphones cannot access certain applications needed for research, and others have small memories so that students are not able to store enough information after research.

Readers may assume that students walking about with smartphones in their hands know everything; and yet, many of them need assistance even to use their devices routinely. Teachers and parents should not be ignorant of the needs of their students and children. Some smartphones can be so advanced that students may face challenges in using them. Challenges can also arise when students start to compare their devices (Armstrong, 2014).

Some of the devices that parents buy for their children are so expensive that students are not allowed to take them to school, fearing that they might be stolen. Besides the issue of theft, some

of the gadgets are expensive to repair if they are damaged. Some parents are so particular that they will not allow their children to use their smartphones without giving them the go-ahead. With the tasks that students are given in different subjects that require a lot of commitment and hard work, such students will be left behind.

2.5.1.12 Affordability

Cost of smartphones may be understood from diverse perceptions starting from the price of the infrastructure to the cost of technology i.e. programmes used to develop the mobile-based system. Smartphone use normally comes with a regular charge, for example, the data plan. A student may own a smartphone, yet fail to pay for enough airtime or data bundles to access the Internet, especially at home. The cost of smartphones will create unnecessary competition among students. Students come from different backgrounds. Some students cannot even afford to purchase a smartphone, let alone have facilities like Wi-Fi to access the Internet as and when needed.

2.5.1.12 Acceptability

Another critical issue in determining the success of the implementation of the mobile learning is the teacher's and students' willingness to adopt the technology. Some of the studies discovered that some learners are not ready to completely transfer into the mobile space for their academic work (MacCallum & Jeffrey, 2009). Most students use smartphones mainly for social activities like, chatting with family and friends online, watching videos and playing music, that has nothing to do with learning.

When I analysed the issue of smartphones from media reports in Zimbabwe, I observed that, although there is general acceptability of the use of smartphones by students in some sectors, the government has not yet delivered a policy relating to the use of smartphones in the primary and secondary education system. Some parents and some school authorities still have a negative perception about children having to use smartphones for academic purposes. Some teachers also have challenges in using modern technologies in teaching; therefore, the use of smartphones may not be readily acceptable to them.

When teachers and learners fail to use the technology or become ignorant of it, then the acceptance of smartphones in teaching and learning will become a challenge or will not be accepted. The use of these devices will need the buy-in of the users for them to be acceptable and to become usable in secondary schools. Teachers and students play a pivotal role in the

smartphones' effective utilisation both in secondary schools and at home.

2.5.1.13 Character challenges

Good character is what all parents aspire to inculcate in their children as they grow and become educated. Makuvaza (1996) claims that today's education and training is now producing educated but uneducated professionals; uneducated in the sense that they lack unhu / Ubuntu, which is the character. Thus unhu / ubuntu means personhood, which is derived from one's historicity and rooted in an ongoing human community (Wood & Roach, 1999). "The English word 'character' comes from the Greek word Charassein; which means 'to engrave', such as on a wax tablet, a gemstone, or a metal surface" (Said et al., 2011). The meaning of character evolved from that root as a typical mark or symbol. The origin of character grew as a distinct pattern of behaviour; "a moral constitution" (Higgins- D'Alessandro, Corrigan, & Brown, 2012). Use of smartphone technology to access mass media is perceived to negatively influence the behaviour of some of the students as they try to emulate what they view on various media platforms.

A strong personal character normally manifests itself in service to communities and organisations, and in courage in public life. The crisis of moral decadence being experienced currently is an indication that more and more people lack the liberating self-mastery that enables them to serve and commit with integrity and independence befitting a free people (Blass, 2004). Any individual's character reflects a moral constitution or pattern of behaviour. Moral constitution develops from observing those around, such as; parents, relatives, teachers, coaches, and neighbours. Mass media can also present to a student certain role models for him/her to copy or imitate. Some of these role models may be questionable characters which corrupt children's behaviour. Children's character also develops through the study and use of the people as they refine their logical responses to thoughts and ideas that constitute their moral roadmaps. Their character is moulded by how and what they offer to others, together with how they assist others at school and in their communities.

According to Aristotle, a good character is defined as a life of right conduct (Ruitenberg, 2011). He further reminds readers that a virtuous life comprises self-oriented qualities, such as moderation and self-control; together with other-oriented virtues like compassion and generosity. African traditional aspects of character education include etiquette, good ethical behaviour, respect for and obedience to elders, courtesy, community, and social traits peculiar to their families. On the other hand, Western aspects are focused more on the issue of human rights,

religious and moral education, sharing and citizenship.

It is not easy to develop conditions that promote the development of good moral values in children. It demands that everyone within the community and the school puts a sober and sustained effort to model, help and teach children to develop the intellectual, social, and moral habits that are critical in growing and leading a decent lifestyle (Lickona, 2009). Lickona (2009) further argues that schools will need to consider the curriculum, and more importantly how children are taught, and how they learn the curriculum within their scope. Of importance is also the need to study the supporting role of the community in the efforts of the schools and to develop strategies that encourage the moral growth and awareness among the children within community organisations.

History has it that, since the time of the Greek philosophers such as Aristotle, Plato, Socrates, and the Stoics, character development has been at the heart of education (Makuvaza, 1996). In Zimbabwean formal schools, there has never before been a greater educational need, emphasis, and serious attempt to address the problems of immorality, violence, deviance, misconduct, and suicide, to mention but a few modern ills. Rau, Gao and Wu (2008) agree that students who use technology (including smartphones) are influenced by their attitude, behaviour, and class achievements. Students who use smartphones are being influenced in their character, some negatively, others positively (Kennedy et al., 2008).

Media effects are observed on the behaviour displayed by students. Acts of violence or mischief appear to be copied from media watching, or stimulated by what people view in the movies. Rabiou et al. (2016) admit that the Internet has exposed many young people to various kinds of content. The accessibility of numerous types of inexpensive and affordable Android mobile phones has enabled adolescents to access various social media platforms and pornographic sites (Rabiou et al., 2016). Through these sites, they download, watch, and exchange pornographic films of various sexual orientations globally. This has greatly compromised the character of students, who often practise what they see on these media platforms.

It is my understanding that students who use smartphones for academic purposes should be moulded in such a way that they maintain their character, despite the fact that they are exposed to various sources of undesirable information through the use of smartphones. An encouraging classroom setting is important for nurturing enthusiasm in students. Research has shown that a

learner-centred environment yields improved performance which can assist students in their character development. Use of smartphones by secondary school students in their academic achievements should not be an excuse for wayward behaviour.

In light of the current developments perceived to be caused by the use of smartphone technology, schools should teach character education to counteract the negative effects mass media can have on the character of students. According to Howard (2004), character education can be described as the teaching of children in a way that helps them develop various aspects of moral and social behaviour acceptable in the community. According to Elias (2006), character education is a nationwide program to produce schools that cultivate young people who are caring, responsible, and ethical, by moulding and teaching good character. In support of the above, Shriver and Wissberg (2005) state that character education is purposeful and must be modelled and taught, focused on core values, goal-driven, being centred on both character and academics, and must be inclusive of the school's entire educational programme (Willis, 1995).

Some concepts under character education include ethical reasoning, emotional learning, critical thinking, violence prevention, cognitive development, life-skills education, conflict resolution, and health education (Howard et al., 2004). Therefore, the emphasis is on common values such as responsibility, civility, respect, fairness, compassion, honesty, courage, and kindness (Anzul, Ely, Freidman, Garner, & McCormack-Steinmetz, 2003). Thus, the objective of character education is to assist students to develop academically, ethically and socially, by infusing character development into the school culture and curriculum. My understanding of the above assertion is that character education should be the deliberate effort by all stakeholders, such as parents, teachers, community, and the children, to cultivate good virtues for the society and individuals.

2.5.1.13 Health and addiction

Some researchers claim that smartphones share some common health effects caused by continuous use of the device over a long period of time. The major side effects include; headaches, followed by irritability, and lack of attention to daily living activities (Rajesh et al., 2015). The overuse of mobile phones will cause users to be anxious because of the flow of news that they receive, subsequently leading to eye strain, and possibly loss of appetite. Overuse can make users feel tired, suffer the loss of hearing from continuous calls, and suffer other problems like lack of sleep, limb pain, neck pain, being otherwise indisposed, and subsequently lead to

addiction. The issue of health should not be undermined, and over-concentration on the screen of the smartphone can affect one's eyes, leading to blindness.

While investigations are scanty on addictions to these new technologies and especially as it relates to the abuse of cell-phones, a research by Naval et al. (2004) affirms that young people between the ages of fifteen and nineteen admit to being addicted to their cell-phones. Specialists specify that cell-phone abuse could be characterised as a condition of addiction which must be stopped without delay (De La Puente et al., 2007). Research by some psychologists in the Media System Dependency theory also suggests that addiction to smartphones has negative effects on the health of a student (De La Puente et al., 2007). According to Rosen et al. (2013) and Anderson et al. (2012), addiction to smartphones can lead to poor sleep, anxiety, and depression (Rosen, Whaling, Rab, Carrier, & Cheever, 2013). According to De La Puente et al. (2007), recent studies show that addicts display withdrawal syndrome that is both psychological and physical after they stop using their cell-phones. This syndrome is characterised by observable symptoms of anxiety, anguish, irritability, nervousness, inter alia. These symptoms disappear after the addict has access to the phone once more. The victim also displays challenges of isolation, low self-esteem, insecurity, problems in relating to others, and other emotional challenges (Ezemenaka, 2013). Research carried out in Tanzania indicates that smartphone abuse and addiction among students is becoming more problematic nowadays. This is because most students, both in higher-level (colleges and universities) and low-level learning institutions are more addicted to smartphone applications because they can download numerous applications and run them with smartphones even in the absence of Internet connection (Kibona & Mgaya, 2015).

Brody (1990), however, postulates that accessing pornographic material or other sites that cause addiction is not the fault of the Internet, but it is because of the mentality of the student which is corrupt. Parents should train their children to shun bad material. In support of the use of smartphone technology in Zimbabwean schools, the former Education Minister, Dr. Lazarus Dokora, reiterated that there would be no opportunity for students to access pornographic sites or other questionable material during learning periods because teachers would give them Internet access codes and monitor any signs of abuse. According to him, every teacher who gives students an assignment on Google will give them an access code, and all pornographic sites will be blocked. At the end of each day, the teacher will have a profile of what all the individual students have been doing. Any attempt by the student to go on pornographic sites can be detected and may be reported to the parents.

Teachers can use certain applications which assist them in controlling what learners can see on their screens. An example of such products is called Nearpod (Frontiera, 2013). Nearpod is an application that offers some powerful functionality in one combined platform that can link students to content and to peers. Nearpod enables teachers to produce multimedia presentations with features that are interactive while controlling the actions with the school's mobile application. Students are able to receive assignments or class tests on their mobile phones, submit their answers, and the teacher will be controlling the progression of the lesson, monitoring classroom activity, and determining the students' outcomes on an aggregate and individual basis (Armstrong, 2014).

Armstrong (2014) recommends one other Software for tablets and smartphones called 'Lan-School', which is suitable for classroom management. This system helps teachers curb distractions and abuse. However, students who use their own smartphones, it may be difficult for teachers to have control of such devices; therefore, such students risk the negative impact of these digital tools. The software can send messages to students; blackout offensive or distracting screens, restrict students on what they can and cannot do; and allow individualised, silent help sessions. These products are envisioned to restore the control that is feared to have been surrendered through the use of mobile devices (Armstrong, 2014).

It is hoped that if students, parents, teachers, and school administrators are furnished with adequate information and awareness on the responsible use of smartphones, students and academic institutions will realise the vast untapped potential provided by the use of smartphones in extending teaching and learning processes of students (Wiest, 2016). Similarly, Osang et al. (2013) state that policymakers should get appropriate advice on the parameters that should not be overlooked in the design and updating of existing and new ways of learning by students as they use smartphones (Osang et al., 2013). The literature review has revealed the need for all stakeholders who are involved in the education of students to consider the use of technology in teaching and learning processes using devices such as smartphones.

The literature review has revealed that studies on the academic use of smartphones were conducted in many countries revealing the various contextual benefits and challenges of using the device. However, it may be seen that there is insufficient information available on the academic use of smartphones in the setting of Zimbabwean education. Therefore, this study aimed

at closing this information gap regarding the effectiveness of using the smartphone as a learning tool.

2.6 Theoretical framework

A theoretical framework is a plan that can support a research theory. It describes the theory that clarifies the existence of research problem under study (Labaree, 2009). A theoretical framework comprises of the existing theory, concepts, and their definitions, and reference to academic literature relevant for use in a particular study (Gbande & Akuhwa, 2015). Therefore, a theoretical framework should exhibit an understanding of the concepts and theories appropriate to the topic of the research, and connect with the wider areas of facts being studied (Labaree, 2009). It is, however not something often readily available in the literature. One must read related studies for analytic models and theories, and review course readings relevant to the research problem being investigated (<https://www.coursehero.com>). The selection of a theoretical framework largely depends on its explanatory power, its applicability, and its appropriateness (Labaree, 2009).

2.6.1 Significance of a theoretical framework

A theoretical framework focuses on specific variables relating to a particular study, thereby limiting the scope of the relevant data. It defines the specific viewpoint to be taken by researchers during the analysis and interpretation of the data to be produced. It also enhances the appreciation of variables and concepts based on the definitions given, and it shapes new facts by challenging or validating assumptions of a theoretical framework (Swanson & Chermack, 2013). According to Torraco (1997), a theoretical framework supports the study as follows: it allows the reader to critically assess the theoretical assumptions and links the researcher to available knowledge. The researcher can intellectually shift from merely defining the phenomenon that has been observed, to take a broad view of the various aspects of that phenomenon. It also helps me to identify the limits to those generalisations (Labaree, 2009).

A theory, on the other hand, is a principle that is well-established and has been developed to describe certain aspects of a phenomenon (Rutherford & Williams, 2016). It is a conceptual foundation for designing, appreciating, and analysing ways to study relations inside social settings (Abend, 2008). A theory arises from repetitive observations and testing. It integrates laws, facts, predictions, and the widely accepted norms that have been tested (Labaree, 2009). Theories are therefore formulated to understand, explain, and predict a phenomenon. Theories also test and spread available facts within the confines of critical assumptions (Ngulube, Mathipa,

& Gumbo, 2015).

Theories can help guide the development of a research framework in several ways. A theory allows fresh research data to be coded and interpreted for use in the future. It is the means for defining or identifying research problems and evaluating or prescribing solutions to those problems (Abend, 2008). A theory provides ways of discriminating certain facts from the accumulated knowledge. It separates those facts that are important from those which are not. It can also present a way of giving new meaning and new interpretations to old data. It assists in identifying new issues that are significant, prescribing the most important questions of the research that must be capitalised on to enhance the appreciation of the matter (Abend, 2008). A theory informs and guides research which subsequently guides the efforts of the research and enhances the professional practice. Good theories fulfil the primary purpose of research. They explain the nature, meanings, and challenges relating to a phenomenon. The researcher can act in a more effective and informed way using that knowledge to (Torraco, 1997).

The work of researchers is based on certain theoretical perceptions. A study may be founded on one or more theories and this is dependent upon the nature of the work being carried out by the researchers (Thomas, 2010). To fully answer the key research questions, this study has drawn from a theoretical lens – the Actor-Network Theory. The aspect of an actor in the phrase ‘actor-network’ is not the basis of an action; instead, it is the target of a wide collection of objects heading in its path (Latour, 2005). The word actor may be used to denote a machine, a microbe, a meteorological system, or a person (Whittle & Spicer, 2008). According to Law (1992), an actor can be described as an effect formed by or a patterned network of heterogeneous relations. The belief of actor networks proposes that what looks like an observer or an actor, could otherwise be the whole network (Czarniawska, 2006). An actor-network includes the participation of both non-human and human elements in its network. This is done using translation and negotiation procedures (Hassard, Law, & Lee, 1999).

2.6.2 Actor-Network Theory

The Actor-Network Theory originated from the works of such scholars as Latour (1992), Michel Callon (1986), Bruno and the sociologist John Law (1987) (Latour, 2005). Latour (2005) affirms that the Actor-Network Theory is inspired by phenomenology, structuralism /semiotic and ethnographic methodology. ANT as an approach is founded on the need to create a social theory that is new and accustomed to science and technology studies (Montenegro & Bulgacov, 2014).

It is a socio-philosophical theory where material and human factors gather together in the same exploratory view (Latour, 2005). Latour (2005) concurs, by stating that students ought to make technology compatible with the social sciences. Hence, ANT is not simply a social theory, but it is a theory that scrutinises how a social phenomenon can be studied (Czarniawska, 2006). This approach originated from science studies and employs a material-semiotic method (Makori, 2016). It, therefore, identifies how people (called actors), artefacts, and objects combine into assemblages or actors networks and work collectively (Jubien, 2013b). The ANT shows how items are either absorbed into or left out of networks. It also shows how some of the connections work and while others fail, and how some networks can be reinforced to make them strong and more stable by linking to other items and networks (Jubien, 2015). In support of the above assertion, Whittle and Spicer (2008) state that the ANT is a suitable philosophy to appreciate how actors are combined, how objects and artefacts facilitate organised actions, and how to construct allegations of truth.

The theory offers important insights into the processes and objectives of education and how students can achieve academic excellence. The smartphone is a recent addition to technology in schools, colleges, and universities. It has applications that are educational and non- educational. In support of the interpretive paradigm, the Actor-Network Theory is also concerned with the morality of students, for example, those students who watch pornographic videos on smartphones. This study, therefore, explores the academic use of smartphones in secondary schools, using ideas from the ANT (Jubien, 2013a).

The theoretical underpinnings of this approach include the following tenets:

1. The Actor-Network Theory explores how the relationship between people, objects, and concepts are created, rather than why they are created (Jubien, 2013b).
2. People do not exist in a vacuum: any act in the world is influenced by various factors, and these create a network
3. Material objects facilitate interpersonal interactions; affect individual actions and behaviour, and define relationships and context (Makori, 2016).
4. The ANT states the durability of some materials. Some components of the network are tougher than others, thereby maintaining relational patterns that are long-lived.
5. Accessing and gathering information through the use of smartphones will help students to explore new knowledge that will enhance their academic achievements.
6. The ANT provides important insights into the processes and objectives of education (Jubien, 2013b).

7. Humans and non-human objects are equally significant, so one should not be prioritised over the other (Fenwick & Edwards, 2011).

Despite the popularity of ANT, it is still considered a controversial approach, both for encouraging a sociological method that seems to lack practical political critique and for insisting on the agency of non-humans (Alcadipani & Hassard, 2009). It has also been subject to such criticism that it neglects issues of morality and political bias; it offers an inadequate analysis of social structures; it has challenges in studying how to track objects in the analysis of the network; and it fails to adequately conceptualise the difference between non-humans and humans (Chris McLean & Hassard, 2004). However, some scholars recommend ultimately that the Actor-Network Theory may be valuable in raising a critical perception of the organisation(s) as a political ontology of organising (Grey, 2007).

One important characteristic of ANT studies is their ability to provide massive descriptions of the numerous actor-networks that are formed. They generally explain the pedagogy or work taking place inside their networks (Whittle & Spicer, 2008). The Actor-Network Theory explores how relations between people, objects, and concepts are shaped. It does not explain why the relationship is formed. It also does not focus on meanings of texts and other objects, but on what the objects do, in relationship to other non-human and human things. Latour (2005) recommends that, if an investigation chose to use ANT, it should be as innovative as possible and, follow the actors themselves. This will allow researchers, through the actors, to study what the joint existence grow into their hands. The theory further elaborates that people, who are the custodians of education, do not live in a vacuum, hence the use of smartphones to enhance academic performance is paramount. According to this theory, accessing and gathering of information through the use of smartphones will help students to explore new knowledge that will enhance their learning processes. The use of smartphones in ANT will also assist students to collaborate with other students, thereby sharing different experiences and knowledge that may even improve their performance both at school and outside school (Jubien, 2013b). Generally, the value of smartphones in ANT is that they enable learners to create, collaborate, connect, and communicate using rich digital resources. According to West (2013), as smartphones become affordable and more prevalent, mobile technology can enhance learning by bringing digital information to the learners.

Another important advantage of using the ANT is that it gives the chance of examining and reflecting on various pedagogical practices (Jubien, 2015). The word practice generally denotes

the number of activities. Some of the practices that appeared in this study include; information gathering, getting feedback from teachers, and collaboration of students with their peers through the use of a smartphone. The focus of ANT on practice reminds researchers that pedagogical practices emerge through the interactions of technology and humans, and does not exist autonomously before objects and humans but overlaps (Jubien, 2015); (Colley & Guéry, 2015). The ANT's analysis emphasises how various non-human and human objects come to associate, be assembled, exercise force, and either decline or persist. The ANT offers significant insights into the objects and processes of education. It is not useful as a theoretical technology, rather, it is similar to a sensibility; a means of sensing and drawing an occurrence. The aim is to appreciate how actors connect or come together, manage to maintain the connection and to bring together networks or collectives that yield force and other effects. The effects include personalities, knowledge, policies, curricula, behaviours, routines, innovations, oppression, and the reform of ills. The ANT helps researchers to ask questions such as: What are the various types of associations and connections formed between things? What are the different qualities and kinds of networks formed as a result of these relations? (Jubien, 2015).

The actor networks intersect and overlap, and some portions of the network work cooperatively, providing permanency, while others work against each other, triggering network tension and breakages. The ANT is more concerned with the collections of these players into networks and the result that is achieved through these networks (Jubien, 2013a). Law (1992) recommends that the task of ANT should be to characterise social linkages in their heterogeneity, discovering how they are organised according to the designs, so as to generate effects such as power, inequalities, and organisations. The theory has three components: heterogeneous networks, network consolidation, and network ordering (Mbaya, 2016; Yin, 2009).

2.6.2.1 Heterogeneous network

The ANT argues that people, politics, technologies, organisations, nature, and social order(s), are the effect, or the result of networks that are heterogeneous (Cressman, 2009). A heterogeneous network suggests that facts are a social result, instead of the product of privileged scientific methods which take on many forms emerging from networks. Researchers indicate that science takes parts of the conceptual, textual, social, and technical, which transforms them into heterogeneous scientific products (Yin, 2009). Social networks are more than simply the people. Material objects facilitate interpersonal connections in these networks. They define context and relationships, affecting individual behaviours and actions. In this research, the smartphone is considered the material object that mediates the interpersonal interactions among students as they

use it as a learning tool.

2.6.2.2 Network consolidation

Network consolidation suggests that a network can be enormously complex; therefore, being completely conscious of the entire network around us is unfeasible. Some networks are not noticeable until they collapse; humans combine networks in order to simplify the world around them (Yin, 2009). The network may fail if resistance is encountered. In this study, I am aware that the academic use of smartphones among secondary-school pupils brings with it a complex network, which involves many actors within the teaching and learning environment. Many actors are involved, and these may include the smartphone, the student, the teachers, the parents, fellow students, the teaching and learning methods, and the school environment, *inter alia*. These networks have been consolidated so that they may look like single-point actors. In fact, I am able to talk of ‘academic use of smartphones by secondary school students’ rather than all the various particulars that make it up. Therefore, the consolidation of these networks has simplified the network, allowing the research to be carried out without much complexity.

2.6.2.3 Network ordering

Network ordering grants that the effects of power, order, and organisation often originate from ‘punctualised’ actors. The process of ‘punctualisation’ changes a whole network into a single point (Cressman, 2009). ANT considers how components in organisations and actors are mobilised and managed, how ‘punctualisation’ and translation occur unnoticed, and how resistance is handled (Yin, 2009). According to Law (2000), some materials in ANT are stronger than others, and consequently maintain long-lasting relational patterns (Law, 2000). Use of durable materials to represent relations guarantees good ordering. The effects of the material can be dependent on the network that it occupies. In this research, the students and the smartphones actors have formed a social ordering. The rigidity or fluidity of the structure of this network depends on durability and the specifications of the smartphone. Some smartphones have all the required applications for students to use for academic purposes, hence maintain a more rigid network and lasting relationship than those which are less durable and lack some important applications required by the students.

2.7 Summary

This chapter has presented a detailed description of the smartphone, and its capabilities compared with other mobile phones, iPads, laptops, and computers. It has represented mass media and

technology as critical factors influencing educational processes today, globally. An in-depth exposé of smartphone technology was made, which distinguishes its functions from other mobile phones and computers/laptops. Academic achievement was defined as one measure that could be used to indicate the effectiveness of smartphone use in education; although it should be noted that academic achievement is influenced by many other processes. This chapter also gave an overview of the role played by mass media in education and raised the need for the education curriculum to consider the teaching of media literacy to evade any negative effects perceived in the use of media and technology among students. It also revealed the level of adoption of smartphone technology in the education sector and highlighted the need for the Zimbabwean education system to embrace smartphone technology in line with the demands of the country's newly introduced education curriculum. The chapter also gave a critical exposé of the advantages and disadvantages associated with the use of smartphone technology, so as to maximising the benefits and evading the negative effects of this technology. An outline of the significance of a theoretical framework in any research was given, and the chapter was concluded with an account of the theoretical framework; the Actor-Network Theory as the appropriate framework which was adopted for use in this research..

CHAPTER THREE

Research methodology and design

3.0 Introduction

Research methodology is an organised approach to solving the problem of a research (Kothari, 2010). It is the overall approach to the processes of a research, ranging from the underpinnings of a theoretical framework to data gathering and analysis. Thus, it encompasses the strategy, plan of action, processes or designs. Methodology, therefore, refers to the inter-relationship that exists between the theory, the methods, data, and the phenomenon under study (Ahmed et al., 2016). It is a road map that provides directives and a clear vision of how the research is to be carried out (Saunders & Lewis, 2012).

Every kind of a study is instituted on some basic theoretical traditions about what a valid research is made up of. In this chapter, the research paradigms and the research design strategies that underpin this study will be discussed. These philosophical assumptions dictate the research methods appropriate for the expansion of knowledge in any given study. Therefore, it is important for a researcher to be acquainted with these assumptions for the success of a research. Three common philosophical assumptions are presented and reviewed, and the interpretive paradigm is identified as the suitable philosophical assumption for this study.

The Actor-Network Theory is considered the most suitable theoretical framework for this research. This theoretical framework explores the relationship between the objects and people and emphasises that they interact with the environment around them. The principles from ANT have assisted in the answering of the research questions. The research methods and research design used in this study were also discussed; including the research strategies, data production instruments, and methods of data generation and analysis.

A qualitative method was identified as the appropriate data-production technique for this study and is discussed in detail as the main data-generation procedure. This chapter also highlights five qualitative research designs and identifies the case study as a suitable design for this research. This study has employed multiple tools of data generation to determine the findings on the use of smartphones by students as they use the devices in their learning processes. The four methods employed are questionnaires, observation schedule, semi-structured in-depth interviews, and documents or reports. In this research, semi-structured in-depth interviews greatly extended the

data production process and the depth of information generated from the participants.

Issues of credibility, trustworthiness, confirmability, dependability, transferability, triangulation, neutrality, consistency, and applicability are discussed and considered essential criteria for quality results. Similarly, this research has considered ethical matters: appropriate action was taken to observe stringent ethical procedures with the intention of maintaining anonymity, dignity, privacy, rights and confidentiality of the participants.

3.1 Research Paradigm

A research paradigm is a key component of a research methodology as it guides the researcher in conducting the study in a more effective way and to produce data in a manner that is appropriate. A research paradigm comprises the research philosophies and research methods. This union has helped me to develop the knowledge and understanding of the academic use of smartphones among secondary school students. A paradigm is a comprehensive philosophical alignment to facts and it directs the design of the research (Neuman, 2006). Paradigm is a word that was derived from the Greek word *paradeiknyai*. According to Neuman (2006), it means showing side by side. It is an example of an outline of something. A paradigm is a set of fundamental theories representing worldviews which explain the world's nature and the conceivable associations to that world and its components. Henning, Van Rensburg and Smith (2004) concluded that a paradigm is a foundation on which ideas are constructed. It inspires how the world phenomenon is viewed, governs the perspectives, and shapes the appreciation of how things are related (Henning, Van Rensburg, & Smit, 2004). Therefore, a paradigm is a framework, outline, pattern, or system of academic and scientific assumptions, principles, and ideas (Olsen et al., 1992).

Holding a specific worldview affects one's professional practice, individual behaviour, and eventually, the view one takes in relation to the subject of one's research. According to Neuman (2013), the fundamental beliefs defining a specific research paradigm can be summed up by the answers given to the three basic inquiries namely; the ontological question, the epistemological question, and the methodological question. Ontology denotes a philosophical branch that articulates the structure and nature of world phenomena (Wand & Weber, 1993). It stipulates the nature and form of facts and all that could be acknowledged about it. Therefore, the ontological question underlines the nature and form of reality. On the other hand, the epistemological question lays emphasis on the fundamental beliefs about knowledge or the nature of knowledge (Bunniss & Kelly, 2010). The methodological question focuses on how the research can go about finding

out knowledge, conducting research using a strategic approach. In other words, it focuses on the related research methods and the nature of that research for each of these perspectives. According to scholars, the responses to these three questions provide a framework that will guide the whole process of research including the approaches, analysis, and strategies (Antwi & Hamza, 2015).

Guba (1981), advises that when selecting the methodology of a study, it is important to choose the paradigm with the expectations that are best fulfilled by the phenomenon under study (Mthembu, 2011). This research is about students' education and the effective academic use of smartphones as they enhance the learning processes in Zimbabwean secondary schools. This phenomenon can best be studied using an interpretive paradigm.

3.1.1 Examples of research paradigms

Newman (2000) identified four research paradigms, namely, positivist, interpretive, social research, and critical social research. These paradigms may be used in the arena of social research. These research paradigms may be suitable in certain circumstances but overly complex or insufficient for other purposes (Terre Blanche & Durrheim, 1999). Research paradigms logically express our convictions regarding the setting we live in or need to live in. Guba and Lincoln (1994) distinguish enquiries of post-modernist, positivist, and post-positivist based on this belief, grouping post-modernism and post-structuralism under the critical theory. Realism is the nature of reality assumed by positivism, they believe in the existence of reality. On the other hand, post-positivism believes that this reality is only probabilistically and imperfectly apprehended (Guba & Lincoln, 1994). Guba and Lincoln (1994), state that although post-positivism and positivism are both objectivists, post-positivism is regarded as a variant of the former positivism.

3.1.1.1 Positivist paradigm

The philosophical notions of August Comte, the French philosopher form the basis of the positivist paradigm and, explores social reality (Henning et al., 2004). In addition, the positivist paradigm is believed to have originated from the works of Descartes. Others have traced the views of positivists back to Galileo. Nevertheless, they all share the same views on knowing reality (Bryman, 2004). Auguste Comte states that observing and reasoning are the best methods for comprehending the behaviour of humans. Truthful knowledge is founded on the practice of senses and may be attained by experiment and observation (Antwi & Hamza, 2015). The theory provides an objective reality and researchers can ascertain truth and compare their claims. The fact that it heavily depends on manipulative and experimental methods, makes it suitable for quantitative

research methods but not qualitative research under investigation in this study (Creswell, 1998). Again, the positivist researchers see themselves as outsiders 'looking in' on the research (Angen, 2000). The positivist researchers take their position to be outside because researchers believe that they are separate and not related to the subject; with the aim of explaining, rather than understanding the processes. Therefore, in this research in which the researcher is considered an instrument, the positivist researcher is not accommodated. The paradigm also generalises issues, yet this research is not about generalisation (Angen, 2000).

3.1.1.2 Critical paradigm

The critical paradigm is a critique of culture and society which applies knowledge from the humanities and the social sciences, and it stresses the reflective assessments (Deetz, 1996). According to critical researchers, social reality is constituted historically. It is generated and regenerated by the people (Guanghua, 2009). It aims to unearth the assumptions of social life that keep people from a true and full understanding of the operations of the world. Consequently, the critical paradigm inspires instructional designers and evaluators to interrogate and appraise the underlying cultural, gender, and political assumptions for the instructional programmes or products that are effective (Dills & Romiszowski, 1997).

Critical methodology interrogates accepted injustices and discrimination and raises the awareness of participants. Theorists of the critical paradigm are worried about action more than discovery (Edge & Richards, 1998). They are not satisfied with the interaction, interdependence, and involvement of people with objects and processes only. In a critical paradigm, the reality is defined within a historical, economic, cultural and political context (Dammak, 2015). Students also need more than interaction and involvement. They need to be sensitised so that they begin to perceive relations in the classroom as problematic. The ability of students to critique is attained by helping students to critically analyse the gap between the targeted output and their performance. This paradigm was not adopted in this study because the study did not aim to uncover issues dealing with social justice and power.

3.1.1.3 Interpretive paradigm

This study has adopted the interpretive case study as a research design and is largely analysed using qualitative methods. According to Creswell (1998), Mogan (2007), and Angen (2000), the interpretive paradigm was established as a review of positivism and the social sciences. It shares the views about the nature of knowing the truth as follows: there is no separation of the subject

and the object; researchers are integral in all stages of the research processes, and the reality is conveyed through discussions. This implies that the researcher in the interpretive method is a participating observer who takes part in the events and determines the meanings of these activities as they are expressed within particular social settings (Henning et al., 2004). He/she does not stand outside or above. This makes the interpretive paradigm a suitable research design for this study, in which the researcher is also an instrument. Angen (2000) postulates that knowledge claims in the interpretive paradigm are developed as the investigation proceeds. Through dialogue, findings emerge and conflicting interpretations are always negotiated among the community members.

According to interpretive researchers, reality should consist of the subjective experiences of people's external world (Willis, 1995). Willis (1995) further states that an 'interpretivist' is an 'anti-foundationalist', who believes that there is no specific method or single precise path to knowledge. In the interpretive tradition, theories are judged on the basis of how thought-provoking they are to the interpreter and to those involved; there are no accurate or inaccurate concepts (Walsham, 1993). Instead, interpretivists derive their theories from the ground using an in-depth investigation of the phenomenon under study. According to Gephart (1999), an interpretivist assumes that facts and denotations are acts of interpretation, hence there is no objective knowledge is autonomous from human perceptive. Interpretive researchers believe that reality is only accessed by means of social structures such as consciousness, shared meanings, and language (Myers, 2013). The interpretive paradigm can be reinforced through observations and interpretations. Accordingly, to see is to collect data relating to certain actions and to interpret is to get some sense out of that data by determining the similarities between the presented data and some intelligent design or by making deductions (Antwi & Hamza, 2015).

Interpretivists attempt to appreciate a phenomenon using the implications assigned to them by people (Deetz, 1996). Reeves and Hedberg (2003), state that the interpretivist paradigm underscores the importance of putting analysis into context. It focuses on appreciating the world from individuals' distinctive experiences. Individual researchers use methods that are associated with meaning, such as participant observation or interviewing, that depends on the particular association between the subjects and the researcher, and not the measurement (Antwi & Hamza, 2015). This makes the interpretive paradigm a suitable design for this study, as it seeks to understand the academic use of the smartphone from the individual students' perspective, who have subjective experiences on the use of the technology.

Interpretive research does not pre-state variables to be independent or dependent. It emphasises on the complete involvement of human reasoning as the circumstances develop (Kaplan & Maxwell, 1994). It aims at describing the meanings and particular explanations that are underlying any social actions. This makes it a suitable theory to analyse the academic use of smartphones, this being a subjective topic: outcomes of this study depend on how well I, as the researcher, can derive meaning from the in-depth interviews conducted. The interpretivist is mainly interested in judging or evaluating, and refining interpretive theories and not generating a new theory (Antwi & Hamza, 2015). The interpretive case studies use theories in three different ways. Firstly, the theory is used to guide the research design and data generation procedure. Secondly, the theory is used as an iterative process of generating and analysing data; and lastly, the theory is used as a result of a case study (Walsham, 1993).

