



MIDLANDS STATE UNIVERSITY

FACULTY OF EDUCATION

DEPARTMENT OF EDUCATIONAL TECHNOLOGY

**TEACHERS' ATTITUDES ON THE USE OF ICT IN TEACHING AND LEARNING OF
MATHEMATICS IN GWERU URBAN SELECTED PRIMARY SCHOOLS.**

BY

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APPROVAL LETTER



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The undersigned certify that they have read and recommend to the Midlands State University

For acceptance of a dissertation entitled: **Teachers' attitude on the use ICT in teaching and learning of mathematics in Gweru urban selected primary schools.**

SUBMITTED BY: Makono Antony (R158167H) in partial fulfilment of the

Requirements of a Bachelor of Education in computer science

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DECLARATION

I, Antony Makono, do hereby declare that this project is a result of my own investigation and research, except to the extent indicated in the acknowledgements, references and by comments included in the body of the report, and that it has not been submitted in part or in full for any other degree to any other university.

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DEDICATION

I dedicate this study to my beloved family for love and financial support, my brothers and sisters I want to thank you for prayers and encouragement.

Your love and support will forever be cherished without you I could have not made it.

ABSTRACT

ICTs have become one of the essential pillars of modern society, therefore the attitude, mastery and understanding of ICT basic skills and concepts by teachers in learning and teaching is imperative. New broadband communication services and convergence of telecommunication with computers have created numerous possibilities to use a variety of new technology tools for teaching and learning system. The Zimbabwean government has put into place the ICT Strategic Plan and created the Ministry of Information and Communication Technology which requires everyone to be computer literate. In an attempt to bring the potentials and benefits of the ICTs into schools and the promotion of computer literacy the Government donated computers and other ICT tools such as laptops, data projectors and interactive whiteboards in schools for the school children and their teachers despite these efforts Zimbabwe remains at the bottom ten of ICT Network Readiness. In Gweru Urban most primary schools have computer laboratories and are connected to internet the researcher noted that teachers are not embracing ICT in teaching and learning, continue to favour the traditional methods of teaching which make the lessons more teacher-centred rather than the effective ICT learner centred approach in spite of the availability of ICT tools in schools. It is against this background that the research looked at teachers' attitude towards ICT use in teaching and learning mathematics in Gweru urban Primary schools in zone B.

Data was collected through the use of questionnaires and interviews. A sample of 50 participants were selected from five primary school. The sampled participants were selected from a population of 100 teachers and five head teachers were interviewed. Purposive sampling was used to select the participants. The study used a descriptive survey method as a research design employing mixed methods approach. Data were analysed using frequencies and percentages. Findings revealed that most teachers are scared of using ICT tools. The finding also revealed that the frequency in use of traditional tools and methods are higher than that one of ICT tools and methods. It was also revealed that training of teachers was the most given response as the solution to the challenges of using ICT in teaching and learning Mathematics . The government can electrify schools and provide generators so that electrical power should always be available to avoid technical problems during the use of ICT tools in teaching and learning.

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CHAPTER ONE

THE PROBLEM AND ITS CONTEXT

1.1 Introduction

This research mainly looks at teacher attitude on ICT use in teaching and learning of Mathematics in selected Primary schools in Gweru urban. This chapter focused on the background of the study and its context. Following is the research problem, discussing the problem that the research sought to address. The chapter proceeded with the significance of the study, limitation, delimitation and assumptions of the study. There after key terms were also defined and the chapter concluded with a summary of major points.

1.2 Background of the study

ICTs have become one of the essential pillars of modern society, therefore the attitude, mastery and understanding of ICT basic skills and concepts by teachers in learning and teaching is imperative. With the rapid development of ICT and its ramification in our world, especially education, can we envision how education will look (Pannen, 2009). Since society is so intertwined with technology, Keitel (1997) argues that it is becoming easier to find technological solutions for problems rather than to search for none technical solutions. This could hold true for mathematics teachers who need to adjust to teaching mathematics with aid of resources such as ICT in a changing society. The teacher's role keeps on changing because of the ever changing amount of resources available to students available via the internet (Johnson, Adams, Becker, Cummings, Astra, Freeman and Ludgate, 2013).