Interpretive researchers strongly emphasise on understanding the world better through quotations of actual conversation from insiders' perspectives or truthful reporting, and first-hand experience (Merriam, 1998), instead of examining the laws of human behaviour. As a result, they engage in methods of data production that are sensitive to contextual settings (Neuman & Kreuger, 2003). Interpretivists use purposeful sampling; contrary to positivists who rely on randomisation, and they select locations and individuals that are rich in information (Creswell, 2008). Researchers in the interpretive paradigm relies on various methods of generating qualitative data, like questionnaires and in-depth interviews, among others. These data-production techniques encourage participants to freely express their personal experiences and to understand the researcher's quest for insight into the phenomenon under study (Antwi & Hamza, 2015). This will produce a thick, detailed, and rich description of the social phenomenon.

The theoretical assumptions that lie behind this study come mainly from the interpretive paradigm. All interpretations in the interpretive paradigm are placed in a specific situation or context and time, and they are founded on a specific moment (Bryman, 2004). These interpretations are open to negotiation through conversation and re-interpretation. Table 3.2 shows the characteristics of the interpretivist, as they are applied in this research. They are classified into the purpose of the study, ontology (the nature of knowledge or the nature of reality), and epistemology (the association between the enquirer and the enquired-into), and the procedure used (Zheng, 2017).

Table 1: Characteristics of the interpretive paradigm

Feature	Description
Purpose of the study	In the interpretive paradigm, the purpose of the research is to appreciate the world from personal experiences. Similarly, this study is determined to explore the academic use of smartphones among students in secondary schools; and to view the perspectives of teachers and parents on using these devices in the learning processes.
Ontology	Ontology states that reality may be constructed or explored through meaningful actions and human interactions and that there are multiple realities. This research allowed for multiple realities by discovering how students make sense of their use of smartphone technology in school situations. This research takes cognisance of the existence of various social realities owing to varying human experience. This includes the students' knowledge, views, interpretations, and experiences.
Epistemology	Epistemology in the interpretive paradigm states that researchers can appreciate events through the interpretation which is directed by interacting with social settings. In other words, it suggests that reality is based on perceptions rather than objective truth and therefore discards absolute facts. Researchers socially construct reality by experiencing the natural settings or real-life (Thomas, 2010). Similarly, in this research, the enquirer (researcher) and the enquired-into (student participant) are linked in a collaborative process of reading, writing, listening and talking. This is a more personalised method of generating data that is employed in order to gain conclusions that are derived from the interpretations of the participants.
Methodology	Methodology in the interpretive paradigm states that research is an output of the researcher's values. The values of the researcher are determined by the processes of data generation. In this research observation schedules, questionnaires, semi-structured in-depth interviews, and documentation were employed as the data generation processes to ensure that credible results are obtained.

Adopted from (Thomas, 2010)

3.1 Actor-Network Theory: a theoretical framework

This research has adopted the theoretical lens of the Actor-Network Theory with the intention of

examining the key issues regarding the academic use of smartphone technology in education. The ANT is an appropriate approach for this research because it provides a means of studying objects and humans together, rather than studying them separately. Therefore, researchers engage the descriptive and analytical framework once they are confronted by a human, a machine, or a text that constitutes a network within an activity (Christine McLean & Quattrone, 2006). It also considers ways in which objects are used by humans in education (Sørensen, 2009). In this respect, the students may be studied together with their smartphones in the field of education.

It is a characteristic of human beings to imagine themselves as central in any network and to reduce non-human objects to the margins. Nevertheless, it is imperative for researchers to resist this inclination, and to adopt a comprehensive viewing platform in order to understand how technological actors that are non-human, and humans come together, socialise and breakdown in unstable and fluid networks. In this instance, humans and non-human objects are equally significant, and one should not be prioritised over the other (Fenwick & Edwards, 2011). ANT does not assert that objects act rather than human players. It basically infers that every social science should start with an enquiry into whom and what participants are in actions. ANT enlarges the list, adjusts the numbers and ways of combined participants, predicting an idea of how they act as a long-lasting component (Latour, 2005). Objects are critical for ANT researchers for being developing actors and for explaining the previously mentioned contrasting setup (Latour, 2005). According to some scholars, objects mediate all the interactions between human actors (Montenegro & Bulgacov, 2014).

3.2 Research Methods

A research method is an approach of an investigation which progresses from the basic assumptions to the design of the research and data generation (Myers, 2013). This research is of a qualitative nature and is founded on empirical and theoretical methodology. The review of journals, textbooks and various research studies provided secondary data, while individual in-depth interviews, questionnaires, observation schedules, and documents were the sources of primary data. Even though there may be other classifications in the methods of research, the most commonly known categorisation of research modes is either quantitative or qualitative (Ramukumba & Ferreira, 2016). Both quantitative and qualitative methods of research are employed in education and none of these approaches is essentially better when compared to the other. Suitability of each of these methods can be determined by the nature, purpose, and context of the research being undertaken. In reality, researchers can alternate from one method to the other dependent on the type of research. One may also choose to practice a mixed methods strategy. This strategy uses the benefits realised in the differences flanked by qualitative and

quantitative approaches (Bryman & Burgess, 1999). Such researchers combine the two approaches for use in one research project, depending on its methodological foundation and the type of study.

3.3.1 Quantitative research

Quantitative research makes use of experiments, questionnaires, and surveys to generate data that is tabulated and revised numerically. In this approach, data are characterised through the use of statistical methods of analysis (Hittleman & Simon, 1997). The three major drives of quantitative research are to define, compare, and attribute connection between variables. In quantitative research, variables are measured on a sample of objects or subjects, and researchers establish the association of these variables based on effect statistics such as correlations, differences between means, or relative frequencies. To a large extent, the focus of quantitative research is on the testing of theories (Antwi & Hamza, 2015). In quantitative a hypothesis should be formulated before the research begins, and it is deductive in nature (Thomas, 2010). In quantitative research, the researcher's role is that of an impartial observer and does not influence or participate in activities of the phenomenon under study. My research, therefore, is not of a quantitative but of a qualitative nature.

3.3.2 Qualitative research

Qualitative research produces findings not arrived at by any means of quantification like statistical procedures (Strauss & Corbin, 1990). According to Anderson (1998), qualitative research is defined as a method of investigation that scrutinises events in context and employs multiple methods to understand, make deductions, and bring meaning to these events. It seeks to extrapolate the findings to similar situations. It also examines the shared values or culture of a certain group of people, named ethnographic (Creswell & Inquiry, 2007). In support of Creswell, Myers (2009) states that qualitative research helps researchers to appreciate people and their cultural and social contexts in which they live. Some scholars claim that human education is best studied through the use of qualitative research approaches (Henning et al., 2004; Domegan & Fleming, 2007; Lincoln & Denzin, 2003). Therefore, qualitative research is particularly useful in studying educational settings and processes (Thomas, 2010). In this research, the culture of students at Harare High School using smartphones for learning is being examined. Qualitative studies, therefore, enable the differences and complexities of the phenomenon under study to be examined and characterised (Philip, 1998). The qualitative method provides a deep description of the group activities in its natural setting (Isowe, 2016).

Creswell (2008) categorised qualitative data into four categories: interviews (focus groups, one-

on-one interviews, electronic mail and telephone interviews), observations (participant and non-participant), and documents (newspapers, private and public records, personal journals and letters); questionnaires, audio-visual materials of behaviours (videotapes, photographs, paintings, digital images and pictures); and raw materials (Dammak, 2015). Words are usually considered as the raw materials that are analysed by researchers in qualitative studies (Bogdan & Biklen, 1992). Data were derived from directly observing the participant behaviours, interviews, from written opinions, or public documents (Sprinthall, Schmutte, & Sirois, 1991). Inscribed descriptions of events, opinions, attitudes, people, and environments, or their combinations may also be important data sources (Java & Herawati, 2014). Qualitative research displays information with words as a descriptive account which tries to represent a phenomenon in its context (Antwi & Hamza, 2015). The qualitative method of research postulates that human actions are influenced by the context in which it happens in a significant way. This is also echoed in the Actor-Network Theory which states that material objects mediate interpersonal interactions (Montenegro & Bulgacov, 2014). Qualitative researchers are not only concerned with the research products or outcomes but also the research processes (Thomas, 2010).

The research methods and processes employed in qualitative research have flexible, changing strategies. This means that it allows for the research design to evolve as the research progresses, instead of having the completed design at the inception of the research. This is due to the fact that it is hard to anticipate the result of the relations, because of the diverse value systems and perspectives of the participants and the researcher, and their role in influencing the outcome of the study and the interpretation of truth (Antwi & Hamza, 2015). Therefore, the research design develops during the process of data generation. A hypothesis is not required to start a qualitative research, and the research is inductive in nature. Qualitative studies consider the researcher to be the most important instrument in the generation and analysis of data (Thomas, 2010). The researcher takes part and becomes absorbed in the social experiences of the research. This implies that the researcher engages the circumstances and use logic to infer the many interpretations, as numerous truths can be found in any given natural setting. This is mainly because both the participants and the researcher construct their own realities (Myers, 1997). Hence, qualitative research products are a result of a researcher's interpretation of the participants' interpretations filtered through his or her own (Thomas, 2010). However, qualitative research acknowledges the subjectivity of the researcher, so it requires that the interests, motivations, perspectives, or biases of the enquirer be declared during the study.

According to Merriam (1998), qualitative methods that use a case study approach to education

are often bounded by concepts, theories and models. They use the inductive technique to support or challenge theoretical assumptions (Isowe, 2016). One major distinction when carrying out qualitative research is that data analysis is a continual process during the study, from the phases of data-production, through the interpretation, into the conclusion phases.

3.3.2.1 Rationale for a qualitative study

According to Maxwell (1998), there are five reasons why qualitative research is particularly useful:

1. It appreciates the interpretations that participants of a research give to situations, actions and the accounts they give of their lived experiences and of events they are involved with;
2. It offers an appreciation of the particular background within which the research participants perform, and the influence that this set-up has on their behaviour (Hall, 2011);
3. It identifies unexpected influences and phenomena, and then creates new theories about them;
4. It offers an appreciation of the processes by which actions and events occur; and
5. It develops causal explanations.

3.3.2.2 Disadvantages of qualitative research

The major weaknesses of qualitative research are that; the bias of the researcher can enter into the process of data gathering, and can prejudice the design of that study (Smith & Noble, 2014); subjects or sources of data generation may not be similarly reliable; some of the participants may be manipulated beforehand and this may prejudice the result of the study. There can also be some bias in the analysis of the observations; any group of people that is under study is somewhat altered by the appearance of the researcher, so, the data generated is to a certain degree skewed (Thomas, 2010). It also takes time for the researcher to gain the confidence of the participants in order to enable honest and full self-representation; this is particularly a disadvantage in short-term observational studies where trust building is required. As a researcher, I took note of the above shortcomings of qualitative research as a data-generation method and used them as a guideline in trying to reduce their effects on this research.

3.3.2.3 Advantages of qualitative research

Qualitative data were in some cases criticised as being biased, idiosyncratic, subjective, and impressionistic, but on the other hand, Miles and Huberman (1994) observed some strong points

that support the use of this type of data (Cohen, Manion, & Morrison, 2007). The major strength of this research method is that analysis methods of qualitative data are not chosen based on the research questions only, but also on the philosophical assumptions underlying the study. This gives authenticity to qualitative data. Qualitative research provides deep, extensive descriptions of an occurrence, thereby assisting the researcher to capture multiple perspectives and voices (Klenke, 2016). It also brings the researcher closer to the informants rather than relying on remote, inferential experimental materials (Denzin & Lincoln, 1994). In addition to the general benefits of qualitative research, each specific data- production technique contains its own unique advantages (Sulmasy & Sugarman, 2001).

3.4 Research design

Research design refers to the arrangements and plans the researcher makes or how they intend to generate and analyse data in line with the study objectives (Ahmed et al., 2016). It can be understood as the main plan of any study that outlines the strategy of carrying out a research. A research design determines the methods and techniques of producing and analysing data. All major components of the research (the groups or samples, measures, programmes or treatments, and more) are seen to work collectively in an effort to answer the questions of the research (Yin, 2003). A research design is like a designer's outline. It represents logic in a set of measures that enhance the soundness of data for any research. According to Yin (2003), a research design is an action strategy "for getting from here to there; here may be the initial set of questions to be answered, and there is defined as some set of conclusions".

There are five specific qualitative research designs, namely, phenomenology, grounded theory, ethnography, biographical (historical), and case study (Cresswell, 1998). Phenomenology examines the distinctiveness of the lived experiences of individuals and each person's own subjective truth. Grounded theory discovers the challenges that occur in society and how individuals handle them. It includes formulating, testing and redeveloping proposals until a theory is established. Biographical studies permit researchers to collect archival documents like speeches, interviews, and other writings. It makes use of various media including audio and video footage, and pictures, to present a comprehensive story about the phenomena under study. Ethnographic studies recognise culture, the variables for study, and literature review. It permits the researcher to obtain informants and gather data through interaction with subjects and direct observation. It also allows them to enter into the culture and immerse self in culture. Lastly, the case study is the most characteristic application of qualitative research in instructional technology,

which is adopted as the research design strategy for this research.

This research investigated the academic use of smartphones among secondary school students at Harare High School in Zimbabwe, using a case study as a research design. The research focused on fifteen students who engaged in semi-structured in-depth interviews. Fifteen parents of the fifteen students and five teachers who teach the fifteen students were requested to complete the questionnaires. The findings from the parents and teachers' questionnaires were intended to augment the interviews of the students. Parents and teachers contributed their perceptions and views on the use of smartphones by their children and students, respectively for academic purposes.

3.4.1 The case study design

A case study aims at understanding the people in a society by inferring their activities as a single event, a single group, or community (Thomas, 2010). According to Gillham (2000), it is an investigation aimed at answering particular research questions that pursue a variety of indications from the event settings. According to Yin (2003), a case study is an investigation that explores a modern occurrence within its natural setting, particularly when the margins between context and phenomenon cannot be visibly outlined. This design is appropriate in circumstances where the background settings of the phenomenon under study are key, and the researchers have no control over the occurrences as they happen (Lewis & Ritchie, 2003). Ritchie and Lewis (2003) state that the key feature of a case study is that it allows for a diversity of perceptions which are entrenched in an exact context.

The case study design can be an event, activity, or a programme confined to a particular place and time. A case study explores in detail a case or bounded system over time, and employs various sources of data available in that set-up (McMillan & Schumacher, 2001). All the pieces of evidence gathered are collated to reach the feasible answers to the research questions. Assuming the interpretive approach implemented in this study and the type of the research questions, the case study design is well thought-out as the most suitable method to engage as it offers a systematic way of gathering information, analysing it and reporting the outcomes. This will ensure that the study comprehends in great depth the phenomenon being investigated (Thomas, 2010). More precisely, it (i) offers a diversity of views from the participant (Seppälä & Alamäki); it uses multiple techniques for generating data; and (iii) it explores the combination of learning and instructional approaches inside a technology-rich setting.

When I adopted the single-case study strategy as the research design of this research, I gained a sharpened understanding of why the students at Harare High School used smartphones in the way they did. The design raised some important areas that required more extensive examination in future research. A single-case study is significant in the psychology and education as a discipline and is effective when researchers use it to test instructional strategies that are specific. Different from many other research designs, the case study can use any methods of data generation methods or data analysis and is not restricted to specific methods (Merriam, 1998). As a result, combinations of data-generation techniques were chosen in this research in the hope of providing a comprehensive representation. Therefore, the approach uses multiple methods of data generation such as semi-structured in-depth interviews, questionnaires, document or records reviews, and subsequently direct participant observations of the phenomena being studied (Yin, 2003).

While data generation in an exploratory case study can often be less structured, this does not mean that there is no structure, but a question of its extent (Thomas, 2010). Normally, the focus group entails less structure, and this may often be because of: the fact that information arises from interacting with the group. This is typical of focus groups, and it is difficult to impose structure on a group discussion (Seppälä & Alamäki); (Lewis & Ritchie, 2003). While unstructured interviews may often involve a comprehensive agenda they can be directed through management and questioning techniques (Merriam, 1998).

A case study has four basic characteristics namely; descriptive, particularistic, inductive, and heuristic (Thomas, 2010). Descriptive denotes the extensive and rich set of facts relating to a phenomenon. Particularistic represents one event process or circumstance that the study focuses on. These two characteristics are heuristic because each of them advances the appreciation of the issue under study, and inductive represents the perceptive used to govern concepts or generalisations which arise from the data (Merriam, 1998).

It should be noted that research methods and paradigms are not dependent upon each other. Although researchers may use them to support their studies, it must be noted that the qualitative methods are not synonymous with the philosophical approach of interpretivists adopted in this study (Yin, 2003). Depending on the researcher's underlying philosophical assumptions, qualitative research and designs may or may not be interpretive. It may also be critical or positivist. It also implies that the selection of a particular research design in qualitative studies (such as action research or a case study) does not depend on the underlying philosophical stance

adopted (Myers, 2013). This research has used the interpretive paradigm.

There has been some criticism of case study research that is based on its lack of generalisability using statistical parameters, and its non-representativeness. It should be noted that outcomes of a case studies are non-representative and they do not claim to be, instead, researchers using case studies emphasise on what may be acquired from a single case study (Tellis, 1997). Single case studies advance essential facts in the relevant areas of knowledge. Accordingly, the basic idea of a single case study is not to prove but to expand knowledge about a phenomenon (Stufflebeam, Madaus, & Kellaghan, 2000). This study, therefore, seeks to improve knowledge of the use of smartphones for academic purposes among students in secondary schools, a study that has not been conducted in the Zimbabwean context. Denzin and Lincoln (2000) still claim generalisability of case studies to be in existence despite the non-existence of a clear and detailed data analysis procedure of case study, and the challenge of being unable to provide generalisability in a statistical sense data (Miles & Huberman, 1994). They maintain that generalisability can be enhanced by observing many actors in several set-ups. Yin (2003), also states that case studies can be used for generalisations that are analytical, in which the aim of the investigator is to take a broad view a specific set of the results to some wider theoretical intentions.

Some researchers also criticise case studies, citing that the complexity and richness of the data gathered imply that the data are regularly exposed to potential researcher bias and various interpretations (Comford & Smithson, 1996). However, those supporting and those against these views agree that there is no perfect research methodology. Consequently, researchers may have to utilise data from various procedures (Thomas, 2010). Basing on the kind of the research questions and the interpretive approach adopted in this research, I have confidence that the case study is the right approach for this research. The advantages of this approach include the fact that it reveals the unique concerns and perceptions of different participants in a research in real-life situation in great detail. This could have been missing if experimental or quantitative methods were used. Case studies are appropriate to situations where it is very hard to detach variables of an occurrence from its natural settings (Yin, 2003); and this research is one such situation.

3.4.2 Sampling

Questionnaires have been used as a sampling strategy in choosing the students to participate in the research. Sampling is to select a small set from the general public for the purpose of making

observations in a study (Dube, 2013). Convenience and purposive sampling techniques were used for this research. Convenience sampling is also entitled opportunity or accidental sampling. It includes picking the nearest person to become a respondent and repeating that procedure till the sample size required has been attained, or pick from those who are accessible or available at that given time (Cohen et al., 2007). In this research, convenience sampling was applied to secondary school students who completed the questionnaires as a strategy for selecting the fifteen participants. Researchers in purposive sampling select the subjects or objects to be incorporated into the sample based on their judgement of their characteristics. By doing so, they produce a sample that meets their particular requirements. Purposive sampling is also called purposeful sampling (Teddle, Tashakkori, & Johnson, 2008). This sampling was applied to the teachers and parents of the selected students. It is an ordered sampling method in which the investigator picks cases that are information-rich in order to carry out an in-depth study (Patton, 2002). In purposeful sampling, the researcher chooses a sample from subjects or objects where most data may be obtained (Merriam, 1998). This sampling strategy is commonly used in qualitative research. It searches for some cases that are loaded with data which may be examined in greater detail about matters that are fundamental to the purpose of the study. Benefits of purposeful sampling can be described as any common patterns that are a result of great variation, and are of particular value and interest in apprehending the essential, shared dimensions and core experience of a phenomenon (Patton, 2002).

In this study, students who had smartphones and were able to use the devices for learning purposes have been selected to participate in the in-depth interviews. In this respect, I administered the questionnaires to all available senior students (Forms 5 and 6) for the sake of addressing them to 15 students. The selection was achieved by assessing the students' level of smartphone utilisation. This was a convenience sampling technique to select the required fifteen (15) students. All parents/guardians of the 15 students and five teachers from the teaching staff who teach the 15 students were selected purposively to participate in the questionnaire survey. Questionnaires for parents/guardian and teachers were not labelled and had no field that required respondents to indicate their identity in terms of identification number and/or name. To ensure the retrieval of all the questionnaires administered to the students, I ensured that the questionnaires were collected immediately after completion. The style of the research generally dictates the size of the sample. In qualitative research the sample size should be small for effective analysis (Cohen et al., 2007), therefore in this research, the sample size of fifteen was adequate.

3.4.1 Participants in the study

Thirty-five participants are involved in this research. This comprises fifteen student participants, who are secondary school students at Harare High School using smartphones for their 'A' level academic studies, five teachers who teach these students, and fifteen parents or guardians of the participating students. The students are the primary source of information, while the teachers and the parents provide information to augment the data generated from the students' semi-structured in-depth interviews.

3.4.2 Pilot study

Before embarking on the main data-production exercise, I first conducted a pilot study for a week with students in the Form Four classes. A pilot study tests and refines the aspects of a final study. These aspects include; fieldwork procedures, its design, data production instruments, and data analysis plans (Yin, 2015). I, therefore, conducted the pilot study with the aim of pre-testing or 'trying out' the research, and to identify any challenges related to the proposed research strategy and its full implementation. I then used the outcomes of this pilot study to modify the research programme accordingly. In other words, the pilot study was intended to sharpen the instruments. However, data obtained from this pilot study was not combined or mixed with the data generated from the real study. After I had completed the pilot study and refined the research design adequately, in liaison with the teacher in charge of the students, we agreed that the research should be carried out with the intended group. I scheduled the interviews in such a way that they would be conducted without disrupting the smooth running of the school lessons and programmes. A timetable was drawn up; each student was allocated time when he or she had no lessons or other commitments.

3.5 Data-production methods

The principal sources of data for this research included the students who were enrolled in 'A' level courses (Forms Five and Six), teachers who teach these students, and parents/guardians of these students. The selected students have undertaken in-depth interviews, while the teachers and parents have participated in some structured questionnaires. There are several methods of data generation that may be used in any research; however, this research has employed four methods of producing data, namely; documents or policies, questionnaires, observation schedule, and in-depth interviews.

The data generation process has taken a period of three months, that is, September, October, and November 2017. This was the period in which students were in their third term of the

Zimbabwean school calendar. The period has permitted me time to establish a good relationship with the school community, and verify the data. The preliminary processes of data generation included developing a background account of the school, and I achieved this through the use of an observation schedule, a briefing meeting with the participants, and the developing of field notes. I did all this to familiarise myself with the school's environment and the school community.

Multiple tools of data-generation methods such as an observation schedule, life-history interviews, and school documents, were also used to determine the findings on the performance and behaviour of students at Harare High School, to create the historical case. The information on the life history of the school having Wi-Fi for e-learning was intended to assist me to determine the period that the school has operated in supporting students on the use of technology. It is from this background that the use of smartphones by students in teaching and learning originated.

3.5.1 Questionnaires: for sampling and data generation

To understand the academic use of smartphones, it was necessary to employ questionnaires. In this study, questionnaires allowed me to sample the participants in the study, especially students. I was also able to gather essential information from participating parents and teachers using these questionnaires. The advantage of questionnaires is that the study can be extended to a wider audience than when using interviews. The main disadvantage is that it is not possible to modify these questionnaires to suit individual circumstances as is the case with other data generation methods, such as interviews. Popper (2005) concurs with this thought when he notes that with questionnaires, large volumes of data can be gathered from a big number of participants in a relatively cost-effective way, and in a short space of time.

In this research, questionnaires were distributed to the following: (i) to the fifteen parents/guardians of the selected students, and (Seppälä & Alamäki) to the five teachers who teach the fifteen selected students, in order to gain their appreciation and their perception of the contribution of smartphones in the processes teaching and learning. The information from the teachers' and parents' questionnaires were used to complement the semi-structured in-depth interviews carried out on the students. I administered the questionnaires to the parents and teachers first, before engaging the fifteen selected students in in-depth interviews.

3.5.2 Interviews

An interview is a method of generating information through oral quizzes using a set of questions that are fundamental and pre-planned (Thomas, 2010). Shneiderman and Plaisant (2005), state

that interviews allow the interrogator to pursue specific issues of concern which may encourage constructive and focused suggestions, so they may be very informative. Interviews are principal methods of producing information which is directly related to the research questions (Cohen et al., 2007). Interviews are also seen to have the following advantages in data generation as granted by Shneiderman and Plaisant (2005) and Genise (2002): (a) they allow for direct interaction with the participants, which often leads to suggestions that are specific and constructive (Thomas, 2010) (b), they are ideal for acquiring detailed information, and (c) rich and detailed data may be provided by only a few participants.

Interviews may be unstructured, structured, or semi-structured and carried out on individuals, or in focus-groups depending on the necessity and strategy. In this research, I have used the semi-structured interviews with individual participants as the chief data-generation method.

3.5.2.1 Semi-structured in-depth interviews

This study has engaged the use of semi-structured in-depth interviews. The in-depth interviews were conducted with fifteen students who use smartphones for their academic studies at Harare High School. The semi-structured, in-depth interviews were held with the students in order to appraise the pedagogical design of the model or the theory. The interviews were scheduled in advance and organised around a set of open-ended questions that were predetermined, and additional questions emerged from the conversation as the interviews progressed (Whiting, 2008). I first established a good rapport with the interviewees to encourage them to share their rich descriptions of the subject under investigation, leaving the interpretation or analysis to me as the researcher (DiCicco-Bloom & Crabtree, 2006). This has enhanced my appreciation of the students' individual perspectives and experiences on the academic use of smartphones. I have interviewed each student for an average period of an hour and have recorded the interviews using a voice recorder.

According to this study, the individual in-depth interview has become a conversation with a purpose. It was the opportunity in which each participating student in the interviews defined his or her position or perception of the academic use of smartphones. The interview process took place at Harare High School. I interviewed fifteen students, all of them among the senior (Forms Five and Six) students at the school. Basing on this background, I have engaged in semi-structured in-depth interviews as the main strategy for data generation. This is a flexible tool that has allowed me, as the interrogator, to make use of questions that were open-ended, prompting the interviewees to respond and elucidate their views; and this has allowed them to freely and openly

express themselves. The use of this form of an interview has enabled students to explore and reveal their experiences, thereby serving as an enriching and positive experience for all participants (Cohen et al., 2007).

The semi-structured interview methods also have characteristics of both unstructured and structured interviews, so they can use both open-ended and closed questions. This method possesses the benefits of the two methods of interviews. To maintain consistency with all the research participants, I prepared some key questions as a guide to enable similar areas to be covered by all the interviewees (Thomas, 2010). As the interviews progressed, the interviewees were afforded opportunities to clarify or provide additional information if desired. The reason for recording the interviews was to capture all the details in the discussion. This helped me not to miss anything during the transcribing of the data. The recording also captures changes in the tone of voice. This has also assisted me to determine whether the interviewee was serious in giving the information, whether this was offered willingly or under pressure. During this interaction with the students, I also wrote some notes which have assisted me in translating the information given by each student.

The main advantage of using semi-structured in-depth interviews as a data-production technique is that the data gathered is deeper and more comprehensive than with other means of data generation (Yin, 2003). This advantage has empowered me to gain an in-depth appreciation of the academic use of smartphones by secondary school students, particularly at Harare High School. I have gathered all the data in my personal capacity because of the passion and importance I attach to the personal value of these studies and the meaning of these research findings. Through this research method, a validating of seriousness and honesty of responses by the participants has been ensured. Each student participant has given his or her own understanding of the use of smartphones for academic purposes. This is expected to add new knowledge, and to supplement data already existing from previous researches.

3.5.3 Observation schedule

An observation schedule is a form prepared prior to data collection that delineates the behavior and situational features to be observed and recorded during observation (Given, 2008). There are several types of observations namely; structured and unstructured, controlled and uncontrolled and participant and non-participant observation. In this research, I employed the non-participant observation by observing the school premises without giving students and their teachers any information. My first visit was targeted at all high schools in Harare Metropolitan province in

Mbare/Hatfield district. The objective of my visit was to determine which high schools in the district had embraced the academic use of smartphones. This was done through inspecting the schools for the existence of Wi-Fi facilities, which would assist students and their teachers to have access to the internet.

At Harare High school I made a thorough inspection of the school to determine their level of involvement in making the school environment conducive to academic use of smartphones inside and outside the classrooms. I had to search for the infrastructure in the school that supports the academic use of smartphones. The main benefit of observational methods is that one can directly evaluate the learners' participation and engagement in the learning set-up, and with the learning activities. A smartphone is a device that people can easily see, and this was used in the observation schedule to identify students who had the devices at school. In support of the above, an American philosopher, Yogi Berra says; "You can observe a lot just by watching" (DiCicco-Bloom & Crabtree, 2006).

In an observation schedule, one transfers the entire being into an emotional and imaginative experience. By so doing the researcher will appreciate the individual's world (Bell, 1993). An observation schedule enables the researcher to generate data from participants in their context without the need to communicate or question with them. In this research, when I used the observation schedule, I managed to enter into the phenomenological sophistication of the students' world in which circumstances unfolded (Cohen et al., 2007). This has helped me to know the type of student that I was to interview. As I watched students in their active learning exercises, class discussions, in discussion forums or group work, and as they were moving and using the device, I could realise how the students learned; how they made sense of and interpreted the use of their smartphones. I could also see where they stumbled, what they did when they did not understand the use of the device, and so on.

I also observed the students' outdoor activities, which, in most cases, were less formal. This observation was meant to assess the use of smartphones by students and their teachers in various situations at the school. The observation took place throughout the data generation, a period of three months. The major disadvantage of the observational method is that students may change or adjust their actions when they recognise that they are being watched. Some students may pretend to be what they are not. However, I took time to observe the students before I was officially introduced to them by the school authorities, and this assisted me in minimising any deception.

3.5.4 Documents and reports

This research has also used documents from the school (historical and administrative records) as well as individual student records. These documents have assisted me to familiarise myself with the history of the school as it relates to use of Information Communication Technology and to consider the strategies in place for safeguarding the effective use of smartphones as a learning tool. Harare High School has files for each student that contains all the information on the student of the books or educational material given by the school on enrolment. The files kept in the office of the head also have the information necessary for analysing data for each student, that is, reports of misconduct or any disciplinary incidents committed by students.

Administrative records are commonly used as a basis for various types of research and studies, ranging from longitudinal studies to international comparisons or studies of policy process (Helm, 2000). The research design includes the need to be aware of the documents available, making use of these. Documents and reports may portray a true picture of the student's performance in class. However, it should be noted that factual data must be interpreted with caution. In the case of the academic performance of students, smartphones are not the only factor that contributes to the success of a student. Therefore, this study did not use academic reports as an indicator of the effectiveness of the academic use of smartphones.

The analysis may be achieved by using documentary evidence; however, it is dependent on the nature of the documents (Helm, 2000). There are three possible research designs for documentary evidence: quantitative analysis, content analysis, and analytical reading. There may be many other approaches to dealing with documentary evidence. Researchers note that there may be links and overlap with other methods of research. People sometimes become passionate about which method is best. I consider this a somewhat trivial point, because these methods are complementary, not competing approaches (Kalafat & Illback, 1998). Researchers such as Guba (1981) argue that triangulation may be accomplished by using various methods and sources for gathering information (Helm, 2000). This research has used the principle of triangulation by employing four methods of generating data: observation schedules, documents and records, questionnaires and semi-structured in-depth interviews.

At the commencement of this study, I negotiated access to some relevant records and documents with the school authority. The records included rules and regulations of the institution, financial records, and other records that were official and unofficial relating to the use of smartphones by

students at the school. Although some of the records were restricted, the ideal situation would have been to access all reports and documents pertaining to students who use smartphones. The use of documents is vital because documents, records, and student reports direct the researcher on issues that need to be pursued further during interviews and during direct observations. Nevertheless, the issue of confidentiality needs to be valued, together with all the data that the researcher has accessed. The level to which the researcher can refer to and quote from these documents for inclusion in the research document is largely dependent on the category of the document. It depends on whether the document is categorised as a public record which may be publicised without violation of participants' confidentiality. Sometimes, with proper safeguards and approval to keep confidentiality, some evidence from these private documents may be cited or quoted directly.

3.6 Data analysis

I have analysed data using the Miles and Huberman Framework of Qualitative Data Analysis, which allows data to be organised in three stages: data reduction, data display and drawing, and verifying conclusions (Miles & Huberman, 1994). Data were analysed concurrently with data production (Rubin & Rubin, 2005), using the lens of the Actor-Network Theory. The theory offered me important insights into the processes and objectives of education using smartphones. The theory also helped me in understanding and exploring the research questions on the academic use of smartphones by secondary school students at Harare High School in Zimbabwe. All the interview data were transcribed and this research has teased out themes relevant to answering the research questions.

Researchers of the interpretive paradigm generate their data from direct involvement with the phenomenon under study. In this case study, the phenomenon was the academic use of smartphones by secondary school students. In the qualitative case study, one of the key aspects of analysing data are the quest for meaning by directly interpreting what the researchers observe, and what the participants experience and report. According to Bogdan and Biklen (2003), data analysis in qualitative research is defined as; “working with the data” and this includes; breaking the data into units that are manageable, organising it, coding it, looking for patterns, and synthesising it. Therefore, the aims of analysing qualitative data are to find meanings, themes, patterns, and concepts (Thomas, 2010). In that respect, case-study research emphasises the need to search for patterns in the data that may identify or explain causal relations in the data (Yin, 2003). In this method, the researcher initially looks at the entire set of data and then tries to break

it, and then reconstruct it yet again into more meaningful summaries (Thomas, 2010). Categorisation helps the researchers to compare and contrast amongst patterns, reflect on some complex threads and patterns of the data, deriving some logic from them.

The data analysis process starts with the organisation and categorisation of data looking for themes that are critical, meanings and patterns that arise from the data (Thomas, 2010). This procedure which is sometimes called open coding is the one that is commonly engaged. The researcher thoughtfully names the theoretical classifications into which the categorisation of the observed phenomena would be done (Strauss & Corbin, 1990). The intention is to produce categories that are multi-dimensional and descriptive, which can provide an introductory framework for data analysis. The categories developed are critical in the process of analysis because qualitative researchers have a tendency to use inductive analysis (Yin, 2003). The generation of data and its analysis in a case study goes together, in a manner that is iterative, because the outcomes of data analysis will assist in guiding the successive data generation processes (Shabalala, 2016). The generation of data and its analysis propel one another, resulting in the analysis becoming a synthesis of the information at a higher level. This iterative sequence recurs, and course development and design revised as the process goes on (Strauss & Corbin, 1990).

The interview sessions of all the participating students in this study were recorded using a voice recorder and transcribed. I prepared some open-ended questions relating to the research questions, and the participants were mandated to answer. During these procedures, useful data relating to their experiences arose. The answers of each participant were categorised, compared and analysed using additional findings from the transcription of the teachers and parents' questionnaires. The outcomes were then triangulated and interpretations were done to draw conclusions. Basing on the review of the literature and the research methodologies identified, the following section outlines the data analysis according to Miles and Huberman's three-stage data analysis.

3.6.1 Data reduction

Data reduction is the process of reducing and organising the mass of qualitative data obtained from observations, field notes, transcripts and interviews (Gratton & Jones, 2010). It includes; discarding irrelevant data, writing summaries, coding, and so on. At this data reduction stage, I had to discard all information data that was irrelevant to the study but ensured that I would have access to it later if necessary. This is because unexpected findings may require me to re-examine some of the data earlier considered to be redundant. Miles and Huberman (1994) concede that

data reduction occurs as a continual process during data analysis and it is part of the analysis.

Miles and Huberman (1994) observed that, even though large quantities of unprocessed data are gathered, the researcher may only scrutinise in detail some negative or some selected cases to test the concept (Savenye & Robinson, 1996). Researchers use analytic procedures to determine the meaning of data. These procedures involve looking for relationships, links, and patterns. Contrary to quantitative research, the qualitative researcher uses assumptions or speculation while searching for meaning in data. According to Goetz and LeCompte (1984), this speculation will enable the researcher to conduct new interviews, make new observations, and look deeper for new patterns in this repetitive process (Van Gog et al., 2008). In both qualitative and quantitative analysis, the purpose of data reduction is to condense the data without any loss of important information. In qualitative data analysis, it is also important not to remove the data from its context (Miles & Huberman, 1994).

3.6.1.1 Coding qualitative data

Coding is the procedure where raw data are organised into conceptual classes. Each of the codes is considered as a bin into which parts of data are deposited (Gratton & Jones, 2010). Codes, according to Miles and Huberman (1994), are labels used to assign pieces of meaning to the inferential or descriptive data generation during a study. The codes are usually attached to masses of varying-size words; whole paragraphs, sentences, or phrases (Miles & Huberman, 1994). The coding process is the initial activity in analysing qualitative data and is the basis for other processes that come later. It is very critical when exploring regularities in the data, (Van Gog et al., 2008).

There are two main forms of codes in the Miles and Huberman method, namely; inferential or pattern codes and descriptive codes. Initial codes may be descriptive, without the need for much interpretation beyond the portion of data itself. They are especially valuable in allowing the researcher to gain a feel of the data, and in initiating the analysis. The inferential code tends to focus on pattern codes; it groups information into smaller and more meaningful units (Franklin & Wang, 2003). The researchers must read data carefully, identifying all statements regarding the research question, and assign each portion of data a category or code. The codes need to be valid; they should reflect what is being studied in a more accurate manner (Miles & Huberman, 1994). Codes should be mutually exclusive, in that they should be distinct, without any overlaps. They should also be comprehensive, that is to say; all related information ought to fit into a code (Jones, 2014). The codes have been grouped into the following themes: general dimensions themes,

higher order themes, and raw data themes (Edwards & Skinner, 2010).

In answering the first research question on how students at Harare High School use smartphones for academic purposes, I developed some four basic codes from the data generated from the in-depth interviews and questionnaires. The codes are research, downloading textbooks and papers, storage of notes and past exam papers as soft copies, and sharing notes and assignments through social media platforms. Using the codes developed above, I searched for statements that fit each of the categories (Gratton & Jones, 2004). I then grouped similar units into first-order themes, separating them from units with contrasting meanings (Gratton & Jones, 2010). I ensured that the data units (each relevant statement, sentences, and more) were clustered into common themes (codes) and subsequent sub- themes. The data were organised under its appropriate themes. This process is called open coding.

Some researchers advise that interpretation of data should not only focus on finding the cases which support the researcher's ideas or descriptions, but also to identify and explain circumstances that are contradictory. Combining the analysis with the findings from diverse data sources is used as a way of demonstrating trustworthiness in the analysis (Toavs, 2017), and this research has used this approach to ensure trustworthiness. To safeguard reliability, there should be an audit trail on all research procedures by which readers and other researchers can judge the process through which the research has been conducted, together with the critical choices that have informed the process of that research (Holloway & Galvin, 2010). I also have critically reflected on my role within the entire process of generating data. I checked for all data, whether confirmatory or contradictory, to ensure that I avoided being unfairly selective in choosing the data. In order to minimise bias, I had to avoid the tendency of selecting and reporting facts that only supported my personal ideas about the main findings of the study.

Below is an example of the coding as described above.

On the theme 'Academic use of smartphones', four sub-themes were developed: research, downloading academic materials, storage of academic materials as soft copies, and sharing notes and assignments through social media platforms. Below are the examples of the coding of the statements given by the students;

Using smartphones for research

BK mentioned that:

I use a smartphone for research purposes, especially in my three A-level subjects: Business studies, Accounts and Geography. In most cases, I work ahead of other students with the syllabi. The most common site that I visit on the Internet is

Google. I am now a good researcher, and because I do research, my academic performance has improved.

Using smartphones to download academic materials

Tracy is quoted:

I use my phone for downloading academic papers and books. Some of my books are quite expensive so, I cannot afford to buy the textbooks, but I can buy data bundles and download e-books and papers for my studies ... I managed to get some applications to download these e-books so I have most of my textbooks as soft copies on my phone.

Efforts were made to ensure the trustworthiness of the data in this study. I provided the interviewed students with an outline of the data analysis and requested them to judge the analysis process and the interpretation. I also requested them for critical comments on the adequacy of the findings (Miles & Huberman, 1994).

3.6.1.2 Memoing qualitative data

Memoing is the second essential procedure of qualitative data analysis; however, it is not necessarily the second step in the analysis process (Miles & Huberman, 1994). A memo theorises review of thoughts and concepts about codes and their associations as they strike the researcher during the process of coding (Mangal & Mangal, 2013). A memo can be a paragraph, a sentence or even a few pages. It uses the researcher's temporary ideas founded on facts with maybe a little conceptual clarification. Miles and Huberman (1994), states that these memos can cover many items; they may be methodological, theoretical, substantive, or even personal. In memoing, coding is linked with the development of the proposition. It is important in qualitative analysis to balance discipline with creativity, and it is in memoing that creativity is reflected (Holloway & Galvin, 2010). As a follow-up to the above codes developed, a memo was written to the effect shown below:

‘All the participating students have demonstrated that they utilise their smartphones for educational purposes in the area of research, downloading of textbooks and papers, storage of

notes and past exam papers as soft copies, and sharing notes and assignments through social media platforms’.

3.6.2 Data display

In this research, data has been displayed in the form of charts, tables, and diagrams. Data display is a way of organising, compressing, and assembling information, thereafter displaying the data. Miles and Huberman (1994) highlighted that a good presentation of data allows the researcher to draw conclusions from the mass of data. This data can be displayed in the form of charts, tables, networks, diagrams of different types, and other graphical. Data display should not be done at the conclusion of the data generation but is a continual process. Displays enable data to be summarised and organised, hence should be used at all stages of the analysis. They are the basis for further analysis because they show the stage the analysis process has reached. According to Miles and Huberman (1994), displays are very vital. The two scholars often use the idiom, “You know what you display”. They are certain that better displays are the most important means of valid qualitative analysis (Punch, 2009).

Below is an example of data display in the form of a pie chart, as given in Chapter Four;

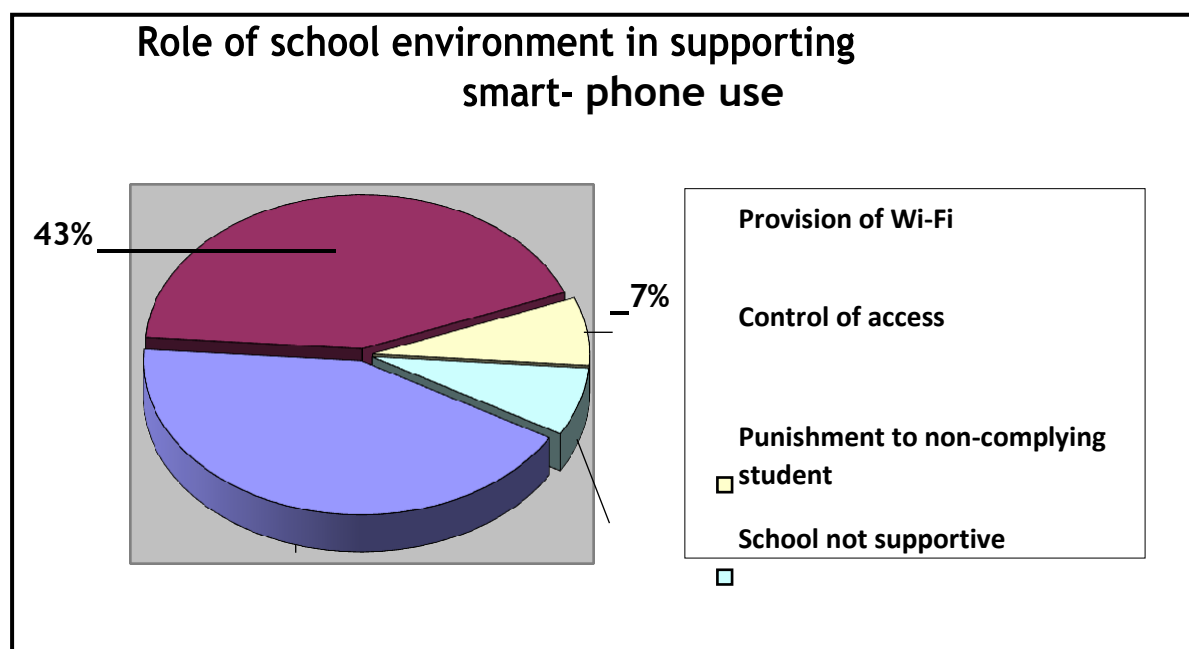


Figure 1: Data display in the form of a pie chart

Jonassen (2004), states that if researchers gather data using videotape or audiotape, they often

prepare written transcripts of the recorded language. He advises that although analysis may be done at a later stage, notes should still be recorded soon after being in the field. These notes may include events taking place in the immediate surroundings, observations about participants' non-verbal actions, or the activities participants have been involved in. In the case of interviews, notes might also include these descriptions, in addition to what participants were engaged in just before the interviews (Jonassen et al., 2008). I have also adopted this in my research. Data transcription from the recorded audios and writing notes on observations I made was also part of my data generation and analysis procedure.

Some researchers indicate that it is wise to gather data in its raw, detailed form, and thereafter record patterns (Bhatia, 2017). This will enable the researcher to analyse the original raw data later using different methods, possibly to answer deeper questions than initially stated. The researcher may have realised that some phenomena previously considered insignificant are crucial to account for the participants' views and actions (Jonassen et al., 2008). In addition, raw data should be preserved to allow other researchers to verify and explore the data and resultant interpretations (Miles & Huberman, 1994).

3.6.3 Drawing and verifying conclusions

Reduction and display of data assists researchers in drawing conclusions. Even though drawing conclusions reasonably comes after data reduction and data display, it occurs relatively simultaneously with them. Consequently, any conceivable deductions may be drawn earlier during the analysis, but may still be ill-formed and vague at that stage (Miles & Huberman, 1994). They are held tentatively, awaiting additional work, and refined during subsequent analysis. These conclusions are not confirmed until all the available data has been analysed. The conclusions will be in the form of proposals, which must be verified once they have been drawn.

In this case study data analysis has allowed me to start to develop conclusions about the academic use of smartphones by secondary school students. These preliminary conclusions were later verified; I examined their validity by referring to the current literature, available field notes from observation schedule and school documents, and from questionnaires. Miles and Huberman (1994) confirm that drawing and verifying conclusions is the third part of the data analysis. This is conceptually distinct from the other stages and involves developing propositions, but again is likely to occur simultaneously with other processes. Miles and Huberman (1994) therefore pointed out that the three overall components; data reduction, data display, and drawing and

verifying conclusions, occur concurrently and are interwoven throughout the process of data analysis. The first two rest primarily on the operations of memoing and coding. In virtually all, the qualitative data analysis methods, memoing and coding are the basic operations that initiate the analysis process. They happen together and are closely related.

3.7 Research evaluation

Evaluation is the systematic production of data that is representative of the experience and opinion of its partakers and other stakeholders in the study (Thomas, 2010). The terms reliability and validity in research are generally used in quantitative research, whereas in qualitative research, the terms need to be redefined with the intention of reflecting the various ways of establishing reality. Research findings in qualitative methods are not derived from the use of statistical measures or other means of quantification (Strauss & Corbin, 1990). Research of qualitative nature seeks understanding, illumination, and extrapolation to similar situations. Observations and interviews are dominant in the interpretive paradigm, and the role and involvement of researchers in the research is significant, therefore the researcher is also an instrument.

The traditional measures for safeguarding the quality of research data such as; validity, objectivity, and reliability, are applied in experimental and scientific research since they are usually founded on standardised instruments and are evaluated using comparatively direct methods. However, qualitative studies do not normally utilise standardised instruments, because they frequently use samples that are smaller and non-random (Merriam, 1998). Accordingly, these assessment standards are not useful in qualitative research, especially when the researcher is more concerned with understanding and questioning the interpretation and meaning of a phenomenon. The major query is on the value of these assessment principles in qualitative research (Thomas, 2010). There is an ongoing debate among researchers arguing that the concepts of validity and reliability are positivist and quantitative, and should not necessarily be used in qualitative studies (Merriam, 1998). Words like trustworthiness and truthfulness should be used.

On reliability, the research seeks to test the quality of the research findings. This is related to the idea of good quality research with the purpose of generating understanding (DiCicco- Bloom & Crabtree, 2006). Assessing the validity and reliability of qualitative results is not easy. In qualitative analysis, terms like trustworthiness, credibility, transferability, dependability, confirmability, triangulation, neutrality, consistency, and applicability are used in place of reliability and validity as essential criteria for quality. Writers like Clont (1992) and Seale (1990)

emphasise on enquiry audit as a pointer which may improve the dependability of qualitative research (DiCicco-Bloom & Crabtree, 2006). This has been used to inspect both the product and the process of the research for consistency (Golafshani, 2003).

3.7.1 Trustworthiness of the study

Trustworthiness is the equivalent word used in qualitative research as an indicator of the reliability of research. It is the degree to which data generation and analysis processes are trustworthy and believable. Creswell (1998) and Krefting (1991) propose that researchers can attain trustworthiness in qualitative research using four approaches namely: dependability, conformability, transferability, and credibility, and these are created analogous to the equivalent quantitative principles of reliability, neutrality, external and internal validity. Each of these approaches, in turn, utilises measures like triangulation, dense descriptions, and reflexivity. I took note of this argument in this study. I also prefer to use 'trustworthiness' as it is used by several other scholars to cover all the aspects of the quality of research (Krefting, 1991).

3.7.2 Credibility

In qualitative studies, credibility is the extent to which the processes of data generation and data analysis are trustworthy and believable (Shabalala, 2016). Creswell (1998) recommends that credibility should be comparable to internal validity; the findings of a research should match the truth. The basic philosophy of qualitative research states that the truth is comparative to the denotation that people make within their social settings (Smith & Ragan, 2005). Therefore, the validity of qualitative research applies mainly to the researcher, not essentially to others, owing to the prospect of the numerous realities. It is left to the people who read to determine the degree of its credibility depending on their personal appreciation of the study (Thomas, 2010). According to most rationalists, there should not be a single truth to a phenomenon, but each individual should construct his or her particular reality (Smith & Ragan, 2005).

From the perspective of an interpretivist, no objective reality may be compared to the findings of a particular study because understanding is co-created (Shabalala, 2016). Therefore, in this study, the existence of participant inspection into the findings; getting feedback from the study participants on the transcribed data, data interpretations, and deductions or conclusions, is used as one way of ensuring credibility. This member checking into the findings technique is considered most critical in establishing credibility (Thomas, 2010).

To achieve credibility or rigour, I had to first carry out a pilot study using the questionnaire and semi-structured in-depth interviews at Harare high school, on the Form Four students, before engaging the senior students (Forms Five and Six), who in this research were the sole group for this study. The pilot study was set in order to hone the instrument. Authority was sought from the Ministry of Primary and Secondary Education before engaging the school. I had to put all my efforts into producing reliable and credible research by creating an environment that probes for deeper understanding, instead of examining superficial features. To attain valid and reliable results, various methods of researching data were engaged (Creswell & Miller, 2000). These methods included observation, questionnaires, documents, interviews, and recordings. I also had to avoid incorporating my own point of view into the research during data analysis. I, therefore, transcribed information from the interviews and gave the transcripts to the students to check whether the information produced was correct.

A well-selected theoretical framework (ANT) is used for this research. Analyses of data are based on the developed theoretical framework, and I systematically employed the Miles and Huberman framework for data analysis. The only problem I faced was that of non- remuneration of the participants; however, this did not compromise the quality of survey results in any way. Some interviewees were expecting some incentives for their participation. However, I managed to contain the situation. Refunds were made to students who used their own transport coming for interviews. Students who were interviewed during the lunch hour or during their tea break were given money to buy lunch or breakfast.

3.7.3 Transferability

Findings of a research can only be generalisable or transferable if they can be applied to other settings beyond the actual study setting. Transferability is comparable to external validity, which is, the degree to which the findings may be generalised (Thomas, 2010). Generalisability denotes the degree to which one may spread the interpretation of a specific population or situation to other settings, times or persons than those directly involved in an investigation (Maxwell, 2002). The main challenge in qualitative research is that of transferability owing to the researchers' subjectivity, yet he/she is an important instrument (Thomas, 2010). In its traditional thinking, transferability is a threat to valid inferences about research data (Maxwell, 2002).

According to Seale (1999), researchers can achieve transferability by making available a comprehensive, dense description of the phenomenon being studied so that the people who read are furnished with adequate evidence to assess the applicability of the findings to other settings

that know to them (Thomas, 2010). This research has adopted a single case study approach. In this research, I, as a qualitative researcher, enhanced transferability by giving a comprehensive account of the research procedures, assumptions, and contexts of the study. This will enable readers to assess my level of subjectivity or objectivity from the outlined methodology. The process of generalisation that correctly matches it is called an inferential generalisation. Inferential generalisation refers to taking a broad view of the setting of the study to other settings (Ritchie & Lewis, 2003). Therefore, there is a need for all documents of this study to justify the methodological approach, and define the basic processes that assisted me to connect, shape, and construct meanings related to the academic use of smartphones by secondary school students (Thomas, 2010). Further, I remained aware of possible biases throughout the course of this study, by being mindful of the potential for various inferences of reality (Ritchie & Lewis, 2003)

In qualitative research, generalisability is occasionally overlooked as researchers elevate the appreciation of a local situation (Thomas, 2010). However, from this research, I managed to obtain a thick description of the phenomenon under study. Thick description in this context refers to a detailed description of the academic use of smartphones among secondary school students. This included my inferences in addition to the processes and context that was observed. It also included giving an in-depth account of the procedures and methods used during and after the production of data, such that the description and data were speaking for themselves. By so doing, readers can evaluate the implication of the denotations attached to the research findings and make their own decision with regards to the transferability of the findings of the research.

This thesis describes in detail how secondary school students at Harare High School in Zimbabwe use smartphones in their learning processes. Hence, the issue of generalisability should be determined by the readers of this research depending on closeness to my context is to that of the reader. It is a question of judging the phenomena found and circumstances which enables others to evaluate the transferability of findings to other set-ups (Ritchie & Lewis, 2003).

3.7.4 Dependability

Dependability is equivalent to reliability; it is the reliability of getting the same findings under settings which are similar. Merriam (1998) defines dependability as the degree to which outcomes of research may be reproduced with similar subjects in a comparable context. It stresses the significance of the researcher who accounts for the varying circumstances and settings that are central to the consistency of the outcomes of research. Reliability is virtually not achievable because human actions or behaviour is not static. It changes continuously and is highly contextual,

dependent on numerous influencing factors (Thomas, 2010). It is further enhanced by the likelihood of various inferences of truth by the participants. This means that an analogous study with other participants, or in another organisation with different institutional context and values, or by another researcher, may not essentially produce matching outcomes (Shabalala, 2016).

The quality of interpretations also rests on the individual construction of meanings depending on the personal experience of the researcher and the skills of the researcher on gathering and interpreting the data. Accordingly, reliability is traditionally not tangible in a qualitative case study. According to Merriam (1998), reliability in qualitative case study should be determined by the consistency of research outcomes with the data gathered (Shabalala, 2016). Therefore, in this research, the following techniques were provided to achieve dependability: (i) I clearly explained the assumptions and theory behind the study (Seppälä & Alamäki); (ii) I also used multiple data generation and analysis methods (triangulation) (Kurkarni, 2013); and (iii) I provided an in-depth description of how data generation was done to give room, if necessary, for an audit trail to be done.

According to Merriam (1998), there are six strategies for enhancing internal validity in qualitative research: (i) triangulation; use of multiple data sources or techniques to confirm research outcomes (Seppälä & Alamäki); (ii) member checks: the researcher takes the tentative interpretations and research data back to the participants from whom the data were derived, and asks them whether the findings are credible (Thomas, 2010); (iii) peer examination; (iv) long-term observation; (v) using collaborative or participatory approaches to research, and (vi) clarifying the theoretical orientation, assumptions of the researcher, biases, and worldview at the beginning of the study.

Seale (1999), states that auditing can be used to achieve dependability. This comprises the documents of research methodology, data, and the choices made during the course of the study, and its findings (Thomas, 2010). Auditing for dependability calls rich and elaborate data and descriptions of the research. The research design may also be altered as new findings emerge in order to enhance dependability during the generation of data.

3.7.5 Confirmability of the findings

Confirmability is the extent to which the outcomes of research may be corroborated or confirmed by others (Seale, 1999). It is similar to objectivity; the degree to which a researcher accounts for or is mindful of the subjectivity or partiality of individuals. According to Seale (1999), auditing can be used to enhance confirmability; a self-critical methodological account of how the

researcher conducted the research should be provided. In this respect, I have archived all generated data (audio tapes, transcribed data and other records) in a retrievable and well-organised form, which can be produced for auditing by other researchers, should the findings be challenged (Thomas, 2010).

3.7.6 Triangulation

Some researchers argue that triangulation is a quantitative technique which has no place in qualitative research (Alcock, Beatty, & Fothergill, 2005). However, in social studies, triangulation is a term applied in a less literal sense. It combines various approaches and procedures of an observed phenomenon with the intention of overcoming problems of validity and bias (Scandura & Williams, 2000); (Blaikie, 2000). Triangulation comes from a moral requirement to check the legitimacy of the research processes. Case studies accomplish validity through the use of various data sources (Yin, 2003). Triangulation is a technique that utilises several informants, multiple sources of data, and multiple data production methods like; focus groups, member checking, participant observation, and so on. This is undertaken with the aim of gathering numerous views on the same subject, in order to achieve a more comprehensive appreciation of the matter under study (Thomas, 2010).

This research has engaged triangulation by employing four data production methods: an observation schedule, questionnaires, semi-structured in-depth interviews, and documents/records as a strategy for enhancing the validity or trustworthiness of the study. Triangulation allows for the comparison of data to decide whether it corroborates research findings (Patton, 2002; Creswell, 2003). It is an important means of enhancing the trustworthiness of the findings of qualitative research (Thomas, 2010). Triangulation can expose any partialities when there is a single researcher studying a phenomenon, thereby providing a way of mutual validation of research outcomes, as is the case in this research. Triangulation may combine multiple theoretical perspectives, data sources, and investigators so as to increase confidence in the research outcomes (Painter & Rigsby, 2005).

Triangulation can be defined as the use of research outcomes from one data source to validate those from another source of data (Brannen, 2004). All methods have their own weaknesses and strengths, and triangulation can provide a way of improving consistency by reducing methodical errors by means of employing multiple sources or methods (Shabalala, 2016). Provided the other methods used in triangulation do not share the similar sources of systematic error, examining data from these other procedures can give insights into ways in which outcomes from the other method

may be adjusted to come nearer to representing the truth on the ground. In this way, the validity and richness of the data are maximised, increasing reliability (Painter & Rigsby, 2005).

Some researchers have questioned the suitability of triangulation in validating qualitative research findings. Others have argued that triangulation provides broader perceptions (Shabalala, 2016). In support of this notion, Richie and Lewis (2003) state that triangulation gives a fuller depiction of a phenomenon thereby providing security. Triangulation is described as crystallisation, which is more than the concept of triangulation, owing to its nature and multi-perspective sources (Denzin & Lincoln, 2000) and (Richardson, 1995). In the crystallisation process, the researcher tells a similar story using data generated from various sources (Richardson, 1995). This process also considers the data from several approaches. This is done by signifying various features, basing on the various stages of the data analysis (Thomas, 2010).

A protracted form of crystallisation for the qualitative data analysis process is known as immersion crystallisation (Borkan, 1999). With immersion, researchers submerge themselves in the data produced by examining or reading in detail some parts of the data (Thomas, 2010). In crystallisation, researchers temporarily suspend the process of immersion so as to concentrate on the experience of the analysis, try to find and articulate themes or patterns noted during the process of immersion (Edwards & Skinner, 2010). The two procedures are carried out until all the data available has been scrutinised. Consequently, meaningful claims and patterns arise from the data and may be expressed and substantiated well (Borkan, 1999). Triangulation was used as the main strategy to assess the outcomes of this research. Semi-structured interviews were carried out with student participants using the interview guide provided in the appendices. The other procedures employed were: observation schedule (participant observation), questionnaires, and documents for clarification of biases. So the triangulation exercises were conducted at several levels of data generation and analysis process to focus on a final result founded on various perspectives (Thomas, 2010).

3.8 Ethical considerations

Ethical issues are a priority when one is to engage in any research worth noting. Ethics is cited within human rights and democracy discourses (Ramathan, Le Grange, & Shawa, 2016). It is therefore essential that all the key processes are adhered to. The key processes include acquiring the informed consent, authority from the relevant government ministries, endorsement by the Local Research Ethics committee of the university, and provision of details to the interviewee

about their rights and the distribution of research outcomes (Whiting, 2008). While the researchers are directed by a range of ethical theories and frameworks, two major areas of concern are the possible consequences of the interview process, and issues of confidentiality (Beauchamp & Childress, 2001); (Hammick, 1996). It should be appreciated that researchers make choices that have ethical and political nuances through the research process (Morgan, 2007). Researchers should ask whether the research is valuable to the target group, seeking out alternative explanations to those constructed by the research. Researchers should also ask the participants whether they have really learnt something from the work.

Silverman (2000) reminds researchers to always remember that, when conducting their study, they are certainly invading the private spaces of their informants. Since this research is a qualitative study, I had to interact intensely with the students, parents and teachers, who are the participants, and by so doing, entered into their private domains of weaknesses, individual learning disabilities, values and so forth, for data generation (Silverman, 2000). Understandably, this raises many moral issues that need attention during and after the research (Thomas, 2010).

Creswell (2003), states that the researchers have a responsibility to appreciate the values, needs, desires, and rights of the participants. Miles and Huberman (1994) have listed several matters that researchers need to be mindful of when undertaking research. Researchers should be aware of these matters before, during, and after carrying out any study. The following are some of the ethical issues: i) informed consent; do informants have a full appreciation of what the research is about? ii) harm and risk; can the research harm the informants? iii) trust and honesty; is the investigator being honest in presenting data? iv) anonymity, confidentiality, and privacy; will the research encroach excessively into the behaviour of students? and v) advocacy and intervention; what the researchers should do if participants exhibit illegal or harmful behaviour? (Creswell, 2008).

Cultural sensitivity is one of the unforeseen worries regarding ethical issues. According to Silverman (2000), the connection between the researchers and their subjects during an interview must be well-thought-out in terms of the cultural aspects, and the values of the researcher. Therefore, this study has taken appropriate steps to observe strict ethical procedures so as to uphold the confidentiality, dignity, privacy, rights, and anonymity of the participants (Thomas, 2010). In view of the ongoing discussions, the following section defines ways in which ethical issues in the carrying out of this study were addressed.

All schools in Zimbabwe are monitored and controlled by the Ministry of Primary and Secondary

Education. Although church (mission) or other private schools are owned by churches as responsible authorities and other private companies and individuals, they still report to the Ministry of Education as the central authority. This is because monitoring of schools' performance and students' academic matters are all under the control of the Ministry appointed by the Zimbabwean government. Payment of workers, such as the teaching staff and some of the non-teaching staff in mission schools is also made by the government. In this respect, I had first to seek approval from the Ministry of Primary and Secondary Education through the office of the permanent secretary, to conduct the research at Harare High School. Authority was also sought from the school administration through the office of the school principal before engaging the teachers and students in the research.

Parents/guardians of the 15 selected students were informed of the interviews with their children and were requested to take part on a voluntary basis. I also had to interview students, most of whom are still minors (under the age of 18). I was mindful of the African Charter on the rights and welfare of the child as adopted by the Organisation of African Unity (OAU) (Union, 1999). I, therefore, had to protect the rights of the students (minors) during the investigations of this study. In that respect, consent forms were created and signed by the parents/guardians of the participating students before the minors were engaged. Annexures of all the approvals are included in this study.

On the issue of confidentiality, I have used pseudonyms for the students during interviews and during analysis of the data. Therefore, responses from students have been held in absolute confidence. I have also informed the interviewees of the following issues during the process of establishing rapport with the respondents: the issue of confidentiality, the use of a voice recorder and taking notes during interviews, and the ways in which the findings of the study would be published and disposed of after the research, according to the requirements of the University of KwaZulu-Natal.

3.8.1 Informed consent

I informed the students and their teachers (research participants) of the methods of data-generation, nature, purpose, and extent of the study before it commenced (Thomas, 2010). I also held a conference with all the concerned students and their teachers before I engaged them, to discuss the ethical issues. I further clarified to them their distinctive roles (Silverman, 2000). In line with this, I obtained the consent of the participants through the completion and signing of the

forms given in the appendix.

3.8.2 Harm and risk

Participants in this study were assured that no one would be exposed to settings that might hurt them because of his or her participation; be it physically or psychologically (Trochim, 2000). The interviews were conducted during the school day, within the learning hours, and inside the school premises, in the office of the senior teacher, where there were fewer disturbances from other students.

3.8.3 Honesty and trust

As the researcher, I was honest and open with the participants, and I also expected the students, parents, and teachers to be honest and trustworthy in giving information. This study followed all the ethical guidelines strictly in order to safeguard the trustworthiness and honesty of the data generation and the associated data analysis (Thomas, 2010). From the initial stages of engagement, we agreed that any student who displayed some form of dishonesty would be disengaged from the interview process.

3.8.4 Privacy, confidentiality, and anonymity

The students were informed that the information that they were providing to the researcher was going to be used for academic research only. Therefore, their views in the interview were to be presented anonymously. I notified them that they were allowed to use pseudonyms, and that, for the sake of anonymity, neither their name nor their identity would be disclosed anywhere in this study. I also stated that the records and other items linked to this research would be kept in a secure file that is only accessible to my supervisors and me. According to the regulations of the university, the materials would be destroyed after five years by burning and shredding. The information recorded on the recorder would be erased.

3.8.5 Voluntary participation

At the commencement of this study, I clarified to the informants that this research was only for educational purposes, and their involvement in the study was on a volunteer basis. I also explained that they would not be penalised if they decide not to participate. Participants were also free to withdraw from participating at any point during the interviews should they feel that they could not proceed. I informed the participants that the research would not provide any direct benefits to participants, but the outcomes of this study would be used in the review of the education curriculum in areas to do with e-learning. A copy of the research outcomes from the case study

in which they participated would be kept in their school library for access by all teachers and interested students.

3.9 Summary

This chapter defined the methodology and design of this research. Positivist, interpretivist, and critical social research were the three research paradigms discussed in this chapter, and the interpretive paradigm was selected for use in this study. Quantitative and qualitative research procedures were discussed, highlighting the suitability of each method in different research scenarios. The qualitative approach to data generation was selected as pertinent to this research. Although there are five research designs discussed in this chapter, a case study strategy was used. A critical exposé was given of the four methods of producing qualitative data employed in this study, and the Miles and Huberman method of data analysis employed was also described. Issues of research evaluation, including trustworthiness, credibility, transferability, dependability, confirmability, and triangulation, were highlighted. Lastly, ethical issues considered for this research were discussed. These included confidentiality, informed consent, honesty and trust, harm and risk, privacy, and anonymity, inter alia.

CHAPTER FOUR

Research findings

4.0 Introduction

This chapter is a culmination of the analysis of the outcomes the study made on the use of smartphones for academic purposes by learners in secondary schools. Four methods were employed in data generation; the observation schedule, use of documents, questionnaires, and in-depth interviews. Data generation and analysis processes were done simultaneously, according to the recommendation of the Miles and Huberman Framework of Qualitative Data Analysis.

On the quest to assess the academic use of smartphones vis-a-vis how school students are using them, who should provide these smartphones, and why students are using these devices, I observed that there are some schools in Zimbabwe which have adopted the academic use of smartphones. On schools in the Harare Metropolitan province, I have identified three government schools namely; Glen View 2 High School, Vinona High School and Harare High School, in which the school administrators have acquired and connected Wi-Fi facilities for students to access the Internet at school. The school authorities allow students to use their smartphones. However, I could not establish the extent to which these students were using smartphones in their learning processes. This has prompted me to carry out an in-depth analysis of the academic use of smartphones at Harare High School, as a case study.

On my initial observation schedule, I toured around the schools in the Metropolitan district of Harare. I observed that seventeen out of twenty schools had WI-FI facilities at their premises. This process assisted me in choosing a school to carry out my case study. I observed that Harare High school had a greater number of students who were in possession of smartphones. It was upon this observation analysis that I chose Harare High school for my case study. Harare High School is situated in the oldest high- density suburb of Harare, Mbare. Therefore, most of the learners at this school come from differing social classes, ranging from the middle to low socio-economic class. The population of students at the school is also very high and in the year 2017, the school had enrolled 2010 students.

I conducted my main observation schedule after receiving approval from the Ministry of Primary

and Secondary Education, and the school authorities to conduct my research at Harare High School. I discovered that all 'A' level classrooms had electrical facilities, especially electrical sockets along the walls for students to charge their smartphones. The school also provides Wi-Fi facilities which are paid for every month, allowing teachers and students to access the Internet through their laptops, iPads and smartphones. Access to this service is restricted through the use of passwords. Students are therefore required to seek authority in order to access the school Wi-Fi facility. There is an arrangement at the school by which the teachers request on behalf of their students the password to access the Internet using their smartphones. As a participant observer, I discovered that all the teachers who were in the staffroom on the first day of my visit to the school had at least one smartphone each and some even had two devices.

I also observed that a greater number of 'A' level students had smartphones. A few were holding them in their hands as they moved around the school during break time and into their classrooms, yet others had their phones in the satchels or in their pockets while putting on headphones. Upon entering, I discovered that, in some classes, most of the students had smartphones but in other classes, only a few students seemed to have them. When I enquired why some students had devices while others did not, I discovered that some students did not have a 'pass' (the authority) to bring their smartphones into the classroom. It is a school requirement that students should have authority from the school administration, carrying the 'pass' with them in order to use the smartphone. Such a 'pass' is acquired through the recommendation of the subject teachers. It is also through this 'pass' that a student is given the required password to access the Wi-Fi.