A phenomenal growth in communication technology, computer network and information technology, development of new broadband communication services and convergence of telecommunication with computers have created numerous possibilities to use a variety of new technology tools for teaching and learning system (Majumdar, 2006). Thus integration of computers and communications offers unprecedented opportunities to the education systems with its capacity to integrate enhance and interact with each other over a wide geographic distance in a meaningful way to achieve the learning objectives.

In the United Kingdom, the official view of ICT as potentially transformative of education has placed it at the centre of the national agenda for school reform (Deaney, Ruthven & Hennessy, 2005). As a result, the promotion of ICT in education has been a significant part of the UK government policy in education since the 1980s with various programmes being implemented over the years has yielded positive results on teaching and learning.

In United States of America schools generally showed a positive trend in the achievement of Students when ICT is employed (Christmann, 2003, Bayraktar, 2001/2002, Waxman, 2003). In her studies, Bayraktar (2001/2002) found that computers were more effective when used in simulation or tutorial modes and ICT were more effective when computers were used individually. There is clear evidence from the findings that ICT has a positive impact on learning and teaching, although on small effect. However Christmann (2003) wrote that more research is needed to test the lofty expectations that many have ICT as the basis for educational achievement. Otherwise, ICT may become another misunderstood, overbought, under-used, and, eventually, a large discarded tool.

South African learners particularly in schools with limited resources have continuously not performed well in subjects like Mathematics and Science (Nokulanga and Donovan,2012). The government has turned to modern technology and ICT to strengthen teaching and learning and to redress past inequalities in its schools. This intervention has made little or no progress despite the availability of Information and Communication Technologies (ICTs) in these institutions (PanAfrican Research Agenda, 2008-2011). The teachers in these schools are still in the attitude phase of using ICTs to merely transmit subject content rather than utilise the ICT to enhance learning and teaching (Nokulanga and Donovan,2012).

The South African ICT Education policy, (DoE, 2004) advocates the pedagogical integration of ICTs that promotes the development of higher-order thinking skills. Teachers' attitude competence and innovativeness to maximise the potential of ICT in teaching and learning mathematics are critical if their use will improve thinking skills that are a significant component in enhancing learner performance.

Teachers in most South African public schools have attended ICT training workshops and generally these sessions constitute basic computer skills (Nokulanga and Donvan,2012) . These acquired abilities have proved inadequate to equip teachers with the skills they need to infuse ICTs into the subject teaching . A research carried on ten South African schools by Pan African Research Agenda (2008-2011) show that the majority of teachers cannot go beyond using ICTs to type lesson plans, tasks and tests for their learners. They are not maximising the potential of computers especially for enhancing the actual teaching and Learning of their subjects.

The Zimbabwean government has put into place the ICT Strategic Plan and created the Ministry of Information and Communication Technology which requires everyone to be computer literate. In this realisation the Nziramasanga Commission Report (1999) an educational report called for the adjustment of primary and secondary school education curriculum to incorporate ICT to exploit the benefits of ICT for the purpose of teaching and learning from the pre-school level to university level. In an attempt to bring the potentials and benefits of the ICTs into schools and the promotion of computer literacy President Robert Mugabe donated computers and other ICT tools such as laptops, data projectors and interactive whiteboards in schools for the school children and their teachers.

ICTs serve as a transmission belt in generation, dissemination and sharing of knowledge (Anderson, 2008). The education sector plays a key role in information and knowledge production hence the need to ensure that teachers and pupils are not left behind. As a developing nation, Zimbabwe needs to be part of this new dispensation which entails integrating new ICT. Zimbabwe remains at the bottom ten of ICT Network Readiness Index (Kabweza, 2011, Reddi, 2004). In Gweru Urban most primary schools have computer laboratories and are connected to internet. Ruto and Ndaro (2013) noted that teachers are not embracing ICT in teaching and learning , continue to favour the traditional methods of teaching which make the lessons more teacher-centred rather than the effective ICT learner centred approach in spite of the availability of ICT tools in schools. It is against this background that the research looked at teachers' attitude towards ICT use in teaching and learning mathematics in Gweru urban Primary schools in zone B.