I also observed that there were more boys with smartphones than girls. I realised that students in the Commercial and Science classes were more active in the use of smartphones than students in the Arts classes. Teachers who teach commercial subjects actually encouraged their students to bring their smartphones for use in lessons on commercial subjects such as business management, commerce, computer studies, accounts and geography. During my interaction with some students, I observed that students had various types of smartphone, ranging from highly sophisticated and expensive phones to simple and cheaper models.

On the use of questionnaires, I first distributed these to the forms five and six students. About ninety-eight (98) students participated in the completion of the questionnaires. This exercise was meant to downsize the number of students to fifteen for them to participate in the semi-structured in-depth interviews based on their level of smartphone utilisation.

I also used questionnaires on the teachers and parents of the participating students. All the parents/guardians of the fifteen selected students and five teachers who teach the fifteen students completed the questionnaires. The parents' and teachers' questionnaires were administered in order to gain their perceptions on the use of smartphones by their children and students in their learning processes. Their views have contributed to the outcomes of the analysis of the findings on the use of smartphones for academic purposes among secondary school students in the Zimbabwean context.

I have also used school documents as data-production tools. School documents such as the school regulations regarding the use of smartphones, students' passes, and disciplinary records were used to complement the interviews and the observation schedule on information about the use of smartphones by students. However, most of the documents, especially those related to disciplinary cases, could not be published, as they are confidential documents on the school and students.

The final data-generation method was semi-structured, in-depth interviews performed on the fifteen students. This was the sole method of data generation on which I was focusing. This research interviewed all fifteen students for an average period of one hour; the data generated is presented in this chapter. The data were recorded on the voice recorder and then transcribed. This method has allowed me to have greater depth of the individual student's appreciation of the use of smartphones for the purposes of learning and teaching of students in secondary schools in Zimbabwe.

Using Miles and Huberman's framework of qualitative data analysis, all the transcribed data went through data reduction and data display. Using the research questions as a guide, I then grouped and condensed paragraphs, sentences, and words with related meanings and similarities. Based on the underlying meanings of each class of data, I developed some codes and then sub-divided them into various themes, labelling the classified data according to these themes. Some of the data were then displayed in tables and/or as charts and graphs.

4.1 Presentation of the generated data

This chapter articulates the outcomes of this research, classified according to the objectives of the study and research questions. The first objective was to explore how students at Harare High

School use smartphones for academic purposes. The relevant research question was asked: how do students at Harare High School use smartphones for academic purposes? The second objective was to examine the various perceptions of the academic use of smartphones by students at Harare High School. The pertinent follow-up question was what are the perceptions of students concerning the academic use of smartphones at Harare High School? The third and final objective was to analyse in which ways students at Harare High School use smartphones. The appropriate question was; why do students at Harare High School use smartphones for academic use the way(s) they do?

4.1.1 Academic use of smartphones

Objective one and question one of this study aimed at exploring how learners at Harare High School use smartphones for academic purposes. Responses from students reveal the following themes: using smartphones for research; using smartphones for downloading e- books and academic papers; using smartphones for storage of academic materials and using smartphones for sharing notes and assignments through group discussions. In each theme, I started by presenting students' views before parents and teachers' views. Therefore, in the second and third section of this chapter, I shall present the views of the parents and teachers, respectively, regarding the academic use of smartphones.

4.1.1.1 Using smartphones for research

Part A: Students' views

This theme was supported by most students. For example, BK mentioned:

I use a smartphone for research purposes, especially in my three A-level subjects: Business studies, Accounts and Geography. In most cases, I work ahead of other students with the syllabi. The most common site that I visit on the Internet is Google. I am now a good researcher, and because I do research, my academic performance has improved.

In support of BK is Chamu, who argued that:

I use my smartphone mainly for research purposes ... My phone has all the applications that allow me to access all the information I require on the Internet ... I have accessed a lot of current information using my phone ... I

have observed some improvements in the quality and depth of academic discussions and arguments that we make during our class presentations and I attribute this to the use of smartphones to access the Internet.

Mellissa has coincided with other students in the use of smartphones for research. She has this to say:

I use it to access the Internet and search for information in my subjects like Mathematics, Business Studies and Accounts on sites like Google. I realised that the notes given to us by the teachers in class are not enough, so the smartphone assists me to access information on the Internet to supplement what our teachers will have given us. This has enhanced my level of understanding of many of our topics.

In support of the theme ‘using smartphones for research’, Cassino states:

I use my smartphone for research because our school textbooks are now outdated and some are also not enough to cater for all students ... I have noted a great improvement in my ability to research and present quality work to the class because of the use of smartphone ... By accessing the Internet, I am always updated with current information as I use my smartphone.

MK decided not to use the computer lab to access computers for research. He is quoted:

I don’t wish to visit the computer lab for my educational research because my phone can do everything I wish to do ... I can use the Internet to access all the sites I need for my studies ... I have a very good phone which is very expensive and very few students can afford to have it, and it has all the applications I need for my research. I am really proud to have such a phone.

On research, the students further elaborated on the issue of accessing current information using their smartphones. In this regard, Ben says:

I am able to access current information which I cannot get from the school library. I also use my phone to access new formats in Accounts on the Internet. I am

impressed in the performance of my phone when I use it in Accounts, I use the smartphone every day but mostly at home and when the teachers indicate the need to use it in class for research. I frequently use Google as a site for academic searches.

Cassino concurs with Ben:

I use my smartphone for research because our school textbooks are now old and some of the current textbooks are not enough to cater for all the students. I use google and some media platforms like YouTube for my studies. I use the smartphone at home and at school. ... I am into Commercial subjects and need to access current information and new formats from the Internet.

Finance agrees with the use of smartphones in accessing current information, saying:

I use my phone for academic purposes in my three subjects; Accounts, Geography and economics ... You can get all the information that you require when you visit some credible sites on the Internet and it will be current information. Researching has now become easy, and I am now in tune with current issues in my business studies. Some of this information cannot be found in textbooks.

Deon remarks:

I use my smartphone for research. I always want to be ahead of my class in research so, I use my syllabus to search for topics ahead of the teachers. ... I also use it to access the new formats in Accounts on the Internet through Google or YouTube. I am impressed with the performance of my phone when I use it in Accounts.

Doctor concurs with the issue of accessing current information on his smartphone, articulating:

I use google to search for information on the Internet. I use my phone in Economics and Business studies to search for current information and as a dictionary ... Some of the current information required in some subjects is not available in textbooks. So, I also get current information by reading newspapers on my phone and this helps me in my Economics subject.

Some of the students claim that, through the use of smartphones, they have improved in their research skills and they are now able to work ahead of others with the syllabi.

BK is quoted:

My smartphone has assisted me to learn to research. I am now a good researcher and have improved my academic performance. I can search for any information that I want to know from my phone especially on google. I can even understand some topics before the teacher teaches them in class. That is the advantage of using smartphones.

Edwin adds:

I am not very good at using smartphones for other things but as for research, I am trying. I am now able to search for relevant academic data on some Internet sites for my studies. ... I am able to search for current information for my Geography lessons. I can learn Mathematics and understand better through video lectures on YouTube even before my teacher teaches the topic.

Finance, in support of BK and Edwin, claims:

Researching has now become easy as I use my smartphone, and I am now in tune with current issues in my business studies. I also had problems with my academic performance but since I started using a smartphone, I have realised quite an improvement. This is because if I fail to understand a particular topic in class, I can go on google and look for video lectures on the same topic

Ben supports the idea of working ahead of others:

I frequently use Google as a site for academic searches. ... Whenever my subject teacher introduces a topic, I search for the topic and get to know everything before the next lesson begins. I also use the syllabus to search for up-coming topics ahead of other students, and this has improved my participation in class. I also use YouTube to access some video lectures.

Deon, in support of Ben, expresses:

I use my smartphone for research ... I always want to be ahead of my class in research ... I also listen to video lectures on YouTube that are academic especially in Mathematics. This allows me to grasp some of the concepts that I may have missed with my subject teacher. I enjoy working ahead of the rest of the class, I always know what the rest of the students may not know.

Some students also indicated that it is laborious to read textbooks rather than going on Google and searching for specific topics under study. In support of this notion, Chamu postulates:

My phone has all the applications that allow me to access all the information I require on the Internet ... It is also laborious to read textbooks compared to going on Google and search for specific topics under study. More time is required to search for the specific information you may require in a textbook, but if you go on the Internet, you can just type the topic you want to search on and the information becomes available to you....

On the issue of reading textbooks, Finance observes:

I use my phone as a library and this motivates me to study. Reading hard copy textbooks is now tiresome than going on the Internet through a smartphone. Using my phone, I can easily get information to a specific topic under study compared to flipping through a 200 paged textbook. I enjoy reading through my smartphone.

On the issue of video lectures, Deon asserts:

I do not enjoy reading through textbooks to get the information I want. When I use my smartphone, I can download and listen to audio and video lectures on YouTube that are academic especially in Mathematics. This makes Mathematics easier to understand than when reading through textbooks.

The students also pointed out that the newly introduced education curriculum requires students to be innovative in using ICT, therefore, the use of smartphones for research is a requirement for students to succeed. Apple alleges:

I use it for communication and research. I use google, and YouTube for academic research ... The newly introduced education curriculum requires students to be innovative in their research ... I appreciate the introduction of this curriculum because it gives us the opportunity to be adventurous ... A smartphone is a special gadget for research in the new curriculum. You can research in time and improve the quality of research as well.

Denzel commends the insights of Apple, adding:

I use the smartphone for research ... I normally go for academic than social. Because of the introduction of the new curriculum, we are required to do some projects and tasks. ... I also use my smartphones during interviews like what you are doing now. You can research in time and improve the quality of research as well.

On the same issue of the new curriculum, Deon responds:

The smartphone is also assisting me with research which is required by the newly introduced school curriculum. Being an adventurous person, I feel the new curriculum will not be a challenge to me at all because of the use of smartphones. The kind of work required by the new curriculum will keep me so busy that I will be able to concentrate on my studies and not visit irrelevant sites

Ben supports the use of a smartphone for research in the newly introduced educational curriculum, reflecting:

With the introduction of the new educational curriculum, smartphones play a pivotal role because it requires a lot of research. Teachers are now facilitators who should just guide us as learners and a smartphone is needed for research. We are now given “tasks” to carry out and “projects” to do every term, so the smartphone is needed for capturing pictures in subjects like geography, and for audio and video recordings of interviews in subjects like business studies.

Cassino argues that:

The introduction of the new education curriculum has brought with it some challenges that need the use of smartphones.... These challenges include tasks and projects that need to be done every term and these call for research, and taking of pictures, video and audio recordings. The use of smartphones becomes handy because it is easy to carry.

Part B: Teachers' views

In support of the students, the participating subject teachers who completed the questionnaires have confirmed that they appreciate the use of smartphones for academic purposes. Below are

the various views of the teachers on the use of smartphones as a learning tool used for research.

Teacher No. 1:

The use of smartphone technology motivates students to develop a culture of research. Students using smartphones for their learning activities have developed self-confidence with exciting arguments during class discussions mainly because they research.

In support of this view, **Teacher No. 2** adds:

Smartphone encourages students to research widely. Students who use smartphones as a learning tool have become resourceful and have demonstrated an understanding of many topics positively well, and there is a great improvement in their answering of questions. Most of the students with smartphones participate more in class than those without.

Teacher No. 3 remarks:

It is an effective way of imparting knowledge to students. The academic use of smartphones by students in research is a better learning method encouraged in the new education curriculum. The use of smartphones for academic purposes ensures that students work hard on their own, avoiding teacher dependence.

Part C: Parents' views

In support of the students' view that smartphones are used for research, most of the parents have shown their appreciation of the smartphone as a tool for research. Below are their various responses.

Parent No. 1:

We are now living in the era of technology hence the need for schools to embrace technology is most welcome.

Parent No. 2 concurs:

Smartphones are good for research and help our children to work harder both

in class and at home.

Parent No. 3 reiterates:

The use of smartphones saves time when studying compared to reading textbooks my child has improved a great deal... I would like to thank all the school authorities for such a move....

Parent No. 4 agrees:

The academic use of the smartphone as an improvement to the education system which allows children to access current and adequate information is now playing a very important role in our children's education and this is commendable.

Parent No. 5 argues:

It improves the intelligence of our children and this can yield into better academic performance. I commends the authorities who have accepted the use of smartphones by our children....

Children are now able to get online assistance on assignments without the need to rely upon us parents... says **Parent 6**.

4.1.1.2 Using smartphones to download academic materials

Part A: Students' views

The idea of using smartphones for downloading academic materials was supported by most students in this study. For example, Tracy remarks:

I use my phone for downloading academic papers and books. Some of my books are quite expensive so, I cannot afford to buy the textbooks, but I can buy data bundles and download e-books and papers for my studies ... I managed to get some applications to download these e-books so I have most of my textbooks as soft copies on my phone.

Ben concurs with Tracy:

My smartphone has made my educational life easier ... It has also become less expensive and more affordable to buy a smartphone and download the

available e-books when compared to buying the many textbooks required for each subject ... Even laptops and computers are more expensive to buy than the smartphone, yet the smartphone can be used more convenient....

Panashe supports Tracy and Ben's views:

I use my smartphone to download educational papers and books ... I actually use it as a library because it contains many current books which I downloaded from the Internet ... I have realised a reduction in the cost of buying textbooks when I started using my phone for academic purposes. Some economics textbooks are more expensive to buy than a smartphone and yet a smartphone can contain several of these books when downloaded or obtained as soft copies.

On the same issue, BK expresses:

... I use it to download some of my academic books and papers, and current textbooks that are not available at the school. Downloading of textbooks from the Internet through my smartphone can be a cost-effective method of accessing information than buying textbooks.

Chamu adds:

The main advantage of using smartphones is that some of the textbooks at our school are scarce and some are outdated especially in Economics which requires current information. I have therefore accessed a lot of textbooks through the use of the Internet on my phone. Smartphones are cheaper to buy than buying textbooks and even cheaper than buying computers and laptops.

Part B: Parents' views

The parents concurred with their children's views on the ability of smartphones to access and download the required textbooks from the Internet. In support of this notion, a parent answered his question thus:

The use of smartphones allows children to download books from the Internet, and this has greatly reduced the cost of buying textbooks.

4.1.1.3 Using smartphones for storage of academic material

Part A: Students' views

The idea of using smartphones for storage of academic material was supported by a majority of the students who participated in this study. For example, Clara observes:

I write most of my notes, assignments and homework on my phone. I also keep soft copies of most of my textbooks, revision question papers and all the subject syllabi on this phone ... Carrying a bag full of books these days is out of fashion. Students should just have all their information on their smartphones. We are now in the information technology era and as students, we need to embrace the paperless way of doing things....

Finance responded to the same issue:

... Some of the Geography books are too expensive and heavy to carry so I opt to use soft copies carried on my smartphone. I also record lectures from my subject teachers during lessons and refer back to the lectures during study time. Most of my assignments and revision papers are stored on my phone ... I also use the phone to take photos for my Geography lessons. I use my phone as a library and this motivates me to study.

In support of the need to store information on the smartphone, Denzel articulates:

I record important things like lectures during class lessons when I feel like I cannot cope with the pace of writing notes ... I also use the phone to do my homework. Most of my downloaded books and papers including revision questions and assignments are on my phone and I can access them when I want to use them.

Tracy also states that:

Most of my books, notes and question papers are stored on my phone ... I also record lectures when I feel like, I do not want to write notes for use during revisions. I record group discussions and use them for my revisions. It is cool to have your information in one place so my phone is very useful for my academic work.

As a requirement for the new education curriculum, students take photographs, audio and video recordings of interviews as they work on their tasks and projects, storing them on the smartphone. Denzel stated:

... As a requirement from the new education curriculum, I started recording interviews of business people for the tasks given to me in my Business Studies using my smartphone. My phone takes good quality pictures, audio and video recordings so it is going to be very useful for my academic work...

As Melissa uses her phone to record learning materials she commented:

I write notes using this phone ... I also use the phone to record discussions in my class groups. I use the phone to record audios and videos on projects and tasks given to me in my Accounts subject for presentation in class as a requirement for the new curriculum. I also use the phone as a calculator, a watch or a reminder ... This allows me to keep my things in one place.

Part B: Teachers' views

One of the teachers agrees with the students' views that smartphones may be used to store academic materials:

Students can have question papers on their phones for revision.

Part C: Parents' views

One of the parents concurs with the students' and the teachers' views:

A smartphone is a convenient learning tool for the children which can be used to store academic material.

4.1.1.4 Using smartphones for sharing notes and assignments through group discussions

Part A: Students' views

The idea of using smartphones for sharing notes and assignments through group discussions was supported by most students in this study. For example, Chamu expresses:

... I use my phone to share notes with other students via platforms like WhatsApp. I have joined various WhatsApp groups at my school where we

share and discuss questions given to us by our subject teachers. Our teachers also participate in group discussions. Consultation with teachers is also very easy because I get feedback immediately.

BK agreed to the use of media platforms, remarking:

... I also use my smartphone in group discussions with my classmates through WhatsApp. I have joined academic chat groups for my three subjects and in these group chats, we discuss academic issues only. I have also improved my ability to interact with other people and sharing what I know with them so that I can also benefit from their knowledge.

Apple confirms BK's perspective:

I share academic information with others on chat groups. Our teachers are on some of the chat groups and they normally give us questions for discussion on these platforms. Sometimes as students, we also ask our teachers some questions which may be too hard for us and they respond with urgency. This is helping in improving our knowledge base.

Tracy concurs with some of her colleagues above:

I have joined several WhatsApp groups like commercials group which has more than 200 students scattered around the country. I am also in my class chat group and the Mathematics group where our subject teachers also participate. My phone allows me to communicate with others in the group where we share notes and questions from our teachers. If I fail to answer a certain question, I put the question on the WhatsApp group and those who know the questions will assist me. This has promoted the sharing of information among students and solved the problem of some students who want to be selfish.

Mellissa echoes the same sentiments:

We have created a WhatsApp group for Business Studies for the purposes of sharing academic information and I am the administrator. I am in the Mathematics and Accounts groups as well. ... I have some health challenges which prevent me from attending some of the lectures at school, and these chat groups assist me to get an update of the lectures and other activities

going on at school.

Students also claim that doing homework has now become easier. In support of this view, Ben was quoted:

The smartphone assists me very much in doing homework when at home. I can easily consult with group members if I get stuck with any question and get assistance from home. Consultation with my subject teachers is also very easy because I can get feedback immediately and not wait for the next school day to seek assistance from my teachers.

Agreeing with Ben, BK remarks:

With the use of a smartphone, I am able to do assignments on time. As I do my homework from home, I can get help from my classmates if I get stuck....

Besides using media platforms, some of the students indicated that they have other methods of sharing information. Panashe adds:

I use some applications like Share-it, WhatsApp and Face-Book to share educational information with my friends. I prefer using Share-It because to me it is user-friendly: it is fast, and you can share many documents at once...

Denzel affirms:

I use my phone to share with my classmates some questions and downloads through WhatsApp groups ... I have joined different educational chat groups on WhatsApp. I share some academic documents with my friends on WhatsApp and on e-mail. I have an e-mail account. I share soft copies of the information that I will have researched with my friends.

Part B: Teachers' views

Some of the teachers confirm the students' view that smartphones have created platforms for students to share current information. This may be seen in the following statements.

Teacher No. 1 answers his questionnaire thus:

Students who are using social media platforms to share information have new insights and more information; they have demonstrated a marked

improvement in their homework and presentations.

Teacher No. 2 pronounces:

Assignments can be sent through the students' smartphone applications or through media applications like WhatsApp.

Part C: Parents' views

Confirming the students' views, most of the parents also noted that their children chat with others as they do schoolwork on these social media platforms. The following statements were made by the parents.

Parent No. 1:

My child is in WhatsApp chat groups which enable him to do his homework without much assistance from us as parents.

Parent No. 2:

My child has stopped the habit of moving around looking for information because she can get it from her classmates or friends through their chat groups. Good results have yielded from the use of these media platforms.

4.1.2 Perceptions on academic use of smartphones by students

Following Objective Two and Question Two of the study, which aimed at examining the various perceptions regarding the academic use of smartphones by learners at Harare High School, responses from students reveal the following themes: smartphones are ideal for academic use, smartphones are good but need monitoring, and smartphones are not good for academic use. On the theme smartphones are ideal for academic use, I start by presenting students' views before those of parents and teachers. Therefore, in the second and third parts of this section, I present the views of the parents and teachers, respectively, on the academic use of smartphones.

4.1.2.1 Smartphones are ideal for academic use

Part A: Students' perceptions

The perception 'Smartphones are very good for academic use' was supported by a number of students. For example, Mellissa posits:

A smartphone is convenient for use in education ... A smartphone can carry

a lot of information including e-books, so to me, it is like a library ... Smartphones will help those students who are serious about their school work. I have personally observed some improvements in the academic performance of some students who use smartphones.

Deon offers:

A smartphone has an advantage that you can carry it everywhere you go ... A laptop is more expensive compared to a smartphone and carrying a smartphone is smarter than carrying a laptop. E-learning, especially with the use of smartphones should be encouraged in all schools because it is an advantage when you finish school in that you will have knowledge of ICT.

Ben alleges:

Smartphones are cheap to use because I can put all my books and other learning materials on my phone as soft copies or PDFs. In other words, the smartphone becomes my library ... The use of smartphone also serves time compared with going to the library to search for information.

Chamu agrees:

I prefer using my smartphone because it is easy to use and serves time. The major advantage of using the smartphone is that you can access your learning material anytime without any restrictions ... while the school has a computer lab in place for students to access information on the Internet; the numbers of computers is so small that it is difficult for most of us students to access them for effective e-learning. Most of us have smartphones, and the school provides Wi-Fi for use, so why not make the best of it?

The students understand the smartphone as the appropriate technology in view of the newly introduced educational curriculum which places emphasis on research and innovation. The following statements from the students confirm this view.

Casino articulates:

As students, we need to move on with technology. The smartphone is our new technology, it improves our learning techniques...I will continue to use it as long as I am at school....

In support of the use of the smartphone in the new education curriculum, Chamu pronounces:

... the demands for the new education curriculum in Zimbabwe will force students to resort to smartphone utilisation. The curriculum requires students to research when doing projects and these smartphones can assist us.

Ben claims:

... From the new education curriculum in Zimbabwe, teachers are now facilitators who should just guide learners, and a smartphone is very necessary for research in this new curriculum. ... The students are now given “tasks” to carry out and “projects” to do every term, so the smartphone is needed to take some photos and record video and audio recordings especially when assessing the environment in geography or when doing interviews in subjects like business studies and geography.

Densil adds:

The introduction of the new curriculum which comes with the use of new technologies will force all students to use these devices. Smartphones are important to students who are serious with their academic studies

Apple agrees:

The use of smartphones in the new curriculum is an advantage because a smartphone can be used everywhere, anywhere without any limitations. Students

can easily carry a smartphone to do interviews as in the case of tasks carried out in business studies. They can take photos with them and record their interviews.

Part B: Teachers’ perceptions

Most of the teachers concur with the students’ perspectives that a smartphone is a convenient tool for learning. The statements below support this view.

Teacher No. 1:

The use of smartphones motivates students to work hard through research and to understand topics in a more effective way.

Teacher No. 2:

There are some marked differences in the performance of students who use

smartphones and those who do not. Their level of participation in class and answering of questions also differs.

Teacher No. 3:

The use of smartphones as research tools promotes learning and teaching methods to migrate from teacher dependent to learner centred.

Teacher No. 4:

Use of smartphone encourages interactive methodology. There should be no going back on the use of smartphones.

Part C: Parents' perceptions

Adopting the students' views, the parents perceive a smartphone as an essential ICT learning tool that is helpful in the learning and teaching processes. The few statements given below confirm this.

Parent No. 1:

Our children are now able to access information and answers that we as parents may sometimes be unable to provide them with. My child's level of concentration on studying has improved greatly.

Parent No. 2:

Use of smartphone is a fair improvement to the education system. Children are now having wider platforms for research.

Parent No. 3:

It is a brilliant idea. My child can have a better and faster understanding of concepts taught in class due to the availability of a variety of simplified explanations on the Internet.

Parent No. 4:

It is so convenient. Children can now access new information that is not yet written in textbooks and know of the changes that are now happening in the world.

4.1.2.2

Smartphones are good but need monitoring

Part A: Students' views

This perception was supported by the majority of the students in this study. Student Deon confirms this when he states that:

... I learned the hard way when I failed my exams. A smartphone can be a disadvantage to school work. I advise that when using a smartphone, students should be time conscious. Your phone can become your enemy if you are not careful. To my friends, I always advise them to use their smartphones for academic purposes only and avoid spending time on social issues like playing games and chatting, because they can rob them of time to study.

BK adds:

I admit that the idea of using smartphones for academic purposes is a very noble one if they are used profitably, but the problem can arise when students start to abuse smartphones ... There are sites found on the Internet that are not good for students, so students need to be protected from accessing them.

Chamu offers:

Smartphones are good and can be used for learning purposes ... I believe that the smartphone should be controlled and monitored by the owner to avoid abuse. It is an advantage when the smartphone is being used by disciplined students ... The issue of addiction to smartphone use depends on individuals but am not a victim because I am devoted to my school work.

Finance reflects:

Using a smartphone has advantages and disadvantages but as for me, smartphone use poses more advantages than disadvantages. Efforts should be made to ensure that as students we enjoy the advantages and minimise the effects of the disadvantages. Therefore, all schools should allow students to use smartphones since we are now a technologically advanced country.

Mellissa agrees:

Smartphones are so helpful and I am one of the students who has benefited from their use academically. I, however, do not support the use of smartphones among junior students (form one to form four) because they can

easily fall into the temptation of abuse and addiction. Smartphones should be used by mature people who have the self-discipline to guarantee their effective use.

Part B: Teachers' perceptions

In support of the students' view, teachers also perceive the smartphone to be good. However, they expressed the need for a cautious approach, to protect students from abusing the technology. Below are some of the statements given by teachers to confirm this;

Teacher No. 1:

Students may abuse smartphones if they are not monitored.

Teacher No. 2:

If students are not watchful, smartphone use can be time-consuming, students should balance their time on smartphone and other activities.

Teacher No. 3:

Students may develop negatively in their academic performance if their use of smartphones is not monitored. Strategies should be put in place to ensure that students are always monitored, both at school and at home.

Teacher No. 4:

The benefits of using smartphones for academic purposes outweigh their costs, so efforts should be made to ensure that students capitalise on the benefits and minimise the negative effects that come with the use of this technology.

Part C: Parents' perceptions

In support of the students' view, some parents perceive the smartphone to be a beneficial new technology when used responsibly. The few statements displayed below agree with this.

Parent No. 1:

Media platforms should only be accessed at other times not during lessons and study time, especially when being accessed for social purposes.

Parent No. 2:

As a parent I need to closely monitor my children from home as they use

these smartphones for learning purposes to ensure that they do not spend most of their time on the phone, doing non-academic things.

Parent No. 3:

Children need a lot of attention when using smartphones because some of our kids are too playful and they cannot control themselves.

4.1.1.6 Smartphones are not good for academic use

Part A: Students' perceptions

This perception was supported by very few students, however, Ben conjectures:

I feel that as students, we should also take note that smartphones encourage laziness because you can get information without much effort.

Edwin comments:

I do not believe that all students should use smartphones because some students are still young; like forms one to form four students, they are still immature to handle the temptations associated with smartphone use.

Part B: Teachers' perceptions

Only one teacher supported this perception, claiming

The use of smartphones encourages laziness as students just get information without working for it.

Part C: Parents' perceptions

A few of the parents supported this perception. This was one observation:

Parent No. 1:

The use of a smartphone for learning purposes is a bad idea. This is an abomination; these sites may carry material not suitable for human consumption. It allows children to open other sites that are undesirable.

Parent No. 2:

I am against this; these platforms are likely to be abused. Some children end up misusing the privilege. Smartphone use encourages abuse, a temptation

which is difficult to manage.

Parent No. 3:

...as a parent I have observed the deteriorating performance of my child in academic work and I attribute this to the way my child has been using the smartphone, it's sad.

4.1.1.7 Analysis of the students' use of smartphones

Question one of this chapter explored how students at Harare High School use smartphones for academic purposes. Question Two, on the other hand, examined the various perceptions of students as they use smartphones for academic purposes. Objective Three and Question Three of the study aim at analysing why students at Harare High School use smartphones for academic purposes the way they do. This section examines seven themes developed from the data generated from the students. The themes developed are listed as: the social benefits of using smartphones, challenges students face when using smartphone technology in their learning processes, the role of the school environment in supporting smartphone use, teachers' role in teaching and learning by means of smartphones, parental role in supporting the academic use of smartphones, and recommendations given for the improvement or precautions to consider for effective academic use of smartphones. The views of the parents and teachers on these themes will also be presented in this section. Some graphs and charts have been used in the analysis of the findings.

4.1.1.8 Social benefits of using smartphones

Besides using smartphones for learning purposes, it was revealed by the students' responses that learners also use smartphones for social activities. From the students' presentations on the 'Social benefits of using smartphones', I developed four sub-themes namely, communication; voice calls, texting and chatting on platforms of social media like WhatsApp, Twitter, Facebook inter alia; watching television and videos on YouTube; listening to the radio, playing music, and reading newspapers; and playing video games.

4.1.1.8.1 Communication: voice calls, texting and chatting on platforms of social media

Most of the students specified that they also use their smartphones for social needs, especially when communicating with family, relatives and friends. This is achieved through voice calls and

text messaging on local networks, chatting, audio and video calls on media platforms such as WhatsApp, Skype, Twitter, IMO, and Instagram. Some of the students also use Facebook for these social chats and a few students talked about the use of emails as a mode of communication. Some students such as Edwin, however, indicated that such communication is usually conducted after lessons to avoid disrupting the flow of the school programme. Some students, for instance, Mellissa, specified that they only use the smartphone for socialisation when they are at home.

In support of the use of smartphones for communication, Ben averred:

I sometimes use it for social purposes like chatting and communicating with friends and relatives....

However, there are other students such as Tracy, who indicated that they do not use their smartphone on social issues, as they reserve it mainly for academic use.

4.1.1.8.2 Downloading and watching videos and television on YouTube

Several students admitted to using the smartphone for downloading movies or videos on YouTube and watching them for entertainment purposes. Some students, such as Doctor and Panashe, specified that they watch television channels on YouTube. Denzel indicates that he also uses his phone to watch television, soccer, and some movies on YouTube.

4.1.1.8.3 Listening to the radio, playing music, video games, and reading newspapers

Most of the students, including Chamu, Edwin, Mellissa, Panashe and Clara, indicated in their presentations that they use their smartphones to listen to music. Some also use their device to tune into radio channels, with Star FM the most popular or favourite radio channel among the students. Some students use the phone to access and read newspapers. According to Apple, they use the application 'Binu' to read all Zimbabwean newspapers free of charge: this helps them to keep updated on current affairs in the country. However, there are certain students such as Ben who indicated that they do not use the smartphone for accessing mass media, especially not for reading a newspaper. According to him, he prefers to buy the newspaper in order to access issues relating to his subjects, so that he can keep a record of such issues.

Only three students, namely, Denzel, Clara, and Doctor, have indicated that they play video games on their phones, this especially during their spare time, and when they are at home

relaxing.

4.1.1.8.4 Challenges students face while using smartphone technology in the learning processes

Notwithstanding the fact that there are some academic and social benefits realised through the use of smartphones, students participating in this study complained about certain problems linked to the use of their smartphones. The problems encountered were classified into five sub-themes, namely, financial constraints, technical challenges, distraction from concentrating on school work, abuse in visiting unacceptable sites, and addiction and behaviour challenges.

4.1.1.8.5 Financial Constraints

Some of the students highlighted the cost of purchasing data bundles and servicing the device as their major challenges. There are some parents who cannot cope with these expenses because the costs of maintaining a functional smartphone are beyond their reach. This limits the child's Internet access when studying from home. According to Ben some of their smartphones are expensive to maintain, especially in their repair or servicing. Some students, such as MK, claim that the phone is too expensive, and very few students can afford to have one. Some students, such as Mellissa and Tracy, indicated that their phones were not performing to the expected standards. They are low-cost phones; funds permitting, they wish to buy better phones which can carry out tasks relevant for academic use.

Technical challenges

On technical challenges, some students complained about the capacity or memory of their smartphones. Students, for instance, Mellissa, commented that their phones have limited memory capacity; therefore, students must use memory cards to hold some of their information. Mellissa, Panashe, and Clara complained of the short battery life of their phones. Their phone batteries do not hold power for long, requiring frequent charging. The problem is worsened by the regular power cuts experienced in their homes.

Some students, such as Doctor, highlighted the challenge of lack of experience in using the smartphone. Doctor indicated that he is struggling and failing to use some of the applications on his smartphone, owing to lack of experience in using the device. Students have revealed during the interviews that they have varying levels of experience in using the smartphone as represented by the duration each student has owned the device. According to the students' submissions, they have owned and used smartphones for periods ranging from 4 months to 7 years. Students have owned and used the devices for an average period of about three years, whereas Doctor has been using his smartphone for about a year.

Other students, for example, BK and Mellissa, complained about the Wi-Fi service at their homes, which is too slow, therefore the process of searching for information on the Internet takes longer than normal. The students also indicated that some of the information displayed on some Internet sites can be wrong and misleading to students. Other students such as Doctor reiterated that sometimes the data on their phone becomes corrupted by viruses, and they fail to access it.

4.1.1.8.6 Distraction from concentrating on schoolwork

According to the participating students, smartphone use can cause distractions for students during learning or study time. Edwin specified that the use of a smartphone can be time-consuming if students focus on social networks without balancing their usage. A majority of student participants noted that there are some students who are not serious about their schoolwork; they are always listening to music on their phones. The students also allege that certain students spend most of their time on their smartphones, but non-academically. In support of Edwin, Tracy warned that if students are not careful, they can spend a lot of time on WhatsApp at the expense of undertaking their academic work. Apple and Denzel, on the other hand, pointed out that they now have timetables for smartphone usage, to minimise distractions. According to Denzel, his parents once took away his smartphone because he was always on it. Deon also proposes to limit the

purchase of data bundles and make a timetable of when to use his smartphone so that he can concentrate on his academic work.

Most of the participants in this study advised that students have to be encouraged to concentrate on their studies and avoid spending most of their time on social platforms offered through smartphones. MK admitted that during the previous term he had failed, achieving only 2 points at A-level. His parents blame the overuse of his smartphone for his failure in exams. The participating students also advised that students need guidance on the use of smartphones because some students deliberately missed lessons while concentrating on the entertainment offered by their smartphones. They also raised concern over the number of students who use smartphones at school and are often seen putting on their headphones. According to the participating students, most of these students will not be using the phones for academic purposes, but rather, for social activities.

4.1.1.8.7 Abuse in visiting unacceptable sites

The student participants highlighted the fact that, as students use the Internet for their research, they are sometimes tempted to view undesirable material on sites like YouTube, on which they can access pornographic pictures and videos. The students also reported that some students spend most of their time listening to music and watching videos on their smartphones, at the expense of studying. In support of the above, Ben highlighted that some of the sites that they use to access the educational material like Google frequently lure them into accessing unsavoury and irrelevant sites. Casino also supports this notion when he indicated that some unsuitable websites continue to appear or pop up on his phone with nude pictures, tempting him to want to click on these sites.

A student participating in this study also reported that some students at Harare High School were caught downloading and circulating unacceptable videos in class and were punished as a result. This has prompted the school administrators and teachers to introduce stringent measures to control access to the Wi-Fi facility at the school, to minimise abuse. Accordingly, students now have to gain authority in the form of a pass to access the Wi-Fi and be allowed to use their smartphones at school. However, some students in this study have indicated that they now have certain software and applications that can prevent them from accessing those unsuitable sites. On the other hand, Denzel warned that, if students are not careful with the way in which they use their phones, they could become victims, being drawn unwittingly into joining cults like Satanism.

4.1.1.8.8 Addiction, health, and behaviour challenges

The fact was highlighted that there are certain students who have exhibited signs of addiction, health, and behavioural challenges, resulting from smartphone use. Some student participants reported certain students at Harare High School who allegedly display negative behaviour, like lack of courtesy (not greeting elders) while they are focusing on their smartphone, bad language, or simply disrespect towards elders. Some students are alleged to have developed the tendency to lie, especially when communicating through their smartphones. According to these students, some students at Harare High wear headphones even during class lessons, showing disrespect to the teachers. In extreme cases, some students are alleged to have become addicted to continually being on the smartphone, without allowing room for other important activities of life. Students such as Ben reported that they have seen students addicted to their phones, especially to music: they can hardly study without donning earpieces, and without music in the background.

There were several participating students who admitted to having challenges of addiction to their smartphone. Deon is one of the participating students who believes himself addicted to his phone. He attributes this to some of the questionable sites he has been visiting. However, he has resolved to end this practice. Apple also admitted that at one point in his life at this school he became a victim of smartphone addiction. He has now overcome the addiction and is able to control himself. Panashe admits that, before he started using the phone for academic purposes, he used to spend his time unproductively on his phone. He used to be addicted to his phone on social issues but is now no longer addicted.

Most of the students indicated that they were now aware of the temptation of smartphone abuse and addiction and were very cautious in their use of the smartphone, to avoid falling into this trap. Students such as Doctor stated that they avoid addiction to their phones by switching them off when not in use for academic purposes. Denzel intimated that he is unlikely to become addicted to his phone because he knows how to use it purposively.

Finance complained of the small screen on his smartphone which is now causing eye strain. Students also pointed out that smartphones can negatively influence students' personalities, especially those who concentrate on social media more than on their studies. According to Chamu, there are certain negative aspects of the use of smartphones, for instance, cyberbullying. Some students abuse their device by playing games during lessons. Denzel also talked about his friends whom he alleges to be 'hackers'. According to him, he used to have a password for the

school Wi-Fi but has since abandoned it. He pronounces that he has friends who are hackers and who can assist him to access the school Wi-Fi without a password.

4.1.1.8.9 Ownership of the device

The findings in this study revealed that most of the participating students owned smartphones. Only one of the fifteen students did not have a smartphone of her own. The student, Clara, reported that she had initially had a smartphone, but it had been stolen. Since then she has not had a phone of her own and is now using her mother's phone. However, using her mother's phone is a challenge. Once she recorded a lecture on her mother's phone, but her mother deleted it before she could use it, complaining of wastage of space. There are shortages of textbooks at school, therefore Clara opts to use soft copies on the phone; however, her mother does not allow her to take the phone to school.

4.1.1.8.9.1 The importance of the school environment in supporting the academic use of smartphones

The school's physical and non-physical facilities that support the use of smartphones were classified into four sub-themes, namely, provision of Wi-Fi facilities for students to access; control of access through provision of pass and passwords; penalties, or punishment given when students are caught abusing the facilities; and the school environment not being supportive of academic use of smartphones. The data generated on this sub-theme has been presented in a pie chart as shown below.

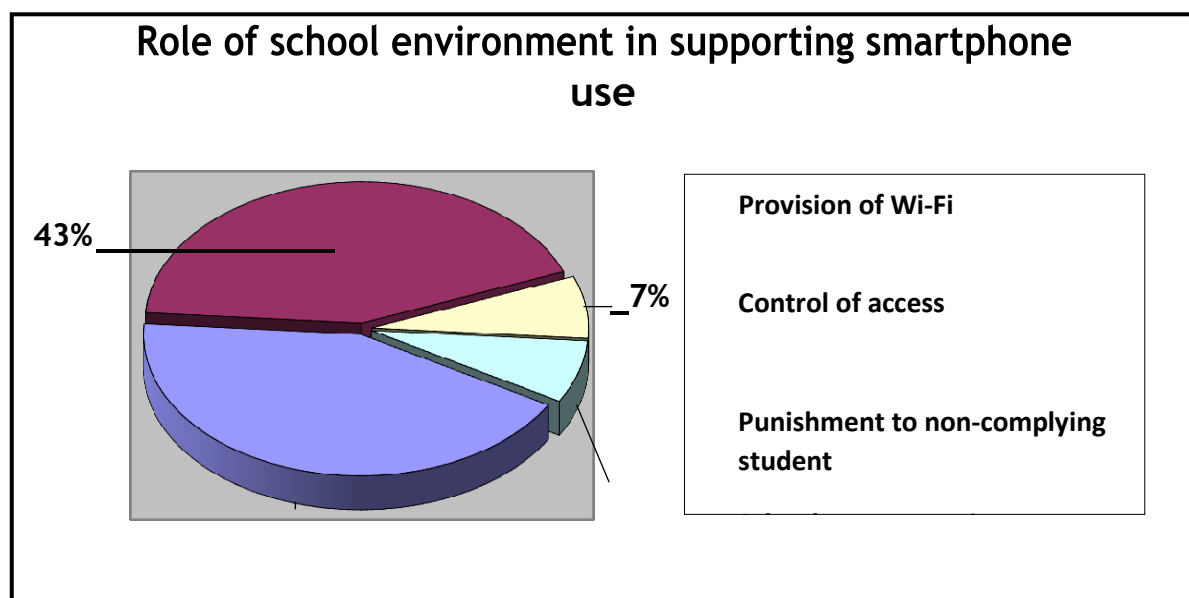


Figure 2: Pie chart for the role of the school environment in supporting the academic use of smartphones

The above pie chart represents the number of students who specified the role of the school in supporting the academic use of smartphones at Harare High School. Six participating students stated that the school has acquired and installed Wi-Fi facilities for students to access. Six of the fifteen participating students mentioned that the school administrators control students' access to the Wi-Fi through the provision of a pass and passwords, while one student specified that, in supporting smartphone use for academic purposes, the school has devised certain penalties or punishments administered when students are caught abusing the facilities. One other student, however, indicated that the school environment at Harare High School is not supportive of the academic use of smartphones.

4.1.1.8.10 Teachers' role in teaching and learning with smartphones

Data from the theme 'the role of teachers in supporting the use of smartphones by students', was classified into five sub-themes: technical support on how to effectively use the smartphone; monitoring; participation of teachers in academic chat groups; teaching of media literacy; students who indicated that there was little or no support from their teachers. Students' submissions were presented in a bar graph as shown below;

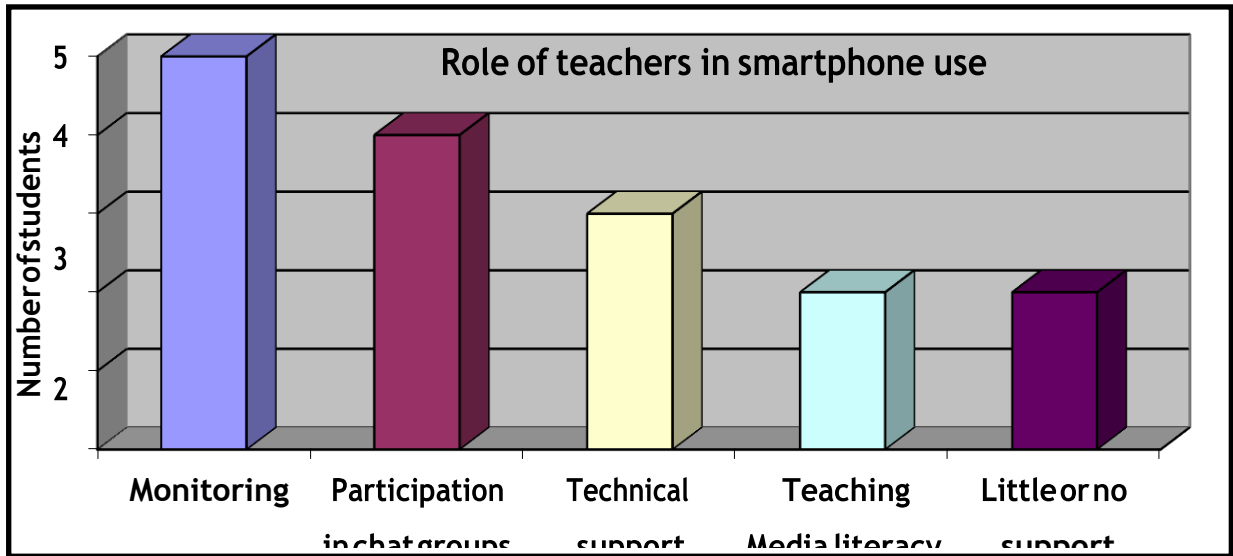


Figure 3: Graph showing the role of teachers in supporting the academic use of smartphones

From the graph displayed above, five students participating in this study have specified that their teachers at Harare High School play a key role in monitoring the students using phones for academic purposes. Four students appreciate the participation of teachers in academic chat groups on WhatsApp platforms. Three students indicated that their teachers offer technical support on how to use the smartphone effectively. The other two students said that phones helped in the teaching of media literacy. However, there were two other students who indicated that they have been getting little or no support at all from their teachers when it comes to the academic use of the devices.

4.1.1.8.11 Parental role in supporting the academic use of smartphones

Another theme developed from the interview data under the analysis of the students' use of smartphones is 'Parental role in supporting the academic use of smartphones'. Parental roles were grouped into five sub-themes as they were presented by the students. These include financial assistance, technical support, monitoring to avoid abuse and addiction, consultations or communication with teachers, and students having very little or no parental involvement. The students' views were captured under the appropriate sub-themes as presented in the bar graph below.

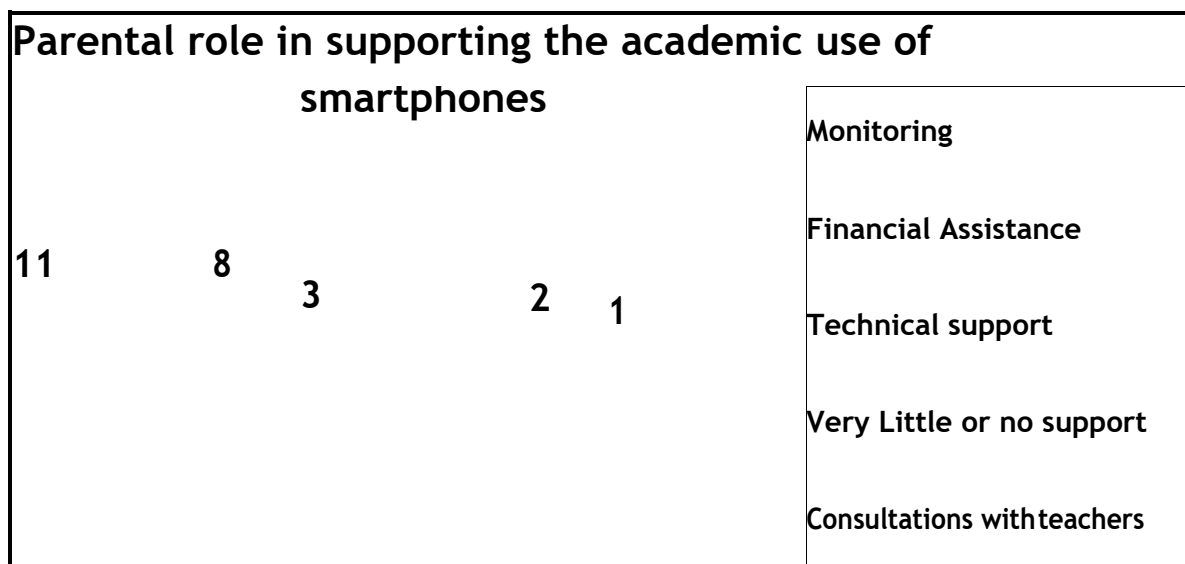


Figure 4: Graph showing the parental role in supporting the academic use of smartphones

The graph above shows that, in support of the use of smartphones for learning purposes, parents play the following roles: eleven participating students specified that they monitor their children to avoid abuse and addiction; eight students mentioned that their parents offer financial assistance in purchasing the smartphones, buying data bundles for their children to access the Internet from home, and are responsible for servicing or repairing the smartphones for their children. Three students said that their parents offer technical support, for example, teaching the child how to use the smartphone for research purposes and for doing homework; while one student indicated that his parents have consultations or communication with his teachers. On the other hand, two students feel that there is very little or no parental involvement when it comes to the academic use of smartphones.

The participating parents in this study concurred with the students' views on the importance of the parental role in monitoring children as they use the smartphone for learning. In their questionnaires, the parents mentioned three important areas of their involvement, which are: providing parental guidance to their children on the effective use of smartphone technology, paying for data bundles to enable their children to access the Internet, and monitoring the children to control abuse of the technology. On parental guidance, parents specified that they guide the children on effective ways of looking for academic material on the Internet and advising them to stick to academic platforms, avoiding social activities at the expense of their academic work. Some parents indicated that, besides paying for airtime or data bundles for their children to access Wi-Fi at home, they also subscribe to online tutorials for their children. On the important aspect

of monitoring, some parents indicated that they perform random checks on their children's phones and monitor them closely to make sure that they are using the smartphone for academic purposes, and not for frivolous purposes. The parents specified that children must not be continually on the phone, avoiding addiction. Some parents said that they set timetables for their children reflecting when they could use the smartphone. Some refused to allow a cell-phone to be taken to school until the teacher indicated. However, some parents highlighted that what a child does in the absence of the parents and other peers determines the success of the use of this technology as a learning tool, therefore children need to be taught self-discipline.

4.1.1.9 Recommendations given by students for improvements or precautions to consider for effective academic use of smartphones

The last theme developed from the submissions made by participating students under the analysis of the students' use of smartphones is 'Recommendations given by students for improvements or precautions to consider for effective academic use of smartphones'. Four codes were developed from the recommendations given, which include the teaching of media literacy, the role of school authorities and teachers, the role of parents, and role of students in safeguarding the effective use of smartphones.

4.1.1.9.1 Teaching of media literacy

The students participating in this study admitted that there is a need for them to be taught media literacy so that they may become knowledgeable about mass media, avoiding its negative effects. Mellissa noted that teaching of media literacy is essential because this will prevent students from abusing smartphones. Doctor added that students must be taught media literacy so that they can weigh the advantages and disadvantages of mass media, using it profitably. According to Panashe, media literacy should be taught to students to avoid abuse of smartphones on mass media. Students should be taught how to use smartphones wisely. Students should also be taught character education through lessons in subjects such as 'Guidance and Counselling' to ensure that their behaviour is not corrupted by what they may see on mass-media platforms.

4.1.1.9.2 Role of school authorities and teachers

The students appreciate the role of the school in providing Wi-Fi facilities at school, as highlighted in the findings of data generation. However, they emphasise the need for school

authorities to allow them to access Wi-Fi services without involving the long and complicated route of acquiring authority to use the services.

In respect of this, BK and Ben wish to advise all teachers and administrators in secondary schools to allow students to use smartphones at school. However, they should devise mechanisms to control access to this facility, to avoid abuse. They agree to the idea of using passwords to gain access but advise that the school should set guiding rules to be followed by students. Some students emphasise discipline and advise that students should not be allowed to move around with their smartphones, to avoid addiction.

According to MK, the government should assist in the implementation of the use of smartphones by learners in schools. The students appreciate the role of teachers and school administrators in monitoring usage of smartphones by learners. The government should make sure that teachers are trained to monitor and control the use of smartphones by students. If possible, they should design the teaching methods in such a way that smartphone use becomes part of the education curriculum. Students like Ben insist on the need for teachers to be trained to use smartphones as learning tools; some teachers do not know how to use these devices. Teachers should give their students guidance, direction and control of the use of smartphones. Students noted with concern that most of the teachers at Harare High School have smartphones, but they doubt whether they are able to use them for accessing academic material. The students also advocate that seminars be planned to train learners on how to use their smartphones effectively. There is a need for students to acquire knowledge and skills on how to use some of the software offered through these smartphones. This will enable students to access information easily on the Internet.

Most of the participating students advocate that the Ministry of Primary and Secondary Education in Zimbabwe should allow only senior and mature students such as the A-level students, to use smartphones. A-level students, being mature, may not need serious monitoring, but may simply need to be guided. This is against the background that lower- grade students lack maturity, and they only disturb others because many of them love music and may not be able to overcome the temptations that come with the use of smartphones. Therefore, it would be better to use computers. The students, however, lamented the shortage of computers in the school's computer laboratory, where there are only about fifty (50) computers to be used by 2000 students. Schools need to equip their computer laboratories with computers for youngsters to use. At school, students should only use smartphones during class lessons to

avoid abuse.

Students like Doctor noted with concern that there are some schools that still do not allow students to use smartphones. Doctor reported that he attended a mission boarding school in previous grades, where smartphones were not allowed. When he joined Harare High School he was relieved to know that smartphones were allowed. He indicated that at these mission schools should a student be caught with a smartphone, he or she would be expelled, as a disciplinary measure. He advised that these schools need to know that technology is moving quickly, and as a nation, we need to embrace such changes and not resist them.

Such schools should be informed of the many advantages of using smartphones for academic purposes and be advised on solutions, to allay their fears of possible abuse of the device. This should motivate such schools to embrace the academic use of smartphones. Were all schools given authority to use smartphones, the government could support these schools by purchasing these devices for the schools, as they do the textbooks. The students also suggest that the government could allow schools to levy parents so that they could raise funds to buy smartphones for all the students, especially the senior students.

BK contributed:

... all schools should allow their students to use smartphones because all subjects in school need to be researched on.

Clara added:

I wish that the school should purchase tablets for use by students and the devices remain school property.

The teachers participating in this study proposed the need for the Ministry of Primary and Secondary Education to make mandatory the use of smartphones by secondary students in all Zimbabwean schools so that students are given an equal opportunity of using this technology. They also advocate that all secondary schools be encouraged to invest in infrastructure which promotes the use of smartphone technology.

The teachers have suggested some security measures that schools may adopt to safeguard the effective use of smartphones by students. These are listed below:

- 4.1.1.9.2.1 The use of individualised student passwords which are controlled and monitored by administrators. This will ensure that the activities of each child on the Internet may be tracked, and any attempts by students to visit undesirable sites detected.
- 4.1.1.9.2.2 The use of smartphones should be monitored and restricted or confined to the classroom lesson time, under the control and instruction of the subject teachers.
- 4.1.1.9.2.3 The use of software applications to block students from accessing unsavoury Internet sites. One of the teachers proposed software called ‘Mikrotik Hotspot Blocker’.
- 4.1.1.9.2.4 Students should only bring their smartphones to school on request by subject teachers.

4.1.1.9.3 Role of Parents

All the participating students agreed that the parents play a pivotal role in the academic use of smartphones. Ben pointed out that parents need to buy smartphones that are suitable for academic use by their children, rather than high-end phones simply to be flaunted.

Chamu and Apple urge parents to assist and monitor their children as they use their smartphones. According to the students, parents must control their children as they use these smartphones. If left unmonitored, children may be destroyed by the irresponsible use of the devices. Doctor concurred with Chamu and Apple, stressing that parents should assist their children in purchasing of smartphones, monitoring their use. They should also accept the rules and regulations set by the school authorities as they govern the use of these smartphones.

4.1.1.9.4 Role of students

The students appreciate that, for academic use of smartphones to be beneficial, there has to be discipline on the part of the student or the user of the device. Students noted that the school authorities, parents and teachers are there to complement the efforts of the learners. Should there be a lack of cooperation from the student; the essence of academic use of the smartphone may be lost. To this effect, participating students advise other students on the following:

- 4.1.1.9.4.1 Students should use smartphones properly, learning to limit their time on the smartphone to allow for other processes in life.
- 4.1.1.9.4.2 Participating students encourage other students to use their smartphones wisely as these devices can assist them in their academic development. Students must know why they are using smartphones, to avoid failure. Social networks are interesting

and enticing. If students are not careful, they will fail in their class work.

4.1.1.9.4.3 Students should focus on academic work more than on social activities.

4.1.1.9.4.4 Students should not use passwords unknown to parents, who must freely access their phones for monitoring purposes.

4.1.1.9.4.5 Smartphone users should be sufficiently disciplined to stick to academic sites and avoid visiting irrelevant sites. Students should avoid visiting sites that corrupt their minds, such as pornographic sites.

4.1.1.9.4.6 Each student should make a timetable to follow when using a smartphone. This is because some students may spend the whole night on a smartphone concentrating on social issues. This will lead to their falling asleep during lessons.

CHAPTER FIVE

Discussion of the research findings

5.0 Introduction to the main findings

This chapter deliberates on the main findings of the study. Drawing on the ANT, a theory in which material and human elements come together in one investigative view. The academic use of smartphones among secondary school students was conceptualised as a heterogeneous network which consists of human and non-human actors. This proposes that non-human actors are also taken as a key component of the social setting that shapes and create facts (Adam, Gluch, & Julin, 2014). It also implies that, in the case of academic use of smartphones, knowledge does not only reside in the minds of the teachers and students in the educational setting. It is not limited to the social interactions between people: instead, it is present in the heterogeneous network that constitutes several other components, such as the parents, school environment, and the smartphone technology itself. Hence the smartphone technology mediates the interpersonal interactions in these networks. It also defines relationships and context and affects individual student behaviour and actions when it comes to their learning processes. However, in analysing this phenomenon, I realised that these networks can be complex, making the analysis process unfeasible. I, therefore, had to consolidate the networks to make them incorporate single-point actors, mainly the student and the smartphone. The other important parts of the network such as the role of the school environment, teachers and parents, are also examined during the analysis.

In answering the key research question, the outcomes of this research are discussed in three areas as presented in Chapter Four. This chapter begins by discussing the academic use of smartphones by secondary school students at Harare High School. The perceptions of the teachers, parents, and students in respect of the academic use of smartphones will also be deliberated on in the second phase of these discussions. The chapter concludes by reviewing an in-depth analysis of the academic use of smartphones. The following topics are discussed as I analyse the academic use of smartphones: challenges associated with the academic use of smartphones, the role of the school environment, teachers, parents, and the students in the academic use of the technology, and the recommendations made towards the effective utilisation of the smartphone for learning purposes.

Harare High School in Zimbabwe has emerged as one of the pilot schools that have adopted the academic use of smartphones by students in their learning processes. This was achieved through the introduction of Wi-Fi facilities at the school for access by the students and teachers. The school was therefore used as a case study in this research. Some students and some teachers at the school have adopted the use of the smartphone as a learning tool. However, it is important to note that most students and teachers from the sciences and commercial subjects have embraced the use of this technology for their learning processes; the remainder of the students and teachers seem sceptical about the new developments. Such teachers and students believe smartphones to be too much of a distraction. The school has put in place monitoring mechanisms to avoid abuse of the smartphones and Wi-Fi facilities. In that respect, students must acquire a pass and an individualised password upon recommendation by the subject teachers in order to be eligible for using the facility at the school. This is in line with ANT, which emphasises collaboration of all actors to achieve the desired results.

5.1 Academic benefits realised from using smartphones

According to the Actor-Network Theory, people do not exist in a vacuum: any act in the world is influenced by various factors, and these create a network. It should be noted that in the context of this study, students at Harare High School are influenced by many factors in their learning processes. One important factor of interest is the smartphone as it is utilised as a learning tool, thereby influencing the educational processes. The Actor-Network theory explores how the relations between the smartphone and the student are formed as the students use the smartphone in their learning processes. Therefore, the relationship between the smartphone and the students in academic interactions is paramount in this discussion. The smartphone and the students combine together into an actor-network, working together to determine the outcomes of the learning processes.

The findings of this research show that a relationship has indeed been formed between the students and the smartphone. However, the relational patterns differ from one student to the other depending on the level of utilisation of the smartphone. Most of the students have developed adequate relationships with their smartphones, which assist them to access and gather information from the Internet, helping them to explore new knowledge and enhance their academic performance. Anshari et al. (2017) concur with this assertion when they state that students use smartphones as learning aids due to many reasons such as the provision of convenience, comprehensive learning experiences, portability, multitasks and multi-sources, and they are environmentally friendly. According to the findings of this study, students use smartphones as

learning tools that allow them access to learning resources. The major benefits of smartphone use as outlined in chapter four are research, downloading academic material, storage of learning materials, and sharing notes and assignments through discussions in academic chat groups.

5.1.1 Research

One of the theoretical underpinnings of the ANT is that human and non-humans can and do work together. In this study, students use their smartphones to access and gather information through the use of smartphones. This has helped students to explore new knowledge and enhance their academic achievements. This study revealed that students use Google as the common Internet site for their academic searches. YouTube is also used by students for accessing audio and video lectures. This demonstrates that the use of smartphone technology has brought with it a number of benefits in the students' learning experiences. These benefits are discussed below.

5.1.1.1 Access to current information which may not be available in textbooks

According to the theory ANT, accessing and gathering of information through the use of smartphones will help students to explore new knowledge that will enhance their academic achievement. I observed that most of the learners who were participants in this study as uncovered in their transcripts are in the commercial subjects' classes. According to the participating students, the information in most of the available textbooks for subjects such as Accounting, Commerce, and Geography is outdated because of revisions in the syllabi. The need for current information to augment these textbooks cannot be overemphasised. Smartphone use to access the Internet has alleviated this problem. The students also indicated that some of the current textbooks available in the school library are too limited in number to cater for all the students. Students also appreciate that the notes given to them by their subject teachers are inadequate, hence the need to supplement such notes through further research. Therefore, the use of smartphone technology has enabled them to access current information and new formats for those studying accounts.

Academic materials are now obtainable on the Internet, making the lives of students much easier. Information has now become an important aspect of education and the tablets and phones may benefit students in their research, and in gaining a worldwide perspective of theories. Outcomes of this study show that students have now embraced these aspects of research in their learning processes, owing to the use of smartphones. Students' research skills have improved, thereby enhancing the students' level of understanding of the concepts and topics taught in class. The participating students stated that during lessons the teacher tasks them to research on specific

topics: they are required to present their findings in class the following lesson.

The students have reported that they have observed improvements in the quality of academic presentations made by some students owing to the use of smartphone technology. Also, the depth of presentations or arguments made during these discussions has reached commendable levels. Some of the participating students even claim that they always work ahead of their teachers because of the use of smartphones in their research; whenever a teacher introduces a topic, they look for the relevant information on the Internet, gaining knowledge on the topic before the next lesson begins.

It should be noted that some subjects require views of various authors on certain topics in order to have a comprehensive perspective on the subject. This, therefore, requires students to buy or have access to several textbooks written by different authors on a single subject. However, with the use of smartphones, a student may gain access to the varying views of authors through the Internet. Students can download these various views either as e-books or as academic papers. This reduces the need to purchase the many hard copies of textbooks, making studying much more convenient and cheaper.

The participating students highlighted that some key textbooks like those on subjects such as geography and economics, are expensive to buy, and are mostly available in scant numbers in the school library, making them very difficult to access. However, students can access and download such textbooks from the Internet as e-books. Students claim that this is a cost-effective way of accessing information, rather than buying hard copies of the textbooks. Students also perceive smartphone access to be cheaper than buying the textbooks or buying computers and laptops. One of the students, Chamu, maintains that she has accessed many textbooks from the Internet through the use of her smartphone. Students such as Edwin pointed out that they use the smartphone to download academic materials for subjects like Mathematics, Geography, and Accounting, in the form of Portable Document Format (PDF). Panashe claims that he has so far realised a reduction in the cost of buying textbooks. According to him, some economics textbooks are more expensive than a smartphone; and yet a smartphone can contain several of these books when downloaded or obtained as soft copies. In support of the students' view, research carried out by Anshari et al., (2017) also revealed that students use their smartphones to access teaching materials or supporting information, which are normally accessible through the Internet.

Another benefit cited on use of smartphones was that they provide the ability to gain instant

answers via the Internet. It was noted that some learners may be reluctant to seek clarification to a question which they may have in the classroom; however, using smartphones in a classroom set-up can avail such answers. Previous research has also shown that there are applications for just about everything, and on the smartphone, you can do your tasks a lot easier (Anshari et al., 2017). The participating teachers in this study also welcomed the use of smartphones, highlighting their role in enhancing wider research, which according to them is an effective way of imparting knowledge to students. Teachers have seen smartphones as helpful in encouraging students to work hard on their own. The teachers admit that some students who use smartphones have demonstrated a higher level of understanding on many topics, as seen in their improvement in answering questions, in their homework and class presentations. According to the teachers, students have become more resourceful; have developed self-confidence, presenting exciting arguments during discussions.

Parents also noted that their children are now able to achieve assignments or homework easily without much assistance from them. Some parents have also noted certain improvements in their children's performance in school owing to the use of their smartphones. Others feel that the burden of buying textbooks has been reduced through the application of smartphone technology. In this study, the ANT has implied that humans and non-humans can work together, as when students use smartphones to access data. However, it should be noted that it is harmful academically when students use cell phones irresponsibly instead of concentrating on class participation (Dietz & Henrich, 2014).

5.1.1.2 A smartphone is more convenient to use

The participating students indicated that the smartphone is more convenient to use for e-learning compared with computers and laptops. Some students specified that they use smartphones to capture notes during lessons, and for writing homework or assignments. The portability of the device allows students to use it whenever the need arises. Students also shared that it is laborious to read textbooks; with the use of smartphone technology, they can go on Google, search for a specific topic under study, the information becomes available to them instantly. In support of the students' views, Barker et al. (2005) reiterate that the portability of mobile phones allows the ubiquitous use of these devices for students' learning; students are able to find or retrieve course material since their smartphones can be carried from one class to another or anywhere else. This allows learning to take place anywhere, anytime. Time can be valuably utilised (Myers, 1997). The portability of the smartphone may also enhance a wide range of learning situations, like, the

classroom, outside the campus, or a field trip.

Nowadays, students are generally interested in conducting online studies. In the Zimbabwean context, e-learning is gaining ground owing to the introduction of smartphones as an academic tool. Econet, one of the wireless network providers, launched an e-learning platform on the Internet called 'Ruzivo' in 2016 (<https://www.newsday.co.zw/2016/02/econet-launches-e-learning-platform/>). This is an online collaborative digital educational platform targeting secondary and primary school students. Ruzivo complements the government's efforts in providing resources for learning to improve the pass rate of public examinations. Ruzivo contains locally established academic content in digital form, including tests, exercises and interactive lessons. Packages may be used both in the classroom for lessons by teachers and by students at home for their revisions. Once a child initiates the programme, Ruzivo will store the child's progress in all exercises and tests. Another platform developed for the same purpose is 'Wagona Maths'. This is an e-learning platform that supports the learning and teaching of mathematics in Zimbabwe and throughout the world. It allows students to enrol in a particular mathematics syllabus, learning topics within that syllabus. In this instance, when students sign up for ZIMSEC syllabus, they are able to access the various syllabi for Forms 1-4 Mathematics within ZIMSEC. The access will be for all areas of O-level, regardless of the stage at which the student is currently. Students may also enrol for Cambridge syllabi, depending on the choice of the student.

According to Osang et al. (2013), it is more convenient to house a number of portable devices in a classroom when compared to numerous desktop computers. In support of this comment, some of the participating students offered that they no longer needed to visit the school library for their research. Their smartphones can do everything a computer or a laptop can do in a more convenient way. Myers (1997) reiterates that the use of smartphones by students allows students at any time to search for any information they seek. They can consult their phones on any new and current information as and when they wish, which will increase student interest in using the device.

5.1.1.3 Smartphone an appropriate technology for the newly introduced education curriculum

One of the theoretical keystones of ANT is that it is not merely a social theory; instead, it is a theory of how a social phenomenon can be studied (Czarniawska, 2006). The students highlighted that smartphone technology for learning has come at an appropriate time. The Ministry of Primary and Secondary School Education has introduced a new education curriculum which emphasises student-centred teaching methods, thereby bringing the social phenomena to light. The new

curriculum has the component of continuous assessment, which demands that students be creative, innovative, and adventurous in their research. Besides using the smartphone for research, students pointed out that they also use smartphones to take photos, audio and video recordings of fieldwork and interviews, as they complete their ‘tasks’ and projects, especially in the commercial subjects, and field surveys in geography. Some students claim that they have become quite adventurous through use of this technology.

In support of the students’ views above, some scholars confirm that the applications of the smartphones are online search, data production, taking notes, communication with others, organisation of data, and the production of content (Holtzhausen, 2017). In this respect, the smartphone plays a pivotal role in the newly introduced education curriculum as a data-production tool. Teachers have also applauded the utilisation of smartphone technology as it enables them to migrate from lecture methods which are discouraged under the new curriculum. In the new curriculum, the teacher is now a facilitator to the student who is now called the learner. Some scholars support this declaration by the teachers, in claiming that because of technology, students are being transformed into explorers, and teachers into guides (Thompson, 2016). According to the participating teachers, this also provides for interactive teaching methodology, promoting good rapport between students and teachers.

5.1.1.4 Downloading academic material

The students highlighted that some textbooks in their school library are old and out-dated, raising the need to seek recent textbooks or current information. Some of the current textbooks are also scarce; there may only be a few copies available for use by many students. Furthermore, some of these textbooks are very expensive to buy. These textbooks and some other academic material may be accessed and downloaded from the Internet. Students prefer to download and store these on their smartphones as e-books and academic papers. They claim that this is a cost-effective way compared to buying hard copies.

5.1.1.5 Storage of notes and past examination papers

The theoretical foundation of ANT is that people’s actions are influenced by different aspects, and these aspects create a linkage. Accordingly, there are connections between the use of smartphones by students and their access and storage of the academic information on their smartphones. The participating students indicated that a smartphone is a convenient tool for

storing academic material as soft copies. The findings of this study reveal that students prefer to store much of their academic work as soft copies so that they can conveniently access the information wherever they are. Some students even write notes and assignments on their smartphones. According to the participating students, all the downloaded e-books and papers, and all other important educational materials such as the subject syllabi are also stored on the phone for use in writing assignments, or for revision. Soft copies or snapshots of their notes, revision papers, and assignments may be found on the phone; as is recorded or downloaded audio and video clips of lectures or group discussions, and interviews conducted during field surveys. This makes learning more convenient as information becomes readily available. According to the students, the phone has now become their library. When using smartphones assignments may be completed on time; and students can revise their work anywhere, anytime, without limitations (Jafarzadeh-Kenarsari & Pourghane, 2017). In fact capabilities of smartphones as audio and video recorders can bring life to the learning activities within the classroom through the use of music, video images, and voice recordings. (Jafarzadeh-Kenarsari & Pourghane, 2017).

According to the findings of this study, students prefer using textbooks in soft copy format because they claim that some textbooks are too heavy to carry. They insist that it is out of fashion these days to be seen carrying a bag of books. The students appreciate that we are now in the information technology era and are advocating for the need to embrace the paperless way of working. In support of the above, Barker et al. (2005) also assert that smartphones or tablets are less bulky and lighter on holding notes and e-books than bags full of textbooks, papers, and files, or a laptop. In this respect, the students use their smartphones as libraries, and according to them, this motivates them to study.