1.3 Research problem

The success of student learning with ICT technology will depend on the attitudes of teachers, and their willingness to include the ICT technology (Teo, 2006). Gaining an appreciation of the teachers' attitudes towards ICT use may provide useful insights into ICT technology integration and acceptance and usage ICT technology in teaching and learning. Though the concept of attitude of teacher towards ICT use in Mathematics has been examined in other countries it is partially examined in Zimbabwe due to technophobia among other issues (Tsokota, 2012). Ruto and Ndaro (2013) noted that teachers are using textbooks frequently and did not make use of other instruction and technologically oriented resources in their teaching. This is so because ICTs in education are not considered central to the teaching in the classroom in Zimbabwean schools. Teachers continue to use the traditional methods of teaching like the textbooks lecture methods which make the lessons more teacher-centred than the learner-centred.

Since the installation of computers in Gweru Urban Zone B in the late 2000 most teachers at these school are not using the potentials of the computers in their teaching. The teachers complain of shortage of teaching materials and had affected the pupils' interest of the mathematics lessons yet the computers and the internet services available at the school can assist them to address these challenges. It is therefore desirable to analyse the attitudes of the teachers towards the use of ICTs and offer suggestions on how to improve their knowledge on the impact and importance of ICT in teaching mathematics subject.

1.4 Research questions

1. What are the attitudes of the mathematics teachers towards the use of ICT tools in their teaching?
2. Are the mathematics teachers using ICT in teaching and learning?
3. What are the challenges of using ICT in teaching and learning of mathematics?
4. What are the ICT Solutions that enhance teaching and learning of mathematics?
5. What are the benefits of ICT in teaching and learning of mathematics?

1.5 Significance of the study

It is hoped that school authorities would know if they are meeting the needs of students as well as teachers effectively in fulfilling their mission statement of providing quality education. They will be forced to review the school policies on the use of ICT in teaching. The research results will inform the school the professional development requirements of practising teachers to enable them to use ICT.

The study also would provide a deeper understanding on teacher's attitudes towards the use of ICT in teaching. The study would improve the use of ICT in teaching and learning of mathematics in Zimbabwean schools. It is also hoped that the study would form the basis for further research in related areas. The study is also envisaged to benefit the Ministry of Primary and Secondary Education since it will produce a guide for the implementation of ICT in teaching and learning mathematics. . Finally, the study would contribute to the existing theory and practice relating to ICT technology use in teaching and learning.

1.6 Assumptions of the study

It was assumed that:

- ICT tools like computers were available in Gweru Urban Primary Schools Zone B cluster and were accessible to teachers for use in their teaching and learning.
- It was also assumed that the mathematics teachers are aware of the benefits of ICT in teaching and learning.
- The study also assumes that ICT is used in teaching and learning of mathematics in Gweru urban Primary schools though there are no proper implementation strategies that were employed.

1.7 Limitations

This study encountered some limitations such as time and funding. The findings from the study may not be generalised to the whole province, or the country since the study was carried in Gweru urban primary schools which has conditions and situations different to other schools.

The time for the study was limited for it was undertaken in just two semesters. If the researcher had enough time would have covered all schools in the district of Gweru. However, this problem

was resolved by limiting the study to Gweru urban Zone B primary schools which ensured the completion of the study within time frame.

The researcher funded the study. Money was used in seeking of permission to carry out the study from the Permanent Secretary in the Ministry of Primary and Secondary Education, Midlands Province and Gweru district. More costs were incurred in the production of questionnaires and travelling .

The research was also carried out during the school term when the targeted participants were all busy with their lessons. The teachers were unwilling and reluctant to participate in the study at first because they did not want to divulge their ICT competencies levels believing that the information would be published. The researcher overcame this dilemma by explaining to the teachers that the information was not going to be published but was used for academic purposes and no names were written on the questionnaires and the information was confidentially kept.

1.8 Delimitations

The study was restricted to schools in Gweru Urban Zone B Primary Schools. Gweru Urban Primary schools are in Gweru Midlands Province in Zimbabwe. The researcher marked the boundaries in relation to numbers, geographical situations and target population. The study targeted teachers and school Heads from Gweru Urban Primary school. The study sought to reveal the attitudes of teachers towards the use of ICT in the teaching of mathematics.

ICT stands for information communication Technology that provide information handling tools that are used to produce, store, process, distribute and exchange information (Tella, et al, 2006). These information handling tools include the computers, laptops, handheld devices such as mobile phones, iPods, pads, and tablets among others which are now able to work together and combine to form networked world which reaches every corner of the globe using the internet.