5.1.1.6 Sharing notes and assignments through social media platforms

According to the ANT, the use of smartphones will also assist students to collaborate with other students, thereby sharing different experiences and knowledge, improving their performance both at school and outside school (Jubien, 2013a). The utilisation of the smartphone promotes social and collaborative learning. Such use can encourage students to work on projects in groups, sharing discoveries and information. According to some scholars, students can even connect with other students from around the world, and by so doing, their learning world expands (Jafarzadeh-Kenarsari & Pourghane, 2017).

The students in this study indicated that they have created or joined certain academic chat groups on social platforms for discussions and sharing of information. The most common media

platforms used by the students are WhatsApp and Facebook. Share-It is also used for sharing large volumes of information at personal levels. Academic chat groups have proved an effective way of sharing assignments, homework, and revision work among the students. Through these platforms, students help one another in answering questions given to them by the teacher, clarifying areas that others may be struggling to understand. They have also included their subject teachers in these chat groups. The teachers' participation helps guide the students in making productive discussions; and assists them when they face challenges in answering certain questions. In addition, some students who may have missed lectures through reasons beyond their control can easily access the lectures and related assignments from home through these platforms. Students claim that doing homework has now become easier, as they can gain help from their classmates if they cannot proceed. They can also communicate with their teachers from home, receiving assistance. Smartphones can, therefore, allow students to work on projects in groups, sharing discoveries and information, as shown by the findings of this study.

Therefore, through the use of such social platforms, students can work to achieve a common goal. This is when library applications and book-search applications become very useful. Applications like these simplify the process of searching for appropriate study material for students on their mobile phones. This helps keep students nearer to their learning material, assisting them to look for their study materials over the Web. In summary, the value of smartphones in ANT is that they enable students to communicate, connect, and work in collaboration to create digital resources that are very rich (Jubien, 2013a). This has been confirmed by the findings of this study.

5.1 Perception of students, teachers, and parents, on the use of smartphones for academic

One of the theoretical underpinnings of the ANT is that the theory is also concerned with the morality of the actors (Jubien, 2013a). From the findings of this research, it may be noted that there are three perspectives on the use of smartphones for educational purposes. Some of these perspectives are based on the moral concerns of the participants. Some say smartphones are a very good tool for learning; others feel that smartphones are good learning tools; however, their use requires monitoring. Others are of the opinion that smartphones are not a good tool for learning. So, the Actor-Network Theory is indeed a framework worth of developing important perceptions on organisations like education. The participants in this study have aired their views pertaining to the use of smartphones for academic purposes.

5.1.2 Smartphones are an ideal tool for learning

According to the outcomes of this study, some of the students perceive smartphones as an excellent learning tool. This is attributable to the many advantages that they highlighted, which come with the use of this technology. The major advantages of smartphone use, according to the students, are that it is a convenient tool for learning; it provides the ability to gain answers quickly, and it is a cost-effective way of accessing learning material. The students indicated that, although the school has a computer lab in place for learners to access educational materials on the Internet, the numbers of computers available are inadequate to allow students to access them for effective e-learning. Students also argue that a laptop or a computer is more expensive to buy compared with a smartphone; carrying a smartphone nowadays is considered *de rigueur*, unlike carrying a laptop. A smartphone has the advantage that you can carry it everywhere you go. Therefore, the use of a smartphone ensures that study time is not wasted; students can access their learning material anytime from anywhere, unlike the library, a laptop, or a computer. Learning may take place anywhere, anytime without limitations, thereby extending learning outside the physical boundaries of the classroom, and past the fixed time limits of the school day (Afolabi, 2016).

In supporting the perception that the smartphone is a convenient learning tool, the students argue that smartphones are cheaper to use, all books and other learning material being stored on the smartphone. In other words, the smartphone becomes the library. The learning material in the form of e-books, educational papers, and other material, may be downloaded from the Internet. Students can conveniently store these downloaded books, together with soft copies or snapshots of notes, revision papers, and assignments, *inter alia*. Depending on the capacity of the smartphone and availability of appropriate applications, lectures downloaded from YouTube as audios and videos or class-lecture recordings may also be stored on smartphones for use by students during the study.

The students also perceive the smartphone as the appropriate technology in view of the newly introduced education curriculum which emphasises research and innovation, with ICT at the core. The new curriculum comes with a requirement for learners to use smartphones in some of their learning areas. The smartphone comes in handy. It has the capabilities of a camera for capturing lecture moments through video recordings, snapshots of notes and assignments, and it may be used as a calculator and an alarm or reminder. These attributes have motivated students to fully embrace the smartphone as a learning tool. According to the requirements of the new education curriculum of Zimbabwe, teachers are now facilitators who should merely guide learners; a smartphone is a necessary tool for research. The students also advocate that e-learning through

the use of smartphones should be encouraged in all schools because it gives students the exposure they need when they finish school, in that they will have knowledge of ICT.

Although the parents did not say much about the use of smartphones, the few who responded on this issue appreciate its use as a research tool. The parents specified that the use of the smartphone is a positive move towards embracing ICT technology.

5.1.3 Smartphones are a good learning tool, but their use requires monitoring

The foundations of ANT grant that researchers and physical objects are essential for being developing actors, and also because they clarify the contrasting picture of the connection between humans and non-humans mentioned beforehand (Latour, 2005). Outcomes of this study show that the majority of the teachers, parents, and students agree that the introduction of the smartphone for academic purposes is very good. They appreciate that the world is getting more digital, and the introduction of the smartphone in learning is inevitable; however, there are fundamentals that must be covered before it is fully embraced. A high degree of level-headedness is required in embracing smartphone technology use in the classroom. There are foundations that must be covered, such as placing certain restrictions on Internet access and addressing teacher aptitude, among other things.

Most of the participating students admit that the idea of using smartphones for academic purposes is worthwhile if phones are used responsibly. Students noted that, besides the smartphone being a learning tool, the device is very popular as a tool for social and entertainment activities. Students believe that the smartphone should be controlled by the owner to avoid abuse. Students, therefore, need to be highly disciplined when it comes to using smartphones. According to the students, there are sites found on the Internet that are unhelpful for students, therefore students must be advised to be watchful, guarding against the temptation of concentrating on these non-academic sites at the expense of studying. Some students advised that, when using a smartphone, students should be time conscious. To this effect, the students indicated the need to put in place some precautions to ensure that they do not spend too much of their time on social networks and other forms of entertainment, at the expense of schoolwork.

The students highlighted that they are aware of the shortcomings associated with the academic use of smartphones but noted that their advantages outweigh the disadvantages. The students, however, emphasised the need for discipline on the part of those who use smartphones if they are to realise their full benefits as learning tools. The discipline of the students may be enhanced

through monitoring by the parents at home and teachers at school. The school should put in place strategies to curb the abuse of these devices. Students must also be advised to be aware of the challenges associated with this technology so that they may be watchful.

The emphasis here is that smartphone use should be controlled and monitored. Parents and teachers are also of the notion that smartphones are good technological tools for learning; however, if they are not controlled they can have a bad influence on the students. Some parents lamented the exposure of their children to certain media platforms and media content which is not suitable for their age. The children, therefore, need to be guided, so that they are not corrupted by uncensored media content.

Some teachers claim that smartphone use can be time-consuming, especially if the use is not monitored. Parents noted the need for monitoring to ensure that use is not abused. According to the teachers and parents, any innovation has its dangers; however, one cannot abandon a valuable resource because of potential dangers. Parents also concur with their children's view that the long-term advantages associated with the introduction of smartphone technology in learning outweigh the disadvantages. According to some of the teachers, monitoring mechanisms can be put in place to restrict learners from being mischievous on the Internet. These include firewalls, filters, and content blocking, amongst others.

5.1.4 Smartphones are not a good tool for learning

Some students have the perception that the smartphone should not be used as a learning tool, especially by junior students in Forms One to Four. They allege that these students are still too immature to overcome the temptations associated with smartphone use. They perceive that the smartphone robs the students of their time for study. Another student named Ben feels that smartphones encourage laziness because one can receive information on the Internet without much effort. A few of the participating students pointed out that a smartphone can be a disadvantage to schoolwork because of issues like abuse and addiction to technology. Students like Deon admitted that they learned the hard way when they failed their exams owing to lack of discipline in using the smartphone. On the other hand, some like Ben feel that students should also take note that smartphones encourage laziness because students can gain information without much effort.

Some parents have also perceived smartphones as a bad technology which should not be used by

children. The teachers noted that smartphones can have negative effects on the student if their use is not monitored. Their fears are that there is no assurance that some naughty learners will not misuse the privilege by getting involved in excessive social media and pornography, hence this stance that smartphones are not good for academic use. The above sentiments can be reinforced by the ANT which is concerned about the morality of the actors (Jubien, 2013a).

5.2 Analysis of the students' use of smartphones

This section examines the analysis of why students at Harare High School use smartphones for academic purposes the way they do. This is consistent with the theoretical framework, ANT, which provides the opportunity if offered, of examining and reflecting on various pedagogical practices (Jubien, 2015). The findings of this study reveal that smartphones play a pivotal role as academic tools in the areas of research, downloading and storing academic information, and sharing information through group discussions on media platforms such as WhatsApp. Three perceptions have emerged from this study. Some students, supported by their parents and teachers, perceive smartphones to be; (i) an ideal tool for learning (Seppälä & Alamäki), (ii) a good learning tool whose use requires monitoring, or (iii) an unsuitable tool for learning. The most popular among these perceptions is that smartphones are good learning tools whose use requires monitoring.

Besides the academic use of smartphones, it was revealed in this study that students also use their phones for various social activities. The outcome of this study revealed the challenges associated with the academic use of the smartphone. To this effect, students have highlighted the important contributions of the school, the teacher, and the parents, as they promote the effective academic use of smartphones. Some recommendations were made which specified ways of safeguarding the effective use of these devices for academic purposes; these will be discussed below.

5.2.1 Social benefits of using smartphones

According to the findings of this research, students also use smartphones for their social activities. The social activities enjoyed by students on the smartphone include making calls (local and international), chatting with friends and relatives, watching videos, movies and television, reading newspapers, listening to the radio or music, and playing video games. As with many other people, students view smartphones as a source of entertainment. These findings corroborate

the findings of other writers like Nath and Mukherjee (2015), who indicated that smartphones are used to make voice calls, send messages through texts, and to write emails. The students also use media platforms like WhatsApp, Facebook, Twitter, Skype, Instagram, and Imo for chatting with friends and relatives. However, there are other students like Tracy who shun the use of these media platforms for social activities. Some students download and watch videos and movies from YouTube. They also watch television channels and soccer. Some use smartphone applications to download and play music, read newspapers, and listen to the radio. The most popular radio station among the students is Star FM. A few other students indicated that they play video games on their phones.

5.2.2 Challenges students face while using smartphone technology

According to the ANT, one of the theoretical underpinnings of the theory is that material objects mediate interpersonal interactions in these networks; define relationships in contexts and affect individual behaviours and actions (Yin, 2009). As students use smartphones in academic work, they also face some challenges. The major challenges of using smartphones, as cited by the participating students, are financial constraints, technical challenges, a distraction from concentrating on schoolwork, abuse of the smartphone, addiction, and behaviour challenges. It should, however, be noted that the challenges culminating from the academic use of smartphones in this case study may be peculiar to a specific social or economic class in the Zimbabwean society, which may not be generalised to all social classes. The participating students and parents, generally being from the lower socio-economic class (which makes up the majority of people in Zimbabwe), and residing mainly in the high-density areas of Mbare, may not have the same appreciation of the smartphone as those in the elite class; because of their differing levels of interactions with technology. Therefore, what they may perceive to be challenges may not really appear to be challenging to the elite class of society.

5.2.2.1 Financial constraints

Some students in this study highlighted financial constraints as one of the challenges to the academic use of smartphones. From the outcomes of this study, I have observed that the type of smartphones owned by the students ranged from cheaper smartphones with simple mobile operating systems to expensive and advanced or highly complicated mobile operating systems. The type of phone owned by the students depends largely on the financial status or capability of their parents. Therefore, some students complained of having phones with certain technical

challenges which limit their capacity as learning tools. However, the students indicated that were they to obtain sufficient funds they would purchase smartphones with better specifications and more features that make them appropriate learning tools. Apart from the smartphone itself, the students complained of the high costs of purchasing data bundles or paying monthly subscriptions for Wi-Fi services at home to maintain connectivity to the Internet. According to the students, some parents cannot afford these costs. The phone also requires servicing, and some applications require to be purchased in order for the students to fully use the other functions offered through these applications.

5.2.2.2 Technical challenges

One of the theoretical bases of the ANT is that some materials are more durable than others (Law, 2000). Since students are allowed to acquire various types of smartphones for use at school, there may be limitations of the device, security, matters on instructional differences, safety, training, and maintenance, as well as some implementation costs. There are many types of smartphone that may be bought by students for use. However, some of these devices are not durable, and others are not suitable for use as learning tools. Some smartphones do not have certain specifications and/or applications needed for research on the Internet. Others have such small memories that students are not able to store the large volumes of information after research.

From the findings of this study, it may be noted that the type of phone (i.e. its durability, operating system, and memory size) a student owns determines the extent to which he or she can effectively utilise it for learning purposes. Based on the economic status of some parents of participating students, the type of smartphone owned by a student is one of the factors that limit the capabilities of the device as a learning tool. Smartphones with better specifications are higher priced, and they, therefore, become unaffordable to most of the parents. Some of the students in this study complained about their phones having limited memory; they cannot accommodate large volumes of information downloaded from the Internet. Some students also complained of the short battery life of their devices, and this entails the need for frequent charging of the phone. This problem, according to some students, is worsened by the frequent power cuts experienced in their homes, thereby limiting the effectiveness of smartphone use for academic work. One of the students complained of the small screen on his phone which is now causing eye strain when he uses the phone for study or research. The memory size, screen size, and battery life are some of the device specifications which can raise the price of a smartphone. Some parents can only afford to buy cheaper phones which present these challenges.

Generally, people assume that, when students walk around carrying smartphones, owners are au fait with all the operating systems, yet many students need assistance even to use the device at the most basic level. Technology has never been easy; therefore, teachers and parents should not be ignorant of the needs of their students and children. Some smartphones are more advanced and as a result, students may face challenges in using them. Outcomes of this study revealed that some students lack the necessary skills to navigate through the applications on their phones for effective utilisation of the technology for educational purposes. Some students specified that they were still learning how to make use of the phones in their learning processes.

Some students also complained of certain Wi-Fi services which appear to be somewhat cheaper and more affordable to their parents, yet they are often very slow. This implies that they take time to process information. This has negatively affected the learning processes of the students, especially at home, when they wish to conduct research on the Internet. Students also highlighted the challenge of credibility of information obtained from some Internet sites. Information displayed on some sites may be wrong and misleading to the students. Students, therefore, require guidance to evaluate and ensure that they use information from credible sources on the Internet sites. In support of the above technical challenges faced by students in this study, Armstrong (2014) restates that bandwidth, technical support, type of mobile device and software, are among the challenges faced by students, leading to their not using smartphone technology more often at school.

According to some of the participating students, they are also facing challenges with viruses which corrupt their phones and damage documents, to the extent that they fail to access saved data. Students need to be equipped to deal with such challenges. It should be noted that, although smartphones are private devices, people still face security threats and risks everywhere. Virtual viruses are potent and hackers are always present. Smartphones are susceptible to such threats in accessing the Internet. Therefore, students must be very vigilant when accessing sites and clicking on links.

5.2.2.3 Distraction

It should be noted that the adoption of mobile devices within the educational set-up has presented certain challenges of distraction from the education processes. Most of the student participants in this study admitted that the idea of using smartphones for academic purposes is a worthwhile and valuable idea. The students concurred that the smartphone is also a very good technological

device for entertainment. They pointed out that smartphone use can deter students from concentrating on their academic work if appropriate precautions are not taken by the users. Discipline on the part of the user is required for it to be effectively used as a learning tool. Many people tend to use this device mostly for social issues. If students are not careful, they may waste much productive time on social platforms, on non-academic undertakings at the expense of schoolwork. The findings of this study corroborate the research conducted in the UK, which revealed that some youths are spending a great deal of time on the Internet (Frith, 2017), and in most cases non-academically. According to reports from these young people, they feel anxious when they spend much time offline, a phenomenon which is sometimes referred to as FOMO; “fear of missing out”. If these trends enter the Zimbabwean context, students may ultimately neglect their school work.

Some scholars have also revealed that it looks like some students are able to do the multi-tasking that is required when using smartphones in learning. However, for other students, the smartphone is essentially a continual distraction (Barnwell, 2016). For some students and many adults, the presence of phone takes them away from their focus. However, some learners can effortlessly shift their focus from the device as an entertaining tool to a learning tool. For other learners, the phone’s prospects as a learning tool are routinely ignored. The usage of smartphones for academic purposes requires students to stay focused and synthesise information on a discussion or a lesson. Students with a repeated urge to multitask on entertainment or social media, and have poor learning skills usually face challenges integrating the purposeful use of smartphone into the learning activities (Riley, 2018). Thus, the prospective benefit of the tool is often squandered. In support of the participating students’ claims, Chen and Denoyelles (2013) indicated that there are applications which send notifications when there are updates, messages, latest offers, and so on. These disturb the momentum, which has the potential to reduce one’s output, and in the case of students, their learning and study time is interrupted. When a student attends to these notifications, they will find themselves attached to the phone. This was confirmed by students like MK, who specified that his phone is so tempting that he always wants to see the messages posted on it each time they appear.

According to the students’ experiences, smartphone technology can rob them of study time if they are not careful. Highlighted was that, if students are not given the appropriate guidance on the use of these smartphones, they may ultimately truant while concentrating on entertaining applications on their smartphones – playing games or watching videos. Some students are alleged to have deteriorated in their academic performance owing to lack of discipline in using this

technology. One student, MK, admitted that his performance in the class had deteriorated the previous term. His parents were blaming his smartphone use for his failure. MK confessed that the social platforms on his phone are so exciting that if anyone is given such a phone, he or she will not have time to study. Lepp et al. (2015) concur with the findings of this study in revealing that smartphone use may also interfere with behaviour favourable to academic success (Lepp et al., 2015). Denzel also admitted having problems in trying to control his use of the smartphone. He indicated that, at one point, his parents had to take the smartphone away from him to enable him time to complete his school work. Some parents have also indicated that their children have now become too apt to play, owing to the use of this technology. Recent studies have also recognised an undesirable connection between academic performance, and usage of social-networking sites like Facebook, My Space, Twitter on smartphones (Chen & Denoyelles, 2013). According to North et al. (2014), lower educational attainment is one of the negative effects of using smartphones. The findings of this study confirm that a careful approach should be taken to avoid these negative or undesirable outcomes.

Students like MK, in his statements, admitted that, although it is difficult for him to leave his phone alone, he has resolved to change his behaviour to please his parents. This shows that addiction caused by smartphone use is not always permanent; it can be resolved when the user realises that it is retrogressive. However, from my own point of view, I think MK should not be resolving to change his attitude for the sake of pleasing his parents: he should be doing this for his personal benefit. Students in this study also claim that there are some students who allegedly spend the greater part of the night on the smartphone concentrating on WhatsApp, movies, or games, and this leads to their falling asleep during class. Some students reported that they have observed students using smartphones for academic work only when instructed by the teacher to do so; otherwise most of their time they will be on social platforms. Some students are always observed listening to music, even during study time. Some were allegedly removed from academic chat groups for displaying negative attitudes and disturbing the seriousness of discussions ongoing in those groups.

5.2.2.4 Abuse of smartphones

Although students boast that the Internet provides easy access to information for learning purposes, this can pose some disadvantages for learners. Students can easily access and view, intentionally or unintentionally, the uncensored material, including pornographic content and violence, inter alia. This was confirmed when the students participating in this study highlighted that the major problem when using the Internet for academic work is that they come across pop-

up messages and adverts on their screens, prompting them to open undesirable sites. Most of the students are tempted to open these pop-up messages, often showing nude pictures, leading them to access pornographic material, whether intentionally or unintentionally. Some students like Deon admitted to having fallen prey to such adverts, and have frequently been visiting such sites. However, Deon claims that he now has some software applications which can block him from accessing such undesirable sites. Some students, however, do download porn videos, circulating them to others in the school. According to the students, one case was reported in which a group of students was caught circulating such videos and were punished for their actions.

5.2.2.5 Addiction, health, and behaviour challenges

According to ANT, social networks are more than just people (Yin, 2009). It should be noted from the students' presentations that; besides the academic use of smartphones, students use the smartphone to create social networks. Another theoretical underpinning of ANT states that smartphones can mediate interpersonal interactions, define relationships and contexts, and affect individual behaviour and actions. Likewise, some students in this study, such as Deon, have demonstrated from their statements that they have developed a very strong relationship with their phones. They can hardly bear to be separated from them. This relationship has affected the behaviour and actions of students to the extent that their academic work and social behaviour has been negatively affected. It must be distinguished that smartphones use is not envisioned to cause any adverse effects, yet, the time and attitude focused on these tools has incarcerated many students, often making them addicts (Ezemenaka & ICT, 2013).

While there are limited investigations on addictions to smartphone technologies, a research by Naval et al. (2004) affirms that young people between the ages of 15 and 19 confess to abusing to their cell-phones being addicted. According to specialists, the abuse of cell-phones may be characterised as a condition of addiction that should be attended to with urgency (De La Puente et al., 2007). Addiction is the repeated involvement with an activity or a substance, despite causing substantial harm, because that involvement may continue to be valuable and/or pleasurable (Holtzhausen, 2017). In the context of this study, addiction results from activities like gaming, chatting and watching videos, conducted by students on their smartphones. This is referred to as 'activity addiction' which is classified under activities such as the Internet, sex, gambling, shopping, and pornography. Sometimes these are called 'process addictions'. According to the participating students' experiences, they have observed some cases of smartphone overuse which may be classified as an addiction. These cases include students who spend most of their time on

the phone without allowing much room for other important activities of their lives; some students who are addicted to music to the extent that they can hardly study without the music; and such students who study while wearing headphones. Some students like Ben admitted that, at one point, he fell victim to smartphone addiction, but has since resolved the problem.

In line with the theoretical framework, the Actor-Network theory, Morgan (2007) argues that moral and pragmatic concerns are essential concerns when assessing interpretive science. He postulates that nurturing a dialogue between respondents and researchers is important. This dialectical process creates a more sophisticated and informative understanding of the social world (Morgan, 2007). In this respect, I came across some students who did not admit to being addicted; however, some of the statements they made were disconcerting and were a possible pointer to problematic smartphone use. I engaged a deeper dialogue with them which revealed that these students had indeed developed strong bonding with their smartphones to the extent that they can hardly be separated from these devices. It was after these further enquiries that some of the students admitted to having a habit of watching pornographic videos and playing games, thereby confirming my concerns about possible addiction.

A number of students, such as Denzel, Apple, and Panashe admitted to visiting unsavoury Internet sites and watching pornographic pictures and videos, as well as having some possible degree of addiction to this technology. Researchers state that the obtainability of different types of inexpensive and affordable Android mobile phones has made it easier for young people to have access to many kinds of pornographic sites and social media applications (Rabiu et al., 2016). Through these sites they access, download, exchange and watch pornographic films of various sexual orientations from all over the world. This has greatly compromised the character of students, who often ultimately practise what they see on these media platforms. However, some students have indicated that they have since recovered or found their way out of the addiction, and others have resolved, after my encounter with them, to make efforts to renounce the habit. According to research, the issue of addiction is one major challenge faced by people who overuse smartphones. The negative effects of smartphone use raised by the students are similar to those cited in the literature. Some researchers support the students' claims, saying that there are certain negative effects of using smartphones which include reduction in well-being and social relationships owing to isolation, loneliness, and depression (Babadi-Akashe, Zamani, Abedini, Akbari, & Hedayati, 2014), emotional stress, addiction, dependence, and lower educational attainments (Jafarzadeh-Kenarsari & Pourghane, 2017).

According to scholars like Jafarzadeh-Kenarsari & Pourghane (2017), overuse of smartphone technology can result in degradation of real-life social interactions; people no longer interact with real people, spending more time on their smartphones. This detaches them from the real world, leading to loneliness. In this study, some bad behaviour noted by students includes lack of courtesy among students as they concentrate on their smartphone. Other students display acts of disrespect to elders, lying to others when communicating on the phone, and using bad language. Extreme cases reported were that students show unseemly behaviour as they try to emulate what they see in some videos and movies. Rabiou et al. (2016) admit that Internet access has exposed many young people to a wide range of content, and some of it has detrimental effects on their life.

One of the students mentioned the challenge of eye strain because of the small screen size of his smartphone. Babadi-Akashe et al. (2014), in support of this, claim that using smartphones can cause health challenges such as vision problems resulting from staring at a screen for prolonged periods. On the other hand, one student named Denzel indicated that he used to have an official password which he received from the school authorities but has since stopped using it. This is because, according to him, he has hacker friends, who have assisted him to access the school Wi-Fi without the need for the password. He claims there is an application to hack and bypass the password, accessing the Wi-Fi service without the authority of the administrators; a claim that may need to be investigated and substantiated to ensure that such rogue elements are dealt with if they exist at all. In support of the above student's assertion, previous research shows that media effects are observed in the behaviour displayed by students. Acts of violence or mischief appear to be copied from media watching or stimulated by what students view on media movies.

5.2.2.6 Ownership of the device

According to the outcomes of this study, there is only one student who does not own a smartphone. This student uses her mother's phone to perform academic work. It may be noted from her presentation that using her mother's phone is a hardship, especially because her mother does not appreciate the important role the device is playing in the academic life of the child. The student once recorded a lecture on her mother's phone; however, her mother deleted it, complaining that it wasted space. Because of shortages of textbooks at school, this student opts to use soft copies on the phone. However, her mother does not allow her to take the phone to school. I have noted this challenge of not having a personal smartphone, there being restrictions on its use. In this case, the child is failing to enjoy the full benefits of the academic use of the device. Considering the economic status of most students at Harare High School, this challenge

may be just the tip of the iceberg in impediments faced by those students who do not have personal smartphones for use in their learning processes. Since this study focused on those students who had smartphones, this shows that there may be other hurdles for students who do not have access to these devices, which have not been captured by the scope of this study and may need to be explored through further research.

5.2.3 The role of the school environment in supporting the academic use of smartphones

Another theoretical underpinning of the ANT is that it offers significant insight into the processes and objectives of education. It is against this background that this study analyses the importance of some physical and non-physical facilities that a school can provide in support of the academic use of smartphones by students so that the objectives of education can be achieved. The school facilities create a conducive environment that promotes the use of the smartphone in educational processes as a learning tool. In support of this assertion, Akanke claims that learning occurs through one's interaction with the environment (Hong & Ho, 2005). The environment here refers to amenities available at the school to facilitate the learning outcomes of students. Therefore, the school environment at Harare High School is critical in determining the effectiveness of the academic use of smartphones.

5.2.3.1 Physical facilities

All the participating students concurred that the school authorities have taken a step forward in terms of creating a favourable environment for smartphone use as a learning tool at Harare High School. The process of acquiring and setting up the Wi-Fi facility for use by the students and teachers at the school was the first step in promoting the academic use of smartphone technology. It should be noted that the school has a computer laboratory furnished with computers that are linked to the Internet through network cables. The Wi-Fi facility is an additional facility specifically for students to use their smartphones. As I moved around the school during my observation schedule, I observed that classrooms are electrified, with many power points that allow students to conveniently charge their phones. According to previous research, the learning environment influences the performance of students or how they respond to situations and circumstances around them (Tsavga, 2011). This entails that no society is devoid of the influences of the environment. The above school facilities have also created a conducive environment that promotes the use of the smartphone as a learning tool.

5.2.3.2 Non-physical facilities

Previous studies show that the acceptance of the teachers and institutional policies are among the reasons why smartphone technology is not often used at school (Armstrong, 2014). The non-physical facilities here are those institutional policies set by the school to facilitate effective utilisation of the technology. These include regulations that govern the use of the smartphone and strategies in place to promote the academic use of these devices. Smartphones are tools for accessing information and for communication. Therefore, there need to craft strict regulations for their use like other tools in any trade. From the findings of this study, Harare High School has put in place rules and regulations that have to be followed if a student is to access the Wi-Fi facility, to ensure that the facility is used productively, and not abused. According to documents available in the school, and the presentations by the students, the procedure for students to use smartphones at school is that a student who wishes to bring his or her device to school should first seek permission to use it from the subject teacher. If the teacher authorises the use of that smartphone, he or she will recommend the name of the student to the school administrators. An account will be opened for the student who will be given a password and a pass to use the school Wi-Fi. It should be noted that, according to the history of the school, when the Wi-Fi facility was introduced at school for the first time, all students were allowed to access it without any restrictions. However, when some students were caught abusing the facility with their smartphones, some restrictions were put in place to curb this abuse. Students now have to request authority and acquire a pass to use their phones in accessing Wi-Fi at school.

The school administrators, with the help of the teachers, have also put in place monitoring mechanisms to ensure that smartphones are primarily used for academic purposes at school. This was echoed by the participating teachers who specified that the students use individualised passwords, which are monitored and controlled by the administrator. As a monitoring mechanism, the teachers indicated that students only bring their smartphones upon request by the teacher. Their use is therefore confined to the classroom and for learning purposes only. They also have access to the software ‘Mikrotik Hotspot Blocker’, which they use to block undesirable sites, for instance, pornographic sites. In support of this some scholars have also recommended software like “Nearpod” (Frontiera, 2013), and several other software which can also assist in monitoring and controlling accessibility of some websites by students.

The second provision which is linked to monitoring the use of smartphones is to do with instituting punishment/penalties to those found using their smartphones at school without

following the laid-down procedures for acquiring authority, and those caught abusing the facility. This implies that the aspect of monitoring the use of smartphones by students at school has become central. These measures are essential to ensure that students do not waste productive time on non-academic activities. However, there are certain students who feel that the procedure of acquiring a pass is too laborious, thus demotivating students from adopting the use of smartphone technology as a learning tool. The students allege that these procedures are aimed at discouraging some of the students from accessing the Wi-Fi facility. However, this is a point of view of some of the students who may be worth debating.

5.2.4 Role of teachers in teaching and learning using smartphones

Technology can enhance relations between students and teachers, making education fun and more meaningful. When teachers incorporate technology into their teaching processes effectively, their roles develop into that of advisers, content experts, and coaches (Pal, 2017). With the institution of the new education curriculum, the government of Zimbabwe has urged teachers to scientifically ground themselves, employing various possibilities of integrating technology into their teaching methods. Therefore, teachers have an important role in determining the success of the academic use of smartphones. Teachers' attitude strongly determines the performance of students in secondary schools. The students in this study raised four areas in which their teachers play a key role in making sure that the smartphone is effectively utilised as a learning tool. These areas are monitoring, participation in chat groups, technical support, and teaching of media literacy.

5.2.4.1 Monitoring

Teachers are important in ensuring that students are not exposed to any damage through the use of technology in class. If teachers are not proactive in the use of smartphones, control may be lost. In support of this, Armstrong (2014) observed that, even though smartphone technology may firstly persuade students to do their assignments, teachers should ensure that maximum benefits are derived from this technology by monitoring their use. According to the participating students, teachers play a pivotal role in restricting the use of smartphones to academic work at school, minimising its use as a device for entertainment or social activities. The issue of monitoring, therefore, becomes key. The teachers' role is mainly to discourage students from abusing the technology through activities like playing games, playing music, and visiting untoward Internet sites at the expense of schoolwork. Students in this study acknowledge that some of their teachers

have effectively fulfilled their role of monitoring them, especially during class lessons. The process of acquiring a pass requires a recommendation from the teacher, and this creates an opportunity for teachers to interrogate those who have not been authorised to use their device in class. However, there are some who feel that teachers are not doing enough: some teachers are still sceptical about the use of this technology; therefore, they do nothing to assist students. There is very little being done by the teachers in terms of incorporating smartphone technology into the teaching processes. It should be noted that for most teachers in Zimbabwean to use technology in their teaching processes, they are using their personal resources to get the requirements for this cause. Schools and government are not giving teachers the necessary digital skills and material resources (devices) for use in the classroom. This is the scenario obtaining at Harare High School in which the teacher has to fund personal strategies for incorporating this technology into the classroom.

5.2.4.5 Participation in academic chats

Students in this study have expressed their appreciation of the role played by teachers in controlling and moderating discussions held on the WhatsApp chat groups they are in. Their presence in these chat groups has helped to ensure that the discussions are under control, curbing any wayward or rogue elements in the group who may want to disturb the progress of the discussions. This has promoted productive discussions and sharing of information. The students indicated that the teachers sometimes give them questions for discussion, following up. If students fail to answer questions satisfactorily, the teacher will come through and assist. This has also promoted collaborative learning. This is supported by some scholars who elaborate that smartphones allow students to communicate with their teachers, access educational content from home, and use online platforms to work with others (West, 2013). On these platforms, teachers have an additional opportunity to share notes and insights with their students. Their participation in these academic chats makes it easier for students to approach them when they need their assistance even from home through WhatsApp and other platforms.

5.2.4.6 Technical support

Students have admitted to receiving relevant skills from some of their subject teachers who have assisted them to effectively navigate through the applications of their devices, and through the Internet, to access learning material. This has allowed the students to use their smartphones and

available applications to optimise the benefits realised through the use of these devices. Some teachers advise students on how to surf the Internet to access and download e-books and other academic information. This is in view of the current shortages of textbooks faced at school, and the need for current information required in some subjects.

The issue behind this problem lies with the Ministry of Education as the regulating authority; although they encourage the academic use of smartphones among students in the new education curriculum, they have not yet adopted a position on whether this is optional or mandatory. This inconsistency has led some schools to maintain the position of prohibiting smartphone use, while some teachers in other schools have the option of either supporting or not, depending on their personal perspective.

It should, however, be noted that not all teachers are smartphone literate; hence lack of support by some teachers on the academic use of the smartphone is attributed to inadequate knowledge of how this should be done. Teachers need to be innovative and to employ current teaching methods which incorporate the use of smartphone technology. The need for training on these techniques should be taken seriously if the Zimbabwean education system is to successfully implement the ICT component of the new education curriculum. The other issue has to do with the attitude or perception of some teachers with regard to the academic use of smartphones. Some teachers not only lack the technical know-how on using the smartphone as a learning tool but have a negative perception that smartphones are not good for academic use. They are holding onto the negative effects of the smartphone, forgetting that there are many benefits which outweigh these negative effects. Students believe that the outcome of this research when it is circulated to all the teachers might change the mind-set of those teachers with negative perceptions, so that they may also embrace the technology in their teaching processes to the benefit of the students.

5.2.4.7 Teaching media literacy

Students advocate the teaching of media literacy in order to equip them for the challenges associated with mass media. They highlight the benefits realised when there is a cautious approach to the utilisation of these media platforms. Students view the teaching of media literacy as a key to ensuring that they all appreciate and adopt smartphone technology as a learning tool which can enhance their performance in their studies, not as a device for entertainment or social issues. Some writers support this view when they state that the main objective of teaching media literacy is to enable individuals to communicate, retrieve, analyse and evaluate information in its

diverse forms (Lee, 2010). As students use these media platforms on their smartphones, they need to focus on those platforms that are necessary for academic improvement, while avoiding or minimising those media platforms only for social functions.

I have noted with concern that, while e-learning is a welcome technological innovation in the education sector, it allows the students to learn even without the involvement of the real-life teacher (in the case of online learning). Yet the role of a teacher is not only to impart knowledge to the student but also to impart good moral values and character to the students. Considering the current trends in ICT, if students continue to develop unchecked, the role of the teacher may fast be replaced by technology. This may, in the long run, lead to the production of educated professionals who lack moral values.

5.3.1 Parental role in supporting the academic use of smartphones

The academic performance of students is not only influenced by the quality of teachers and the schools. Previous studies show that the participation of parents is a key element in the academic performance of their children (Rabiu et al., 2016). Given the challenges associated with the academic use of smartphones, the level of parental involvement is key to ensuring the effectiveness of the device as a learning tool. The students raised three areas in which parental involvement has been observed in support of their children's use of smartphones for learning purposes. These include monitoring, financial support, and, to some extent, technical support.

5.3.1.1 Monitoring

The issue of monitoring the use of smartphone has been echoed by almost all the students, and while the teachers take the monitoring role at school, the parents are required to fill in the gap and monitor children as they use the devices at home. Therefore, the need for parental monitoring, to ensure that there is no abuse of the smartphone, cannot be overemphasised. Students whose parents monitor them expressed their appreciation of the role they are playing. They guide them, children, away from abusing the technology, protecting them from subsequent effects of smartphone overuse, such as addiction. I noted with concern that many students use passwords to restrict access to their phones by other people. However, there are indications that their parents have been granted access to those passwords to allow them to check on their children. Other students advocate not using passwords on their phones, to allow free access by their parents at any time. Students reported that their parents occasionally view their phones to check ongoing

activities as a way of monitoring, to avoid abuse. The student MK indicated that he does not read newspapers on the phone because his parents do not support this. This shows that some parents dictate what their children can and cannot do on their smartphones. Some parents, as a control measure, give their children a timetable of when they may use the smartphone. However, the effectiveness of each monitoring strategy depends on the consistency of the parent, and the willingness of the child to be assisted. Other students, such as Denzel, claim that they have gained the trust of their parents; Denzel's parents know that he is responsible, so they do not normally monitor his use of the phone.

Most of the participating parents have demonstrated that they are conscious of their role in monitoring smartphone use by their children. Some indicated that they have resorted to spot checking or random checks on the activities on their child's phone for any signs of abuse. Others have drawn up a timetable for use by the child so that he or she knows when to use the device. However, some children feel that their parents are not doing enough to support them. I have noted with concern that parents should not ignore their role of teaching and be cautioning their children about the dos and don'ts of using the smartphone. It is the duty of the parent to educate and advise children on what they expect from them when they use these smartphones bought for them as learning tools. The problem is that parents seem to be too busy to check on what their children are doing, who they relate with, and the content they are exposed to.

5.3.1.2 Financial support

The participating students in this study all rely on the financial support of their parents to purchase the smartphone, buy data bundles, and service the devices. On purchasing the devices, students emphasised the need for parents to consider an appropriate phone with specifications that allow the device to handle large volumes of data. It must have applications to enable them to use the device as a learning tool, rather than a highly sophisticated phone which may not be durable. Teachers also concurred with the students on the need for parents to support their children through the purchasing of appropriate devices for academic use. Besides purchasing of the smartphones, parents also have a responsibility of paying for data bundles to allow the children to access the Internet from home. The only challenge may be that some parents lack the financial capability of purchasing the device for the children. This may be the reason for some students at Harare High School still not using smartphones for academic purposes; this despite the school having played its part in encouraging students to use this technology for learning purposes.

5.3.1.3 Technical support

Some students have indicated that their parents assist them by guiding them on how to use the smartphone and the Internet for research. It should be noted that, while most students enjoy the support of their parents on the use of the smartphone, there are others who complain of lack of support. Students like Casino lament the lack of support from his father but appreciate the role played by his mother. Some parents also indicated that they have to teach their children how to use the Internet for research without abusing it. It may be noted from the findings of this study that parental involvement among the students varies from one student or parent to the other. Researchers support this by asserting that the level of parental participation may differ among parents (Desforges & Abouchaar, 2003). For example, if a mother is a parent of young children, her involvement level may be different from that of the mother of a secondary school child. On the other hand, the father's involvement level with children's learning activities differs from that of the mother in a family set-up. Levels of involvement with their children's education also differ from educated vis-à-vis uneducated parents.

In this context, the level of education of a parent determines the extent to which he or she can assist a child on technical issues of smartphone utilisation. The family's economic status, family background, and social environment also dictate the level of the parents' involvement in all issues to do with the academic use of smartphones. Some parents still have negative perceptions of the academic use of the smartphone: they still view it as an abomination, according to one parent's submission. Such parents will unfortunately not offer any support to their children when it comes to the academic use of this technology. There is, therefore, a need to deal with the attitudes and perceptions of such parents in order for its use to be effective in education.

5.4 Recommendations given by students for the improvement or precautions to consider for effective academic use of smartphones

According to the findings of this study, students, with the support of their teachers, have raised important recommendations to the school authorities for safeguarding the effective use of smartphone technology for academic purposes. They have brought up pertinent issues and they advise other students and parents on precautions to ensure that technology is used effectively, without causing harm to the students. If these recommendations are considered seriously by the

parties concerned, the Zimbabwean education system can effectively implement and incorporate the academic use of smartphones as one important ICT innovation recommended in the new education curriculum.

5.4.1 Recommendations to the school authorities and the teachers

Students and teachers in this study in collaboration with the researcher have proffered the following recommendations to the school authorities regarding the academic use of smartphones.

- i. The Ministry of Education should make the academic use of smartphones as part of the education policy implemented by all schools. They should make it mandatory for all schools to adopt the use of smartphone technology. This is against the background that some schools, especially boarding schools, are alleged to be prohibiting students from bringing to school and using smartphones. School authorities must appreciate that technology is fast-moving. As a nation, we need to embrace such changes, not resist them. The participating teachers also support this recommendation.
- ii. The students advocate that it should be made mandatory for all A-level subject teachers to embrace the use of smartphones by their students for learning purposes. Most of the students who are currently using smartphones as a learning tool at Harare High School are in the sciences and the commercial subject classes only. Participating students are of the view that all subjects should be given an equal opportunity when it comes to using technology. In support of the students' recommendation, I maintain that all subjects should be treated on an equal platform when it comes to using smartphones as a teaching and learning tool. This will ensure that students are accorded an equal opportunity of using the current IC technologies for their academic benefit.
- iii. The students and teachers recommend that only senior and more mature students at the school be allowed to use smartphones. Schools should equip their laboratories with sufficient computers and laptops which are easy to track and monitor, to allow junior students in the school to access the Internet on these machines for research purposes. This is in accordance with the justification given by the participating students, who proclaim that junior students are too immature to handle the negative effects of using smartphone technology. I personally agree with the idea of restricting smartphone use in the case of junior students at the primary level of education. However, when it comes to secondary school students, such students should be allowed to use their smartphones. This is in light of the new curriculum in Zimbabwe. This curriculum has introduced e-learning from pre-

school, that is, ECD level. Following the current trends, smartphone technology, coupled with adequate monitoring strategies, will soon be used as a learning tool even at the early stages of children's learning experiences.

- iv. Students and teachers also recommend that there be close monitoring of the smartphone and networks to ensure that the technology is not abused. Each student should have an individual password, which may be accessed by the IT manager; and there should be a track record of each user. Spot checks should be conducted on students to ensure that they do not abuse that facility. Prefects and class monitors should be empowered to help in monitoring the use of smartphones to avoid abuse. A timetable should be drawn up which facilitates the controlled use of the smartphone. In support of this recommendation, I believe that schools should have wide consultations with specialists in ICT, offering strategies and guiding rules that regulate the use of smartphones for academic benefits while curbing abuse of the technology. However, caution must be taken to ensure that these regulations do not restrict students from participating. Only academic sites on the Internet should be made accessible to students. According to the literature, there are some applications which can help teachers in controlling what students can see on their screens. Teachers can use such products as 'Nearpod'. This application offers powerful, multiple functions in one platform that is integrated and can connect students to content and to their peers (Frontiera, 2013). Armstrong (2014) recommends one other software suitable for tablets and smartphones, namely, 'Lan- School', suitable for classroom management. This system is designed to help teachers control or limit abuse and distractions of the smartphones for students in the class.
- v. Students also advocate the training of teachers on the academic use of smartphones because some teachers may not know how to use these devices as a learning tool. Training of teachers to be smartphone literate should be prioritised, in order for them to adopt use, and encourage their students to use the technology in their learning processes. In this regard, seminars may be arranged to fill the gap. However, as a long-term solution, teacher training colleges should incorporate the use of smartphone technology as a teaching method in their courses, to ensure that they move with current trends. There are some applications, such as 'ResponseWare' that convert smartphones into classroom "clickers" that can answer multiple-choice questions. Clickers, or student response systems, are a technology used to promote active learning (Martyn, 2007).

Another application, 'TurningPoint', allows students to answer interactive questions through their smartphones. This has been proven to increase student retention while

- engaging learners and allowing teachers to immediately assess students' understanding. Students may also use web-enabled devices to participate. Their responses are collected in real time, where teachers can ensure that content is resonating, and objectives are met
- vi. The government, in its new education curriculum, should incorporate the teaching of media literacy. Students advocate the inclusion of topics like media literacy, and character education, in subjects or learning areas like 'Guidance and Counselling'. Such will prepare students so that they are empowered to deal with the challenges of mass media, using the Internet in a profitable way.
 - vii. Students and teachers recommend that schools should levy parents in order to raise funds to buy smartphones for all students. This is because not all students at Harare High School own smartphones. This situation may be attributed to the economic strictures of parents, leading them to prioritise other issues at the expense of buying a smartphone. On the other hand, this may be owing to the parents' negative perceptions of the use of this technology. However, if the purchase of the devices is initiated and enforced by the school, this will ensure that all students have an equal opportunity of owning a smartphone. This will also solve the technological challenges emanating from the use of differing types of smartphones by students.

5.4.2 Advice to the parents

- i. All parents need to adopt a mind-set of embracing the academic use of smartphones by their children. To this effect, they should provide funding for the purchase of smartphones that are suitable for academic use by their children, purchasing data bundles for their children to access the Internet from home.
- ii. Parents should not ignore their role of teaching their children how to use smartphones for academic purposes. Although this task may depend on the literacy level of each parent, there are some basic tips parents can give their children. However, if parents are unable to assist in this area they should look for professional people to assist in this regard.
- iii. Parents should monitor their children when they are using smartphones at home. Parents should control their children as they use these smartphones because irresponsible use can destroy their children's future. They should never be too busy to monitor their children. They also need, as parents, to comply with set rules and regulations by the school authorities, as the schools govern the use of these smartphones.

5.4.3 Advice to the students

- viii. Students, being the sole players in the academic use of smartphones, need a high level of discipline in order to realise the full benefits of smartphone use in their academic work. Participating students in this study are encouraging other students to focus on schoolwork more than on social activities on their smartphones. Students need to appreciate and adopt the smartphones as a learning tool and not as a device for entertainment only.
- ix. Smartphone users should be sufficiently disciplined to adhere to academic sites and avoid visiting irrelevant or questionable Internet sites.
- x. Students should not use passwords: parents must be easily able to access their phones for monitoring purposes.
- xi. Each student should make a timetable to follow when using a smartphone. The student should learn to limit the time on the smartphone to allow for other processes in life to take place.

5.4 Summary

This chapter deliberated on the research outcomes of this research. It demonstrated that students at Harare High School use their smartphones for research, downloading e-books and academic papers, for the storage of notes and past examination papers, and for the sharing of notes and assignments through social media platforms. The perception of the students, teachers, and parents on the academic use of smartphones was also discussed in this chapter. Besides usage of smartphones for learning purposes, analysis of such use has revealed that participating students also use the smartphone as an entertainment device for listening to music, watching television, video viewing, for viewing soccer, for playing games, and social networking amongst other items. However, there are certain challenges noted which are associated with smartphone use. These include financial constraints, technical challenges, distraction, and abuse of the device, addiction, and ownership challenges. This chapter also deliberated on the role of the school environment, teachers and parents, in promoting the academic use of smartphones. The recommendations made by the students, teachers, and parents on improving the academic use of smartphones, was also presented.

CHAPTER SIX

Main findings and recommendations

6.0 Introduction

This chapter reflects on the whole study. It presents the main findings of this study, which are classified into three segments following the three research objectives and research questions. The chapter also highlights the contributions of this thesis to new knowledge: these are classified as methodological and theoretical contributions. The research gaps and recommendations for future research are also given in this chapter.

6.1 Main findings

The overarching objective of this study was to explore the academic use of smartphones among secondary school students at Harare High School in Zimbabwe. To achieve this objective, the study focused on three research questions which are derived from the research objectives. These include how students at Harare High School use smartphones for academic purposes, the perceptions of students on the academic use of smartphones at Harare High School, and why students at Harare High School use smartphones for academic use the way they do. An exploration of these questions led to the following findings.

6.1.1 Academic use of smartphones

The main findings on the academic use of smartphones by secondary school students at Harare High School are that the students use the device as a tool for research, for downloading academic material, storage of learning materials, and sharing notes and assignments through discussions in academic chat groups. On research, the students use the smartphone in searching for information to complement the notes given to them by their teachers. They also research to gain current information which they cannot obtain from the available textbooks, which are in some cases outdated. On the downloading of academic material, the students claim that some books are scarce and too expensive to buy as hard copies. Downloading soft copies of these books has proven a cost-effective way of acquiring such learning material. Students also download revision questions, subject syllabuses and other academic papers from the Internet for their learning

purposes. On storage of academic material, the students specified that some textbooks are too heavy to carry; therefore, having soft copies of such books on their phones is more convenient than carrying a bag full of books. Students store all their downloaded learning material, assignments, revision questions, and notes on the smartphone. They can have access to the learning material anytime from anywhere, owing to the portability of the device. On sharing of academic material, the smartphone is used to connect with other students through academic chat groups on media platforms such as WhatsApp. Students are able to learn collaboratively, sharing knowledge and notes through group discussions, assisting one another in answering questions and completing assignments. Some of their teachers have joined these chat groups – they help in moderating the discussions by the students. This has promoted the relationship between the teachers and their students who can communicate with their teachers on academic issues from home.

6.1.1.1 Perceptions of the students, teachers, and parents on the academic use of smartphones

This study revealed three perceptions of the students on the academic use of smartphones. Most of the participating students perceive smartphones as ideal tools for learning. Others feel that smartphones are a good learning tool, however, their use requires monitoring to avoid abuse. Such abuse robs the students of the productive time. A few students are of the view that smartphones are not a good tool for learning. Most of the student participants perceive smartphone technology as an appropriate technology for learning, especially in this era of ICT. They specified that use of technology is inevitable. They also found the smartphone cheaper and more convenient to use than laptops and computers, because of its portability, which allows learning to take place anywhere and anytime. The use of smartphones has proved more cost effective than buying certain textbooks, and more expedient than carrying a bag full of books for study. Students also perceive the smartphone as an appropriate technology in view of the newly introduced education curriculum in Zimbabwe. This curriculum is research centred and intends to transform learners into explorers, while teachers are transformed into guides; therefore, the smartphone becomes a convenient tool for research. The curriculum also demands that students conduct tasks and projects which involve taking photos, and audio and video recordings of fieldwork. The smartphone comes in handy in carrying out these tasks.

On the second perception, students perceive the smartphone as a good tool for learning purposes; however, they are concerned with the challenges associated with this technology. They indicate that the benefits of smartphone use in education outweigh the costs. They, therefore, advocate for

precautions or strategies to be taken to ensure that the education system evades or minimises any negative effects while promoting the benefits of smartphone use as a learning tool. Students emphasise the need for monitoring on the part of the teachers and parents, and discipline on the part of the students, to promote effective use of this technology. The third perception is one in which some students perceive the smartphone to be unsuitable for academic use. Students indicate that smartphones encourage laziness because students can gain information without working for it. Some highlighted the problems of abuse and addiction, pointing out that smartphones rob students of their learning or study time, therefore they should not be used for academic purposes. However, this perspective does not take into consideration that there are some precautions that may be taken to offset such negative effects.

6.1.2 Analysis of the smartphone use for academic purposes

Findings of this study revealed that, while students at Harare High School use the smartphone for academic purposes, they also use the same device as a tool for socialisation. This study also uncovered some of the challenges associated with the use of smartphones. The study further highlighted the roles played by the school, teachers, and parents in supporting the academic use of the smartphone. The students then made some recommendations to be considered by all stakeholders in the education sector for the effective academic use of smartphones. These stakeholders include the Ministry of Education, the school, parents, teachers, and the students.

6.1.3 Social benefits of using smartphones

Besides using the smartphone for academic activities, students enjoy a wide range of entertainment activities on the smartphone. These include communicating with family, friends, and relatives, social networking, listening to music, watching television, videos, soccer, and playing games, amongst other pursuits.

6.1.4 Challenges of using smartphones as a learning tool

The academic use of smartphones among students at Harare High School has brought with it a fair share of obstacles. These include financial constraints, technical challenges, a distraction from concentrating on schoolwork, abuse of the smartphone, addiction, and behaviour challenges. Some of the parents and students face financial difficulties in purchasing the appropriate device for use as a learning tool, purchasing data bundles for accessing the Internet from home, and in

servicing the device. Some students lack the relevant technical skills to operate the device for effective research. Others have devices with the limited capacity to store large volumes of data downloaded from the Internet, among other hurdles. The participating students indicated that smartphone technology can rob students of study time if not monitored. Smartphone use can deter students from concentrating on their academic work if appropriate precautions are not taken by the users. The issue of smartphone abuse was mentioned as one major challenge that requires to be monitored, to ensure that a great deal of productive time is not wasted. Students sometimes spend much of their time using the device as an entertainment tool at the expense of schoolwork. The challenges of addiction, health and behaviour challenges were also mentioned. These come as a result of uncontrolled abuse of undesirable Internet sites on which students are exposed to pornographic material, violence, hate speech, and cyberbullying. Some students in this study have confessed to having fallen victim to abuse of their smartphones; however, most students have later resolved to abandon such destructive habits.

6.1.4.1 The role of the school environment in supporting the academic use of smartphones

Findings of this study revealed that Harare High School has put in place Wi-Fi facilities in the school to allow students and teachers to access this facility when they use their smartphones for academic purposes. The school has designed a policy which regulates the use of smartphones, controlling access by the students to the Wi-Fi facility to curb abuse. In this respect, students are only allowed to bring to school and use the smartphone upon approval by their subject teachers, who recommend to the school administrators that the student is given a pass and a password for the Wi-Fi. The classrooms are fitted with electric sockets to allow students to charge their phones as they use them as learning tools.

6.1.4.2 Role of the teachers and parents in supporting the academic use of smartphones

The student participants in this study have emphasised the need for monitoring the use of smartphones as a way of ensuring that the device is used profitably and abuse curbed. The teachers' monitoring role at school was underscored as key. Besides monitoring the students, teachers have a participating role in students' academic chat groups. They must provide technical support to the students on how to use smartphones for research and other educational activities. Teachers must also offer the necessary advice to students as they use these smartphones. The teaching of media literacy is essential.

6.1.4.3 Role of parents in supporting the academic use of smartphones

The major role of parents, according to participating students, is monitoring the use of smartphones by their children from home. Parents are urged to perform routine checks on their children's phones and be aware of whom they talk to, what they talk about, and all communication per phone to safeguard their children's security, using as they do these devices as academic tools. The parents also provide financial support, advice, and to some extent assistance to their children on technical know-how of operating the smartphones, depending on the parents' knowledge of technology.

6.2 Recommendations

As a follow-up to the challenges faced in the academic use of smartphones, below are the recommendations for the effective use of smartphones in the teaching and learning processes:

1. The Ministry of Primary and secondary education should formulate a policy making it mandatory for all schools to adopt the use of smartphone technology in their teaching and learning processes.
2. Schools should make it compulsory for all subject teachers, especially at A-level, to embrace the use of smartphones by their students for learning purposes. This will ensure that every student has an equal opportunity of benefiting from this technology. Schools should make wide consultations with experts in ICT, suggesting strategies and guiding rules that regulate the use of smartphones for academic benefits, curbing abuse of the technology. Only academic sites should be made accessible to students on the Internet, even on their private smartphones.
3. Training of teachers to be smartphone literate should be prioritised in order for them to adopt teaching methods that embrace smartphone use and encourage their students to use the technology in their learning processes.
4. The government, in its new curriculum, should incorporate the teaching of media literacy and character education as part of 'Guidance and Counselling' to prepare the students so that they are aware of the benefits and challenges of mass media, becoming empowered to use the Internet in a profitable manner.
5. Schools should levy parents in order to raise funds to buy smartphones for students, to ensure that all the students are given an equal opportunity of accessing the technology for academic purposes.

6.3 Summary

This chapter has given the main results of the research which covers the academic use of smartphones, the perceptions of the students, teachers and parents on the academic use of smartphone technology. Analysis of the smartphone use and recommendations concluded the chapter.

CHAPTER SEVEN

Contributions of this thesis

7.0 Introduction

This thesis has contributed to new knowledge through its findings and on the methodological and theoretical lenses employed in the study.

7.1 Contribution through findings

Findings of this study have added new knowledge to the academic use of smartphones by secondary school students in the Zimbabwean context. Below is a summary of the findings;

1. Students use smartphones for academic purposes in the area of research, downloading and storage of academic material, sharing of notes and assignments through media platforms such as WhatsApp.
2. Most of the students, parents and teachers in this study perceive smartphones to be ideal learning tools but advocate for strategies and monitoring mechanisms to be put in place to curb abuse and ensure that the device is used profitably.
3. Students also use the device for social networking and entertainment purposes. Students face challenges of distractions from concentrating on studies, abuse and addiction if they lack discipline.
4. The role of the school environment in promoting the academic use of smartphones and the monitoring role of teachers and parents cannot be overemphasised.
5. There is a need to train teachers on ways of incorporating smartphone technology into their teaching methods and employing software applications that minimise distractions among students, curbing abuse.

7.2 Methodological contributions

This study followed a qualitative method of producing data, although some studies in the area of education have used quantitative data generation and analysis methods. According to findings of this research, the qualitative data-production method has proved an effective method of data generation. It brings the researcher close to the informants, instead of relying on experimental materials and inferential methods that are more remote. It also focuses on the experiences of the

research participants and their critical voices; therefore, the data generated in this study is rich.

This research also used multiple methods of data production, known as triangulation, as a way of comparing data to see whether it may be corroborated. This has provided a way of overcoming bias and ascertaining the trustworthiness of the research outcomes. In addition to the general benefits of qualitative research methods, each specific data-production technique has contributed to its own unique advantages. The observation schedule has allowed me to examine the actual events and behaviours as they occur in their natural context. The outcomes of this research reflect the academic use of smartphones as they relate to the Zimbabwean context. Interviews gave me the opportunity of asking the participants directly about their personal experiences on the academic use of smartphones. Therefore, qualitative data-generation methods have proved a roadmap providing a clear vision and directives on how the research is to be conducted.

7.3 Theoretical contributions

This study has added new knowledge by employing a theoretical framework of the actor-network theory in the Zimbabwean educational context. The Actor-Network Theory was used as a combination of theory and methodology. In other words, it did not only provide the theoretical concepts as ways of viewing the smartphone and the students as they interact in the learning environment. It also suggested that it is exactly these elements which needed to be explored in the study. Therefore, the ANT has directed me to investigate and document these network elements, which are both human and non-human.

The ANT does not only emphasise that smartphones, which are the objects act instead of students, who are the human actors; it specifies that there is no social science that can commence without enquiry into what and who participates in any action. Hence, in the belief that facts are a social product resulting from the network effect of non-human and human actors, the ANT stands as a promising theoretical, methodological framework for controversial environments, in various knowledge areas like the one presented in this study. The ANT has also allowed me, as the researcher, to track the complex interplay of digital technologies and humans. This was achieved by focussing on the non-humans and humans relations that capture the mediated nature of contemporary life within an evolving technological society (Luppicini, 2010).

The theoretical framework has limited the scope of the relevant data by focusing on the variables specified to this study. It was also used to define the specific viewpoints [framework] that were taken during the analysis and interpretation of the data gathered. It also facilitated the

understanding of variables and concepts according to definitions given in the theoretical framework. It assisted me in building new knowledge by validating or challenging theoretical assumptions (Swanson & Chermack, 2013).

According to Torraco (1997), this theoretical framework has strengthened this study in the following ways: it can allow the reader to evaluate the theoretical assumptions critically, and to connect the researcher to available knowledge. It allows the intellectual to evolve from making simple descriptions about a phenomenon observed, to generalising on different aspects of the academic use of smartphones by secondary school students (Labaree, 2009).

7.4 Research gaps and recommendations for future research

In the course of this study, I have identified several knowledge gaps that could become the focus of future research.

Firstly, the scope of participants in this research involved only students who own and use smartphones for academic purposes. However, through my encounter with these students, I discovered that there are other challenges and perceptions that students have who do not have access to smartphones. Such challenges have not been captured by the scope of this study. It is noted that useful information on the academic use of smartphones could be gathered from students who were excluded from this research. Therefore, there is a need for a study on the academic use of smartphones encompassing all secondary school students regardless of whether they own smartphones in order to gain a comprehensive view of this phenomenon.

Secondly, the ultimate goal of introducing ICT into educational processes is to promote academic excellence. This study has not been able to clearly establish the association between academic use of smartphones and the academic performance of the students. Therefore, as a long-term assessment, it may be necessary to explore the academic use of the smartphone as this relates to the academic performance of the students, especially in the Zimbabwean context.

The third gap identified relates to the perspective of some sectors of the society who perceive smartphone technology as unsafe for use by students, citing the moral challenges associated with its use. Therefore, there is a need for further studies to explore the effects of smartphone technology on the social and moral aspects of the students.

7.5 Conclusion

Basing on the outcomes of this research, this thesis concludes that some students and teachers at Harare High School have embraced the academic use of smartphones and are using them for research, downloading, and storing of learning materials, and for collaborative learning. Students also use the smartphone for social networking and other forms of entertainment such as video watching and playing games. Some students perceive smartphones as useful learning tools. Various issues of abuse of the device causing distractions to students from their academic work, leading to addiction and other behavioural challenges, were cited. This has raised the need for close monitoring by the teachers and parents to ensure that the device is used profitably as a learning tool. Therefore, some of the students advocate for schools to put in place strategies and mechanisms to curb abuse of smartphones, ensuring that students realise maximum benefits without risking their safety. However, in view of the potential negative effects of smartphone use, other students feel that the smartphone is not an ideal tool for academic use.

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Appendix 1: Informed consent resources template

UKZN HUMANITIES AND SOCIAL SCIENCES RESEARCH ETHICS COMMITTEE (HSSREC)

APPLICATION FOR ETHICS APPROVAL

For research with human participants

INFORMED CONSENT RESOURCE TEMPLATE

Note to researchers: Notwithstanding the need for scientific and legal accuracy, every effort should be made to produce a consent document that is as linguistically clear and simple as possible, without omitting important details as outlined below. Certified translated versions will be required once the original version is approved.

There are specific circumstances under which witnessed verbal consent may be acceptable, and circumstances under which individual informed consent may be waived by HSSREC.

Information Sheet and Consent to Participate in Research

Date: 15 February 2017

Dear Student/Parent

My name is Eliot Mashonganyika of the Methodist Church in Zimbabwe, currently working as Education Secretary for Methodist schools in Zimbabwe.

I may be contacted at:

Methodist Church in Zimbabwe

Wesley House

17 Selous Avenue, Harare.

Tel: +2634250523 (work), Cell: +263772385122

Email: eliotmarshy@gmail.com

You are being invited to consider participating in a study that involves research on the academic use of smartphones among secondary school students. The aim of this research is to explore the benefits for secondary school students of using smartphones for academic purposes. The study is

expected to interview fifteen students drawn from the A-level classes, five teachers, and five parents selected purposively from the parents and teachers of the fifteen selected students. The study will involve the following procedures:

- i. Questionnaires will be distributed to all the A-level students for them to complete. These will be used as a sampling strategy;
- ii. Fifteen students will be selected based on their level of electronic device utilisation;
- iii. The selected fifteen students will participate in in-depth semi-structured interviews; and
- iv. Five parents and five teachers will be given questionnaires to complete.

The duration of your participation, if you choose to enrol and remain in the study, is expected to be about a month, with each student being interviewed for a period not exceeding an hour. Interviews will be held on the school premises and during students' spare time on school days.

The study may involve the following risks and/or discomforts: i. The interviews may be conducted during free periods which may otherwise be used by the student as his/her study time; ii. The one-hour interviews may be too long for some students; iii. The interviews may demand that the students share their personal views and emotions on the issues under study; and iv. Since the interview session will be recorded, some students may not be comfortable with this arrangement. This study will provide no direct benefits to participants. However, it will be used in the review of the education curriculum in areas to do with e-learning. The outcome of this study will also help in advising learners and teachers on the best ways of using smartphones to realise maximum academic benefits. Parents and teachers who may not be able to complete the questionnaires owing to work commitments may have the questionnaires completed through telephone conversations.

This study has been ethically reviewed and approved by the UKZN Humanities and Social Sciences Research Ethics Committee (approval number: HSS/0750/017D).

In the event of any problems or concerns/questions, you may contact the researcher at: Methodist Church in Zimbabwe Head Office, Wesley House, 17 Selous Avenue, Harare, or the UKZN Humanities & Social Sciences Research Ethics Committee. Contact details as follows:

HUMANITIES & SOCIAL SCIENCES RESEARCH ETHICS ADMINISTRATION

Research Office, Westville Campus

Govan Mbeki Building

Private Bag X 54001

Durban

4000

KwaZulu-Natal, SOUTH AFRICA

Tel: 27 31 2604557- Fax: 27 31 2604609

Email: HSSREC@ukzn.ac.za

Your participation in this research is entirely voluntary. You have the choice of participating or not in these interviews. You will not be penalised for your decision. You may withdraw from participation at any point if you wish. (Caveat: should the researcher believe that the information being given by the participant is not credible, the participant may be disregarded by the study).

Costs incurred by participants, for example., when travelling for purposes of the study, will be reimbursed by the researcher.

The information that you provide will be used for academic research only. Your views in this interview will be presented anonymously. You will be allowed to use a pseudonym. Neither your name nor your identity will be disclosed anywhere in this study. The records and other items associated with this interview will be held in a protected file accessible only to me and my supervisors. After a period of five years, in line with the rules of the university, materials will be disposed of by shredding and burning. The information recorded on the recorder will be erased.

CONSENT

I have been informed of the study entitled “Academic use of smartphones among secondary school students” by Rev. Eliot Mashonganyika.

I understand that the purpose and procedures of the study are entirely to do with academic research.

I have been given an opportunity of asking questions about the study and have had answers given to my satisfaction.

I declare that my participation in this study is entirely voluntary, and that I may withdraw at any time without being penalised by anyone.

I have been informed of any available reimbursements of resources I may have used as a result of study-related procedures.

I understand that should I have any further questions/concerns or queries related to the study, I may contact the researcher at Methodist Church in Zimbabwe, Head Office, Wesley House, 17 Selous Avenue, Harare, or per the UKZN Humanities & Social Sciences Research Ethics Committee.

If I have any questions or concerns about my rights as a study participant, or if I am concerned about an aspect of the study or the researchers, I may contact:

HUMANITIES & SOCIAL SCIENCES RESEARCH ETHICS ADMINISTRATION
Research Office, Westville Campus
Govan Mbeki Building
Private Bag X 54001
Durban
4000

KwaZulu-Natal, SOUTH AFRICA
Tel: 27 31 2604557 - Fax: 27 31 2604609
Email: HSSREC@ukzn.ac.za

Additional consent, where applicable:

I hereby provide consent to:

Audio-record my interview

YES / NO

The writing of notes during interviews

YES / NO

Signature of participant Date

**Signature of witness
(where applicable)**

Date

**Signature of translator
(where applicable)**

Date

Appendix 2: Child assent form

UKZN HUMANITIES AND SOCIAL SCIENCES RESEARCH ETHICS COMMITTEE (HSSREC)

APPLICATION FOR ETHICS APPROVAL For research with human participants

CHILD ASSENT (13-17-year-olds) TO PARTICIPATE IN A RESEARCH STUDY

“Academic use of smartphones among secondary school students”.

My name is Eliot Mashonganyika. I am a PhD student in the Department of Education at the University of KwaZulu-Natal – Edgewood Campus. I am conducting a research study, working with my supervisor, Dr. Lester B. Shawa. I’d like to tell you about this study, inviting you to participate in it. I am currently working as the Education Secretary of the Methodist schools in Zimbabwe. I may be contacted at:

Methodist Church in Zimbabwe
Wesley House
17 Selous Avenue, Harare.
Tel: +2634250523 (work), Cell: +263772385122
Email: eliotmarshy@gmail.com

What is a research study?

A research study is conducted by people like me. Researchers collect a great deal of information on a topic, enquiring into and examining it. Before you decide whether you wish to be included in this study, it’s important for you to understand why we’re conducting the research and what is involved.

Please read this form carefully. You can discuss it with your parents or anyone else. If you have questions about this research, simply ask me.

Why are we conducting this study?

We are conducting this study to explore the use of smartphones for educational purposes.

This study is not part of your schoolwork. You will not be graded on it.

Why are we talking to you about this study?

We’re inviting you to take part because you are one of the A-level students at Harare High School; and you use smartphones in your learning development.

What will happen if you are in this study?

The study is expected to interview fifteen students drawn from the A-level classes, five teachers,

and five parents, selected from the parents and teachers of the fifteen selected students.

It will involve the following actions:

- i. We will distribute forms to all A-level students to complete and return to us;
- ii. We will then assess and select fifteen students based on their level of smartphone utilisation;
- iii. The fifteen students will take part in the research interviews; and
- iv. Five parents and five teachers relating to the selected students will be given questionnaires to complete.

If you agree to participate in the study, and your parents give you permission, we will ask you to:

- i. Answer a questionnaire

You will be asked to complete a questionnaire on how you use your smartphone for learning purposes. This will take about 10 minutes.

- ii. Participate in the interviews

If you are chosen, based on the assessment of the questionnaires, you will be asked to participate in the interviews. If you agree to be interviewed and your parents approve, an interview schedule will be drawn up and you will be informed of the time you will meet with the researcher during your spare time on the school timetable. The interview will take place in a room allocated by your school.

We will ask you questions about how you use smartphone in your studies. We audiotape (record what we're saying) the interview if you give your permission. If at any stage you feel uncomfortable or change your mind, we simply turn off the tape recorder, or stop the interview immediately. Just let us know.

The interview will take about one hour.

Are there any benefits to being in the study?

There is no benefit to you personally for taking part in this study. However, we hope that the findings of the research will be used in the evaluation of the education curriculum in areas to do with e-learning. The outcome of this study will also help in advising learners and teachers on the best ways to use smartphones, in order to realise maximum academic benefits.

Are there any risks or discomforts to being in the study?

- You may become bored or tired and decide that you don't want to finish the study activities or the interview. If so, simply say that you want to stop.
- A possible risk for any research is that people outside the study might gain confidential study information. We will do everything we can to make sure that doesn't happen.

Who will know about your study participation?

Besides you and your parents, the researchers are the only ones who will know the details of your study participation. If we publish reports or give talks about this research, we will only discuss group results. We will not use your name or any other personal information that would identify you.