Attitude: is a feeling, opinion and way of behaving that is organised through experience exerting a dynamic influence upon an individual's response to all situations with which it is related (Al-Zaidiyeen ,2010). An attitude can be a favourable or unfavourable tendency of individuals towards an entity based on evaluation of this entity by the individuals (Kaur, 2011).

1.9 Summary

This chapter provided some background for this research study. It further provided a focus to the area of the study and defined the problem that was addressed. The research objectives that had been formulated in order to fulfil the aim of this study were outlined. Significance of the study, limitations and delimitation were also discussed.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

Literature review is important in gathering the relevant and necessary information to realise the objectives of the study. The review summarised, evaluated, clarified and gave a theoretical base for the research.

The chapter addressed the teacher attitude towards use of ICT in teaching in the world and Zimbabwe in particular. Teachers held different perceptions on use of ICT in teaching. In this study, literature review was also conducted to explore the challenges, solutions and benefits of using ICT in teaching and learning Mathematics. Literature review was also used in this study to explain different concepts that were used to build this research.

2.2 Attitude of Teachers towards the use of ICT in teaching of Mathematics

The researches carried out in the world especially in the developed countries have revealed that teacher attitudes towards the use of ICT in teaching varies with teacher computer competence, access to ICT hardware and software and understanding of benefits brought about by ICT (Mwalango, 2010). The Empirical Survey carried out in Europe revealed that a fifth of European teachers believed that the use of ICT in teaching did not benefit their students' learning (Korte & Husing, 2007) in (Mwalango, 2010). Some teachers believe that ICTs have the potential to improve teaching and learning, but almost equal numbers of them still find it difficult to understand the specific benefits of ICTs or how it can be used to achieve maximum results.

Albirini (2006) suggested that an attitude of teachers towards ICT is vital to understand to achieve a meaningful use of ICT in teaching so as to encourage them to integrate ICT in their teaching. It is believed that if teachers perceived technology programs as neither fulfilling neither their teaching nor their students' needs it is likely that they will not use technologies in their teaching. On the other hand, if teacher attitudes are positive towards use of ICT then they can easily adopt and use ICT in their teaching process. Some teachers prefer to stick with tried and tested methods which they believed would enable them to predict and control outcomes easily (Ndibalema, 2014)

Yildrini(2000) posits that computer anxiety and liking significantly affects teacher attitude. That is teachers with low levels of computer anxiety and high levels of computer liking are identified with positive attitudes. Most teachers have technophobia fear of technology that which contributes to the development of negative attitude towards the use of ICT in teaching. At the source of these excuses is underlying scepticism that even if teachers change her or his philosophy about teaching using ICT tools will not be able to revolutionaries teaching in the classroom. This lack of preparation prevents teachers from applying and using ICT in their teaching practise (Sharp ,2011).

Several researchers pointed that one barrier that prevent teachers from using ICT is the lack of confidence. Becta (2004) identified lack of confidence as the major impediment to the use of computers in the classrooms. A world wide survey of nationally representatives samples from twenty six countries found out that teachers' lack of knowledge is a serious obstacle to the use of ICT in primary and secondary schools (Pelgrum,2006). The study by Balankat etal (2006) have shown that many teachers do not use ICT in teaching because of lack of ICT skills rather than for pedagogical reasons hence lack teacher competence may be one of the major factors.

Shoepps study (2005) revealed that teachers did not believe that they were not being supported and guided on the integration of ICT into their teaching. Empirica (2006) found out that teachers who are not using ICT technology like computers in their teaching are still of the idea that the use of the ICT has no benefits or unclear benefits. Sicilia (2006) commented that lack of necessary time teachers spent together to work on planning classroom activities as hindering factor to ICT in teaching mathematics. Teachers surveyed by Dillony , Osborne, FairBrother and Kurina (2000) in Hennessy (2003) on the most significant constraint on the use of ICT by 86-88% of Primary and secondary teachers was lack of time

2.3 ICT use by Mathematics teachers in Zimbabwe and the world

It had been found out by researches that the use of ICT in African countries is generally increasing and governments had developed ICT policies. Unwin (2005) in Ndibalema (2014) adds that these policies seem to place a great emphasis on providing ICT infrastructure to schools rather than their use in teaching. However there is not much information on how ICT are being used by teachers in the classrooms. Most of the computers are being taught as a separate discipline whereby ICT usage is limited to demonstration to the role of ICT in teaching

(Hennessy, Harrison & Wamakote, 2010). The government of Zimbabwe is a the signatory to a document which encourages adoption, deployment and use of ICTs for national transformation founded at World Summit on the Information Society (WSIS) of 2003. One of WSIS's major objectives is to connect secondary and primary schools with ICTs, adapt all primary and secondary school curricula to meet the challenges of the information society (Kundishora, 2012). The government of Zimbabwe created the Ministry of Science and Technology Development which had developed the National Information Communication Technology Policy Framework in 2007 in appreciation on the importance of ICT in Zimbabwean economy and education.