To help protect confidentiality, your views in this interview will be presented anonymously. You will be allowed to use a pseudonym.

We plan to keep this information for 5 years, in case we, or other researchers, wish to use it later for other studies. However, we will follow the same steps we have just described to keep it as confidential as possible. The records and other items associated with this interview will be held in a protected file accessible only to me and my supervisors. After a period of five years, in line with the rules of the university, materials will be disposed of by shredding and burning. The information recorded on the recorder will be erased.

Will you get paid for being in the study?

You will not be paid for being in this study. Your parents will be reimbursed for any funds they may have used for you to participate, for example , bus fares and airtime, etc.

Do you have to be in the study?

No, you don't. Research is something you do only if you want to. No one will mind if you decide not to be in the study. Whether or not you decide to participate, there will be no effect on your grades at school.

Do you have any questions?

You can contact us if you have questions about the study, or if you decide you no longer wish to be in the study. You can talk to me, or your parents, or someone else at any time during the study. My phone number is +263 772 385 122; or you can call:

HUMANITIES & SOCIAL SCIENCES RESEARCH ETHICS ADMINISTRATION

Research Office, Westville Campus

Govan Mbeki Building

Private Bag X 54001

Durban

4000

KwaZulu-Natal, SOUTH AFRICA

Tel: 27 31 2604557 - Fax: 27 31 2604609

Email: HSSREC@ukzn.ac.za

ASSENT OF ADOLESCENT (13–17 years old)

If you decide to participate, and your parents agree, we'll give you a copy of this form to keep for future reference.

If you would like to be in this research study, please sign your name on the line below.

Child's name/signature (printed or written by child) * Date _____

Signature of investigator/person obtaining assent Date _____

*If verbal assent only is being obtained:

Investigator or person conducting assent discussion: Initial here if child cannot sign,
documenting that child received this information and gave assent verbally: _____

Appendix 3: Parental consent form

UKZN HUMANITIES AND SOCIAL SCIENCES RESEARCH ETHICS COMMITTEE (HSSREC)

APPLICATION FOR ETHICS APPROVAL

For research with human participants

PARENTAL CONSENT FORM

Note to researchers: Notwithstanding the need for scientific and legal accuracy, every effort should be made to produce a consent document that is as linguistically clear and simple as possible, without omitting important details, as outlined below. Certified translated versions will be required once the original version has been approved.

There are specific circumstances under which witnessed verbal consent may be acceptable; and circumstances under which individual informed consent may be waived by HSSREC.

Information Sheet and Consent to Participate in Research

Date: 21 June 2017

Dear Parent or Guardian

My name is Eliot Mashonganyika from University of KwaZulu-Natal - Edgewood Campus. I currently work as the Education Secretary of the Methodist schools in Zimbabwe. I may be contacted at: Methodist Church in Zimbabwe

Wesley House
17 Selous Avenue, Harare.
Tel: +2634250523 (work), Cell: +263772385122
Email: eliotmarshy@gmail.com

My Supervisor is Dr. L. B. Shawa. He is a senior lecturer in Higher Education Training and development, and an academic coordinator in Pg. Diploma in Higher Education. His office is located within the DVC: University Teaching and Learning Office, Level 3, Shepstone Building, Howard College, 4041 Durban, South Africa. Tel: +277 312 602 291

Your child is being invited to consider participating in a study that involves research on the academic use of smartphones among secondary school students. The aim of this research is to explore the academic use of smartphones among secondary school students. The study is expected to interview fifteen students drawn from the A-level classes, five teachers, and five parents selected purposively from amongst the parents and teachers of the fifteen selected students. The study will involve the following procedures:

- i. Questionnaires will be distributed to all the A-level students for them to complete, and will be used as a sampling strategy;

- ii. Fifteen students will be selected based on their level of smartphone utilisation;
- iii. The fifteen students will participate in in-depth semi-structured interviews; and
- iv. Five parents and five teachers will be given questionnaires to complete.

The duration of your child's participation if he or she chooses to enrol and remain in the study will last about a month. Each student will be interviewed for a period not exceeding an hour within the school premises and during the student's spare time on a school day.

The study may involve the following risks and/or discomforts:

- i. the interviews may be conducted during free periods which could otherwise be used by the student as study time;
- ii. The one-hour interviews may be too long and boring for some students;
- iii. The interviews may demand that the student share personal views and emotions on the issues under study; and
- iv. Since the interview session will be recorded, some students may not be comfortable with this arrangement.

This study will provide no direct benefits to participants. However, it will be used in the review of the education curriculum in areas to do with e-learning. The outcome of this study will also help in advising learners and teachers on the best ways of using smartphones in order to realise maximum academic benefits. Parents and teachers who may not be able to complete the questionnaires owing to work commitments may have the questionnaires completed through telephone conversations.

This study has been ethically reviewed and approved by the UKZN Humanities and Social Sciences Research Ethics Committee (**approval number: HSS/0750/017D**).

In the event of any problems or concerns/questions, you may contact the researcher at: Methodist Church in Zimbabwe Head Office, Wesley House, 17 Selous Avenue, Harare, Zimbabwe, or the UKZN Humanities & Social Sciences Research Ethics Committee, using contact details as follows:

HUMANITIES & SOCIAL SCIENCES RESEARCH ETHICS ADMINISTRATION

Research Office, Westville Campus

Govan Mbeki Building

Private Bag X 54001

Durban

4000

KwaZulu-Natal, SOUTH AFRICA

Tel: 27 31 2604557- Fax: 27 31 2604609

Email: HSSREC@ukzn.ac.za

Your child's participation in this research is entirely voluntary. You have a choice to allow him or her to participate in these interviews. The child will not be penalised whether he or she accepts or rejects the invitation. Your child may withdraw from participation at any point. (Caveat:

should the researcher believe that the information being given by the participant is not credible, the participant's responses may be disregarded by the study).

Costs incurred by participants for example, when travelling for purposes of the study, will be reimbursed by the researcher.

The information that your child provides will be used for academic research only. His or her views in this interview will be presented anonymously. Your child will be encouraged to use a pseudonym. Neither name nor identity will be disclosed anywhere in this study. The records and other items associated with this interview will be held in a protected file accessible only to me and my supervisors. After a period of five years, in line with the rules of the university, materials will be disposed of by shredding and burning. The information recorded on the recorder will be erased.

PARENTAL CONSENT FORM

We, the undersigned parents/guardians of (print full name of the student)

Names of parents/guardians:

Father _____,

Mother _____

agree to our child participating in the study procedures to be carried out by Eliot Mashonganyika from the University of KwaZulu-Natal on "The academic use of smartphones among secondary school students".

1. We understand the purpose and procedures of the study, that it is entirely for academic research.
2. We fully understand that participation in this study is entirely voluntary; and that our child is free to withdraw at any time without being penalised by anyone.
3. We have been informed about any available reimbursements of resources our child may have used connected with study-related procedures.
4. We also understand that the information that the child provides will be used for academic research only. The child's views in this interview will be presented anonymously. He or she will be encouraged to use a pseudonym for the sake of anonymity. The child's name and identity will not be disclosed anywhere in this study.
5. We have also been informed that the records and other items associated with this interview will be held in a protected file accessible only to the researcher and his supervisors. After a period of five years, in line with the rules of the university, materials will be disposed of by shredding and burning. The information recorded on the recorder will be erased.

6. If we have any further questions/concerns or queries related to the study we understand that we may contact the researcher at Methodist Church in Zimbabwe Head Office, Wesley House, 17 Selous Avenue, Harare, or at the UKZN Humanities & Social Sciences Research Ethics Committee.
7. If we have any questions or concerns about the rights of my child as a study participant, or if we are concerned about an aspect of the study or about the researcher, we may contact:

HUMANITIES & SOCIAL SCIENCES RESEARCH ETHICS ADMINISTRATION

Research Office, Westville Campus

Govan Mbeki Building

Private Bag X 54001

Durban

4000

KwaZulu-Natal, SOUTH AFRICA

Tel: 27 31 2604557 - Fax: 27 31 2604609

Email: HSSREC@ukzn.ac.za

8. We do hereby consent to our child's: (tick or circle the appropriate)
 - i. Participation in answering questionnaires YES / NO
 - ii. Participation in the research interviews YES / NO
 - iii. Interview being audio-recorded YES / NO
 - iv. Being the subject of notes written during the interview YES / NO

Signature of parent/guardian

Date

Signature of parent/guardian

Date

Signature of witness

Date

Appendix 4: Parental consent form (Shona version)

UKZN HUMANITIES AND SOCIAL SCIENCES RESEARCH ETHICS COMMITTEE (HSSREC)

APPLICATION FOR ETHICS APPROVAL

For research with human participants

PARENTAL CONSENT FORM (Mvumo yemubereki kumwana wake)

Zviziviso zvakakosha kune vachapinda mutsvakurudzo

Zuva: 21 Chikumi 2017

KuMubereki kana Muchengeti wemwana

Zita rangu ndinonzi Eliot Mashonganyika wepa chikoro chezvidzidzo zvepamusoro ye Kwazulu Natal, ku South Africa. Ndinoshanda semukuru wezveDzidzo musvondo ye Methodist mu Zimbabwe. Ndinogona kuwanikwa pa kero inoti:

Methodist Church in Zimbabwe

Wesley House

17 Selous Avenue, mu Harare.

Tel: +2634250523 (pabasa), Cell: +263772385122

Email: eliotmarshy@gmail.com

Mudzidzisi wangu ari kundibatsira ndi; Chiremba. L. B. Shawa. Mudzidzisi mukuru munyaya dzekudzidzisa vadzidzisi. Anowanikwa kuchikoro chezvedzidzo yepamusoro chekorichi inonzi Haward, mu Durban, South Africa.

Nhare yake: +277 312 602 291

Mwana wenyu ari kukumbirwa kupinda mutsvakurudzo yezvidzidzo pamusoro pe “Mashandisirwo e runhare-mbozha muzvidzidzo zvevana vechikoro”.

Donzvo retsvakurudzo iyi nderekunzvera zvakanakira kushandisa nhare-mbozha mukudzidza kwevana vechikoro. Tsvakurudzo iyi inotarisirwa kuita hurukuro nevana gumi nevashanu uye vadzidzisi vashanu nevabereki vashanu vevana vanenge vasarudzwa. Izvi zvichaitika sezvizvi;

- i. Vana vose vari murugwaro rwechishanu nerwechitanhatu vachapiwa mapepa ane mibvunzo yokupindura.
- ii. Mhinduro dzavachapa dzichashandiswa kusarudza vana gumi nevashanu zvichienderana nemashandisiro avanenge varatidza kuti vanoita nhare-mbozha mukudzidza kwavo.
- iii. Vana vanenge vasarudzwa ndivo vanozopinda muhurukuro dzakadzama.
- iv. Vadzidzisi vashanu nevabereki vashanu vachasarudzwa kubva pavabereki nevadzidzisi vevana gumi nevashanu ava vanozopiwa mubvunzo yokupindura.

Kana mwana wenyu akabvuma, uye imi mukamubvumira kupinda mutsvakurudzo idzi anotarisirwa kunge apedza nezvazvo munguva ingangokwana mwedzi mumwe chete. Panguva iyi mwana mumwe chete anobvunzurudzwa kamwe chete pachinhambwe chingangoita awa imwe chete, zvichiitika pachikoro paanodzidzira panguva yavanenge vasiri kudzidza.

Tsvakurudzo iyi inogona kukonzeresa zvinotevera:

- i. Sezvo bvunzurudzo ichizoitwa panguva inenge vana vakazorora, mwana anogona kuona setamubira nguva yake yaanga achida kushandisa kuita rimwe basa rake kana kuzorora.
- ii. Awa imwe chete inogona kuve yakareba kumwana zvekuti anopedzisira osvotekana kana kushungurudzika nebvunzurudzo yedu.
- iii. Mibvunzo inobvunzwa mwana inogona kuda kuti mwana ataure zviri pamoyo uye zvaakasangana nazvo zvinogona kupedzisira zvomushungurudza.
- iv. Tichange tichizotapa mazvi ezvichange zvichiitika mutsvakurudzo iyi, vamwe vana havasununguki kutapiwa mazwi avo.

Tsvakurudzo iyi haina chinobatika chingauye semubhadharo wekupinda kunenge kwaita mwana mairi, asi zvichabuda mutsvakurudzo zvinotarisirwa kuzobatsira vadzidzi nevadzidzisi kuti vazive nzira dzakanaka dzokushandisa nhare-mbozha mudzidzo dzavo. Vadzidzisi nevabereki vachatadza kupindura mibvunzo panguva yakatarwa nekuda kwekubatikana nemabasa vanozotenderwa kupindura kuburikidza nepanhare.

(Tsvakurudzo iyi yakaongororwa, ikabvumirwa kuti ienderere mberi zviri pamwero nana mazvikokota vezvedzidzo neunhu). (**Nhamba dzacho; HSS/0750/017D**).

Kana mukaita zvinetswa kana mibvunzo maererano netsvakurudzo iyi batai mudzidzi wetsvakurudzo idzi pa: Muzinda mukuru weSvondo ye Methodist mu Zimbabwe, Wesley House, 17 Selous Avenue, Harare, Zimbabwe.

Kana kuti Vakuru vezvedzidzo netsvakurudzo ine hunhu pakero inoti:

HUMANITIES & SOCIAL SCIENCES RESEARCH ETHICS ADMINISTRATION

Research Office, Westville Campus

Govan Mbeki Building

Private Bag X 54001

Durban

4000

KwaZulu-Natal, SOUTH AFRICA

Tel: 27 31 2604557- Fax: 27 31 2604609

Email: HSSREC@ukzn.ac.za

Mwana wenyu arikutarisirwa kuita sarudzo yake yakasununguka uye imi ndimi munotarisirwa kumupa mvumo kana kumurambidza zvichienderana nemaonero enyu. Kana apinda mutsvakurudzo iyi asi ozofunga pava paya kuti haachadi kuenderera mberi anotenderwa kubuda mutsvakurudzo pasina anomupa mhosva. Asiwo kana mudzidzi weTsvakurudzo iyi akaona

sekuti mwana haasi kubudisa nyaya dzechokwadi, ane mvumo yekubudisa mwana wenyu mutsvakurudzo idzi.

Kana mwana wenyu akashandisa mari kana zvimwe patsvakurudzo iyi anozodorerwa zvaanenge ashandisa nemudzidzi wetsvakurudzo.

Zvichataurwa nemwana wenyu zvichangoshandiswa kuita ongororo yakanangana nezvidzidzo izvi chete, hakunazve kumwe kwazvichashandiswa. Maonero ake achachengetedzwa muchivande uye zita rake harizombofa rakabudiswa kuvanhu. Zvinyorwa nezvinenge zvatapiwa patsvakurudzo ino zvichachengetedzwa kuti zvirege kusvika kuvanhu vose vose. Zvinozoparadzwa mushure memakore mashanu maringe nemutemo we Chikoro chezvidzidzo zvepamusoro

MVUMO YEMUBEREKI KUMWANA WAKE

Isu, taisa runyoro rwedu pazasi sevabereki / vachengeti va (nyora zita rizere remwana) _____

Mazita evabereki / Vachengeti:

Baba _____,

Amai _____

Tinobvumira kuti mwana wedu apinde mutsvakurudzo irikuitwa na Eliot Mashonganyika wekuchikoro chezvidzidzo zvepamusoro che KwaZulu Natal pamusoro pe “Mashandisirwo e runhare-mbozha muzvidzidzo zvevana vechikoro”.

1. Tanzwisisa kuti tsvakurudzo iyi ndeye zvidzidzo zvepamusoro chete.
2. Tanzwisisazve kuti mwana wedu anogona kupinda mutsvakurudzo iyi chete kana achiwirirana nazvo kwete kumanikidzwa uye anotenderwa kubuda chero paanenge afunga kuti haachadi kuenderera mberi pasina anomupa mhoswa.
3. Taziviswa kuti kana mwana wedu akashandisa mari kana zvimwe mukuitwa kwetsvakurudzo iyi, anozodorerwa zvaanenge ashandisa.
4. Taudzwa kuti zvichataurwa nemwana wenyu zvichangoshandiswa kuita ongororo yakanangana nezvidzidzo izvi chete, hakunazve kumwe kwazvichashandiswa. Maonero ake achachengetedzwa muchivande uye zita rake harizombofa rakabudiswa kuvanhu.
5. Taziviswa kuti zvinyorwa nezvinenge zvatapiwa patsvakurudzo ino zvichachengetedzwa kuti zvirege kusvika kuvanhu vose vose. Zvinozoparadzwa mushure memakore mashanu maringe nemutemo we Chikoro chezvidzidzo zvepamusoro
6. Kana tikaita zvinetswa kana mibvunzo maererano netsvakurudzo iyi tinobata mudzidzi wetsvakurudzo idzi pa: Muzinda mukuru weSvondo ye Methodist mu Zimbabwe, Wesley House, 17 Selous Avenue, Harare, Zimbabwe.
7. Kana kuti Vakuru vezvedzidzo netsvakurudzo ine hunhu pakero inoti:

HUMANITIES & SOCIAL SCIENCES RESEARCH ETHICS ADMINISTRATION

Research Office, Westville Campus

Govan Mbeki Building

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Durban

4000

KwaZulu-Natal, SOUTH AFRICA

Tel: 27 31 2604557 - Fax: 27 31 2604609

Email: HSSREC@ukzn.ac.za

8. Tinopa mvumo yekuti mwana wedu aite zvinotevera (Isa denderedzwa paunoda)

- | | |
|---|---------------|
| v. Ngaapinde pakupindura mibvunzo yetsvakurudzo | HONGU / KWETE |
| vi. Ngaapinde muhurukuro dzakadzama dzetsvakurudzo | HONGU / KWETE |
| vii. Tapai henyu mazvi ezvichange zvichiitika mutsvakurudzo | HONGU / KWETE |
| viii. Nyorai henyu zvinyorwa zvezvichange zvichitaurika | HONGU / KWETE |

Runyoro rwemubereki / Muchengeti wemwana

Zuva

Runyoro rwemubereki / Muchengeti wemwana

Zuva

Runyoro Rwechapupu

Zuva

Appendix 5: Ethical clearance letter from UKZN



24 July 2017

Reverend Elliot Mashonganyika (214584217)
School of Education
Edgewood Campus

Dear Rev Mashonganyika,

Protocol reference number: HSS/0750/017D

Project title: Academic use of Smart Phones among secondary school students

Approval Notification – Expedited Application

In response to your application received on 03 June 2017, the Humanities & Social Sciences Research Ethics Committee has considered the abovementioned application and the protocol has been granted **FULL APPROVAL**.

Any alteration/s to the approved research protocol i.e. Questionnaire/Interview Schedule, Informed Consent Form, Title of the Project, Location of the Study, Research Approach and Methods must be reviewed and approved through the amendment/modification prior to its implementation. In case you have further queries, please quote the above reference number.

PLEASE NOTE: Research data should be securely stored in the discipline/department for a period of 5 years.

The ethical clearance certificate is only valid for a period of 3 years from the date of issue. Thereafter Recertification must be applied for on an annual basis.

I take this opportunity of wishing you everything of the best with your study.

Yours faithfully

Dr Shenuka Singh (Chair)

/ms

Cc Supervisor: Dr Lester Brian Shawa
Cc Academic Leader Research: Dr SB Khoza
Cc School Administrator: Ms Tyzer Khumalo

Humanities & Social Sciences Research Ethics Committee

Dr Shenuka Singh (Chair)

Westville Campus, Govan Mbeki Building

Postal Address: Private Bag X54001, Durban 4000

Telephone: +27 (0) 31 260 3587/8350/4557 Facsimile: +27 (0) 31 260 4609 Email: ximbap@ukzn.ac.za / snymam@ukzn.ac.za / mohunp@ukzn.ac.za

Website: www.ukzn.ac.za

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Appendix 6:

Application to the Ministry of Education seeking permission to carry out studies at Harare High School



Wesley House, 17 Selous Avenue,
Box CY 71, Causeway, Harare, Zimbabwe

+263 04 250523
0712 360 660

methodist@mczconnexional.co.zw
www.methodistchurchinzimbabwe.org

THE METHODIST CHURCH IN ZIMBABWE

1 February 2017

Dear Sir/ Madam/ Prof. / Dr.

SEEKING PERMISSION TO CONDUCT RESEARCH AT YOUR INSTITUTION (HARARE HIGH SCHOOL)

My name is Eliot Mashonganyika, a PhD. candidate in the school of Education at the University of KwaZulu Natal – Edgewood Campus, Durban, South Africa. I write to seek permission to conduct research towards my PhD studies at your institution – Harare High School.

My research topic entitled '**Academic use of smart-phones among secondary school students**' is supervised by Dr. Lester Brian Shawa, a senior lecturer in the school of High Education Training and Development studies. He can be reached on +277312602291 and shawa@ukzn.ac.za.

Your institution has been selected because it is among the pilot schools in Harare that provides internet (WI-FI) services to promote e-learning among students. I plan to conduct in-depth interviews expected to run for a maximum period of one hour per participant with fifteen (15) learners, five (5) facilitators (teachers) and 5 parents / guardians drawn from the parents and teachers of the 15 learners.

Attached, kindly find the letter from the University of KwaZulu Natal containing my personal details. Consent forms will be provided to those who will volunteer to participate in the research.

I am looking forward to your prompt response.

Yours Faithfully

Reverend Eliot Mashonganyika

Cell: 0772385122

Email: eliotmarshy@gmail.com

Celebrating 40 years of Autonomous Mission" (2 Corinthians 1 vs 20-22)

PRESIDING BISHOP: Revd Dr Solomon Zwana, LAY PRESIDENT: Mr Brown Sanyauke, GENERAL SECRETARY: Revd Dr Jimmy Dube

Appendix 7: Letter of permission form the Ministry of Education granting permission to carry out research at Harare High School

All communications should be addressed to

"The Provincial Education Director"

Telephone : 339334

E-mail : hararemetropolitaprovince@gmail.com



ZIMBABWE

Ministry of Primary and Secondary Education
Harare Provincial Education Office
P. O. Box CY 1343
Causeway
Zimbabwe

24 May 2017

Mashonganyika Eliot
Connexinoal Office
Box CY71 Causeway
Harare



RE: PERMISSION TO CARRY OUT RESEARCH IN HARARE METROPOLITAN PROVINCE: MBARE/HATFIELD DISTRICT SCHOOLS.

Reference is made to a letter dated 10 May 2017 from the Secretary for Ministry of Primary and Secondary Education granting you permission to carry out research in Harare Metropolitan Province on the research title:

"ACADEMIC USE OF SMART-PHONES AMONG SECONDARY SCHOOL STUDENTS"

Please be advised that the Provincial Education Director grants you authority to carry out your research on the above topic. You are required to supply Provincial Office with a copy of your research findings.

.....
Mrs E.Chirapa
FOR: PROVINCIAL EDUCATION DIRECTOR
HARARE METROPOLITAN PROVINCE



Appendix 8: Questionnaires

1. QUESTIONNAIRE FOR STUDENTS

TITLE: ACADEMIC USE OF SMARTPHONES AMONG SECONDARY SCHOOL STUDENTS

My name is ELIOT MASHONGANYIKA. I am a PhD student at the University of KwaZulu-Natal, School of Education and Development, Durban, in South Africa. My research topic is:

ACADEMIC USE OF SMARTPHONES AMONG SECONDARY SCHOOL STUDENTS

I wish to ask you to spare some time to complete this questionnaire. Your submissions will be used solely for the purpose of this academic research.

Your cooperation will be greatly appreciated.

Please tick the box of preferred answers and/or give a narrative in the space provided below each question.

General Information

- 1 Name of student: _____
- 2 Form/class: _____
- 3 Gender Male ☐ Female ☐
- 4 Age Below 17yrs ☐ 18-20 yrs ☐ 21 and above ☐
- 5 Do you have a smartphone for personal use? Yes ☐ No ☐
- 6 Do you know how to use the smartphone? Yes ☐ No
- 7 How often do you use the smartphone? Once a week ☐
Twice a week ☐
Three times a week ☐
Every day ☐
- 8 How long have you been using the smartphone? 1 Year ☐
2 Years ☐
3 Years ☐
4 Years ☐

9 How did you learn about the smartphone?

Friends

Family

School

Other (specify)

10 What do you use the device for?

Communicating with friends

Study purposes

For social purposes

All of the above

11 Which social networks do you use for academic purposes?

Facebook

WhatsApp

Twitter

YouTube

Instagram

LinkedIn

Skype

Other (specify)

12 *Where do you use your smartphone?*

At home

At school

Both

2. An Interview Guide

SEMI –STRUCTURED INTERVIEW SCHEDULE

This interview guide seeks to establish the impact of use of smartphones by secondary school students in teaching and learning processes at school and outside the school environments. The schedule is divided into three sections. It attempts to explore the impact of use of these devices on the student's academic development. I shall focus on Harare High School's 'A' level students for the survey. A pilot survey will be conducted at the same school, focusing on Form 4 students, in order to sharpen the research instruments.

The interviews will take a minimum period of one hour per session to allow the interviewer to obtain as much information as possible from the interviewee on this subject.

Part A: The use of the smartphone

- i. How long have you been using your device?
- ii. How do you use your device?
- iii. What do you use your device for?
- iv. How much time do you dedicate to your academic work on networks?
- v. How did you learn about social networks on your device?

Part B: The impact of using smartphones

- i. How have you benefited academically from the use of your device?
- ii. What challenges have you faced in using your device for educational purposes?
- iii. What positive influences can mass media have on students who use a smartphone at home and at school?
- iv. What negative influences can mass media have on students who use the device at home and at school for academic work?
- v. By your own observations, in which lessons do you learn most from using electronic devices for academic purposes?

Part C: Reasons for students being influenced by using smartphones in their academic development.

- i. In your own opinion, do you think media literacy should be taught in schools? If yes, please elaborate, offering ways of doing this.
- ii. Do you think students are influenced by smartphone use in their learning? If so, please state in which way/s?
- iii. How can students optimise the use of these devices in their learning processes?
- iv. Do you think social media adds any value to your performance in class?
- v. What advice can you give to students who use smartphones for their learning processes?

3. Questionnaire for Teachers

TITLE: ACADEMIC USE OF SMARTPHONES AMONG SECONDARY SCHOOL STUDENTS

My name is Rev. ELIOT MASHONGANYIKA. I am a PhD student at the University of KwaZulu Natal, School of Education and Development, Durban, South Africa. My research topic is:

ACADEMIC USE OF SMARTPHONES AMONG SECONDARY SCHOOL STUDENTS

The aim of this study is to elicit how students in secondary schools use smartphones in their learning, and how the use of these can influence students in their academic development.

I request that you spare some time to complete this questionnaire so that you share your experiences and observations on the subject. Your submissions will be used solely for the purpose of this academic research.

Your cooperation will be greatly appreciated.

- I may be contacted at Methodist Church in Zimbabwe
Wesley House
17 Selous Avenue
Harare
Email: eliotmarshy@gmail.com
Cell +263 772 385 122

My Supervisor is Dr. L. B. Shawa. He is a senior lecturer in Higher Education Training and development, and an academic coordinator in Pg. Diploma in Higher Education. His office is located at the DVC: University Teaching and Learning Office, Level 3, Shepstone Building, Howard College, 4041 Durban, South Africa. Tel: +277312602291

Thank you for your contribution to this research.

Please tick the box giving your preferred answer and/or give a narrative in the space provided below each question.

Q1 How has the use of smartphones by students improved your teaching and learning methods?

Q2 What academic changes have you observed in the life of students who use smartphones at school and at home?

Q3 What security measures are in place at your school to safeguard effective use of Internet services accessed by students at school?

Q4 Recommend any additional measures to safeguard the access of media platforms at school by students through their smartphones.

Q5 Any other comments or recommendations relating to the use of smartphones by students for learning purposes?

4. Questionnaire for Parents/Guardians

TITLE: ACADEMIC USE OF SMARTPHONES AMONG SECONDARY SCHOOL STUDENTS

Dear Parent/Guardian

My name is Rev. ELIOT MASHONGANYIKA. I am a PhD student at the University of KwaZulu Natal, School of Education and Development, Durban, South Africa. My research topic is:

ACADEMIC USE OF SMARTPHONES AMONG SECONDARY SCHOOL STUDENTS

The aim of this study is to elicit how students in secondary schools use smartphones in their learning, and how the use of these can influence students in their academic development.

I request that you spare some time to complete this questionnaire so that you can share your experiences and observations on the subject. Your submissions will be used solely for the purpose of this academic research.

Your cooperation will be greatly appreciated.

- I may be contacted at Methodist Church in Zimbabwe
Wesley House
17 Selous Avenue
Harare
Email: eliotmarshy@gmail.com
Cell +263 772 385 122

My Supervisor is Dr. L. B. Shawa. He is a senior lecturer in Higher Education Training and development, and an academic coordinator in Pg. Diploma in Higher Education. His office is situated at the DVC: University Teaching and Learning Office, Level 3, Shepstone Building, Howard College, 4041 Durban, South Africa. Tel: +277312602291

Thank you for your contribution to this research.

Please tick in the box of preferred answers and /or give a narrative in the space provided below each question.

Q1 Are you aware that your child is now using a smartphone for learning purposes?

Yes

No

Q2 How do you view this new development of use of smartphone technology in teaching and learning processes of your child?

Q3 Have you observed any changes in the academic performance of your child since using this device?

Yes

No

If your answer is 'Yes', please explain the changes.

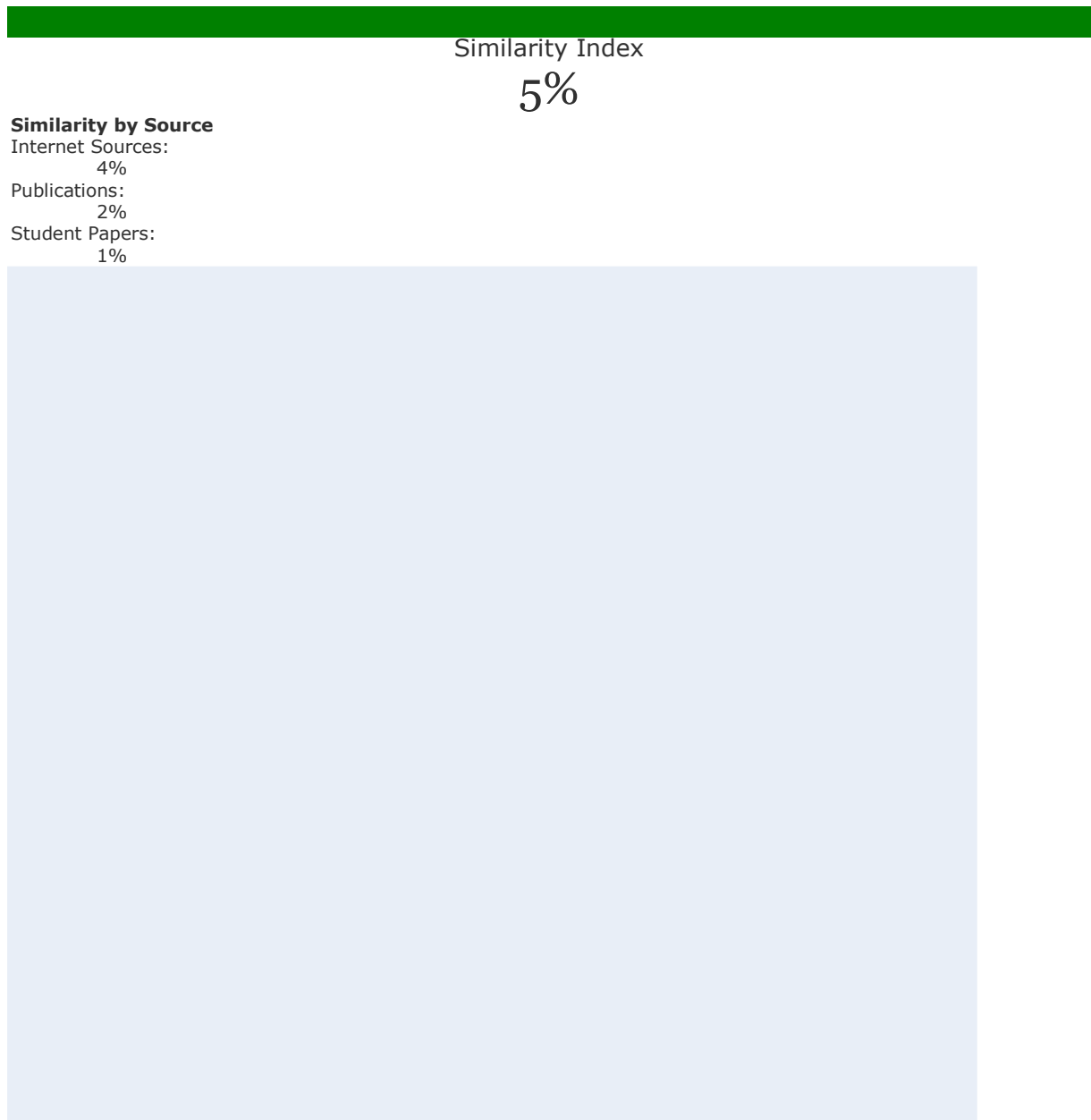
Q4 What is your view on the use of smartphones by children for accessing media platforms such as WhatsApp, YouTube, Twitter and Facebook in their learning processes?

Q5 What assistance can you, as a parent/guardian, give to your child as he/she uses the smartphone for academic purposes?

Appendix 9: Turnitin originality report

- Processed on: 03-Sep-2018 2:43 PM CAT
- ID: 985396933
- Word Count: 75635
- Submitted: 3

ACADEMIC USE OF SMARTPHONES AMONG SECONDARY SCHOOL STUDENTS By Eliot Mashonganyika



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<http://www.scielo.br/pdf/bar/v11n1/v11n1a07.pdf>

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[Md. Emran Hossain, S.M. Zabed Ahmed. "Academic use of smartphones by university students: a developing country perspective", The Electronic Library, 2016](#)

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[Essam Mansour. "Use of smartphone apps among library and information science students at South Valley University, Egypt", The Electronic Library, 2016](#)

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<http://emrbi.org/wp-content/uploads/2014/09/euromed-6-2013.pdf>

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Appendix 10: Observation schedule for Harare High School

School facilities supporting academic use of smartphones	Questions	Comment
Electricity/ Power	Does the school have Electricity/power?	
Wi-Fi	Does the school have a Wi-Fi facility?	
Classroom facilities- Electrical sockets	Do classrooms at the school have electrical sockets and other facilities that support the use of smartphones?	
Smartphone appreciation lesson schedule	Does the school have a timetable for smartphone appreciation?	
ICT Teachers	Does the school have sufficient ICT teachers?	
Smartphones and smartphones chargers	Does the school provide smartphones for the students?	

Appendix 11: Letter of authority to use smartphones



Harare High School

Established in 1958



P.O. Box MSK 140, Mbare Musika, Harare

Tel (04) 790122

12 September 2017

The Head

Harare High School

RE: REQUEST FOR UPPER 6 STUDENTS TO BRING SMART PHONES ON 15 SEPTEMBER 2017

I do hereby request for upper 6 Economics students to bring smart phones on the 15th of September 2017. This has been necessitated by the need to allow them to research on the functions of monetary policy as well as sharing a video on the tools of monetary policy.

Yours faithfully

SIBANDA H.M
(Economics Teacher)