In response to all these developments a Ministry of Information and Communication Technology (MICT) was formed in 2009 as a way of harnessing and tapping the advantages of ICTs for national socio-economic development. MICT was formed to transform Zimbabwe into a knowledge-based society so as to enhance the country's competitiveness in the world (MICT Strategic Plan 2010-2014 Policy Framework). MICT unveiled a visionary Strategic Plan to guide and consolidate priorities to transform Zimbabwe into a knowledge society and pulls the entire nation around a single plan for execution (Strategic Plan 2010-2014).

However, according to World Economic Forum's Global Information Technology Report in Isaac (2007). Zimbabwe remains at bottom ten and is ranked 105 out of 115 economies in 2005-2006 based on ICT network readiness index which measures the degree of preparation of a nation to participate in and benefit from ICT. Zimbabwe is slightly higher than Benin, Chad and Ethiopia with South Africa placed on the 70th and Mauritius on the 55th position (Bilbao-Osorio, Dutta and Lavivin 2013).The country aims to boost its ICT broadband infrastructure to connect with the world through undersea cables from East African Submarine Cable System (EASSy) running along the east coast of Africa and SEACOM which aims to connect West and East Africa with Europe, Asia and Middle East. The Ministry of Information and Communication Technology is helping the Ministry of Primary and Secondary Education with computerisation programme to prepare students the enormous change brought by ICTs.

The ICTs are introduced into education at varying levels from pre-school to university and both formal and informal sectors to upgrade literacy and availability of ICT resources at all levels. In order to achieve this MICT aims to introduce one PC for each classroom in all schools in Zimbabwe by 2014(MICT Strategic Plan 2010-2014).This one PC per classroom was being

enhanced by the generous donations made by President Mugabe since the turn of the century and initiatives by some schools through the School Development Associations (SDAS), NGOs and former students associations. The Nziramasanga Education Commission Report of 1999, the National Science and Technology Policy of 2002 and Vision 2020 among other policies recommended the use of computers for teaching and learning in educational institutions.

Despite all these positive trends and policies made by the government of Zimbabwe, the uptake and use of ICT in teaching are very disappointing (Agere, 2003) in (Nhamo and Magonde, 2013). The country's provision of ICT resources to education sector has been growing in leaps and bounds since 2002. It lags behind in the adoption, use and innovation of ICT in education and is missing out on the benefits of ICTs. Kachembere (2011) in Konyana and Konyana (2013) observes that many students and teachers are losing out on better education and well-paying ICT jobs. ICT is not a common phenomenon in Zimbabwe education due to a number of reasons which include the digital divide between private and government schools, lack of hardware and software, teacher attitude towards the use of ICT, lack of trained personnel/teachers to teach using ICT, non-connectivity, no power supply among other reasons. The socio-economic and political crisis in the country has worsened the education system. Qualified personnel left the country due to brain drain.

It is important to note that even those few schools where they have the computers, power supply and internet the computer usage is limited to demonstrations to learners on how the computers function, occasionally through presentation of certain tools such as word processing or spreadsheet software in the computer laboratories (Karsenti, et al, 2009). The researches have shown that Zimbabwean teachers fear change, lack qualifications in ICT skills and develop a negative attitude towards the use of ICT in teaching. The education system of teacher training is lagging behind on the requisite ICT training of teachers. The aim of MICT to have a PC per classroom by 2014 has not been achieved yet. Most government schools in Zimbabwe have 50 pupils in each class; this would translate to one computer to 50 pupils which is not workable. This is also evident in other developing countries such as Mozambique and Zambia. Most researchers have found out that teacher attitudes are a major enabling and disabling factor in the use of ICT in teaching (Bullock 2004 in Albirini, 2006).

2.4 Challenges on the use of ICT in teaching Mathematics

In Zimbabwe, the 2010-2014 strategic plans for the Ministry of Information and Communication Technology with regards to education are to have one computer per class by 2014. Looking at most Zimbabwean classes with an average of 40 pupils per class, this would translate to one computer for 40 pupils (Zimbabwe MICT strategic Plan 2010-2014:53). This ratio is clearly not workable. A similar trend is also evident in other developing countries like Zambia and Mozambique.

The researches have shown that Zimbabwean teachers fear change, lacks qualifications in ICT skills and develops negative attitude towards the use of ICT in teaching. The education system of teacher training is lagging behind on the requisite ICT training of teachers.

Traditional teaching which is widely used in schools emphasising content using textbooks and one way communication is now out-dated. Mathematics teachers have been taught through lectures, presentations, tutorials and learning activities designed to consolidate and rehearse the content (Kamal and Banu,2010) in Adesote and Fatoki, 2013). The emerging technologies are favouring curricula that promote competence, communication and performance of pupils. Such contemporary curricula requires access to various information forms and types, student-centred learning settings based on information access and inquiry, learning environment centred on problem-solving and inquiry –based activities, teachers as coaches and mentors rather than content experts (Adesote and Fatoki, 2013).

Studies carried out in Singapore by Teo (2008) found out that some teachers lacks sufficient training, demonstration or advice on how to use ICT in the classroom instructions. Turkish EFL teachers were studied by Ayadin (2012) in (2013) discovered that teachers' literacy were restricted to the use of internet, e-mail, word processing and presentation software not teaching tools.

2.5 Solutions to the use of ICT in teaching and learning of mathematics

With the emergence of new technologies, more time is needed to learn and gain experience and confidence to use it in the presence of learners who in most cases know better than them (Becta, 2004). Kellener (2002) in Binglamis (2009) argued that ICT cannot replace normal classroom teaching, but ICTs could be a positive force in Mathematics classrooms for deeper understanding

of concepts and could be used to provide new authentic, interesting, motivating and successful teaching activities.

Pre-service teachers can also provide opportunities for experimentation with ICT before using in the classroom teaching (Albirini,2006). Providing pedagogical training for teachers rather than simply training them to use ICT tools is an important tool (Becta,2004). Cox et al (1999) argue that if teachers are to be convinced of the value of using ICT in their teaching, their teaching should focus on the pedagogical issues.

Korte and Husing (2007) argued that ICT support or maintained contracts in schools help teachers to use ICT in teaching without losing time through fixing software and hardware problems. Many respondents to Becta's survey (2004) indicated that technical faults might discourage them from using ICT in their teaching because of fear of equipment breaking down during the lesson. In support of the above opinion Gomes (2005) argues that ICT integration in mathematics, needs a technical if one is not available the lack of the technical can be an obstacle.

Wenglisky(2005) cited in Polly et al. (2009) claim that teachers are not adequately integrating ICTs pedagogically, despite the influx of computers in schools. They described the ideal process as one where teachers design and facilitate learning experiences that develop students higher-order thinking skills. In their study of a south eastern school in the United States, they illustrated this concept by using Web Quests as activities that teachers could use in their integration as they have the potential to develop higher-order thinking skills. Web quests have the following qualities; they contextualize learning in meaningful ways that bring real life problems for them and expose them to learning pathways that involve a number of ICT resources that are likely not to forget the experiences as they would have been participants in bringing about the solution.

Hubbard (2008) point out that teacher training colleges need to be prepared not just for current conditions but to changes that will occur in the future. Nhamo and Magonde (2013) echoes that the country's teacher module is seen as lagging behind in the regards to ICT training before teachers are deployed to the schools to embrace the use of ICT in their teaching and given insufficient long term opportunities to make sense of the new technologies themselves. Fullan (2007) talks about personal motivation as key to change and explains it like this educational change is dependent on 'what teachers do and think'. If teachers have negative attitude towards

change they would not readily welcome it, but if they have positive attitude they would welcome change. ICT has brought changes in education and is changing the role of the teacher in the classroom.

2.6 Benefits of using ICT

There are numerous benefits of computer technology when it is integrated deliberately and comprehensively into teaching and learning (Apple Education Inc., 2009). These benefits are as follows: Computer technology supports student achievement. When integrated into instruction appropriately, computer technology has significant positive effects on student achievement in reading, literacy, mathematics, and science. Computer technology engages students in learning and content creation. Integrating computer technology into formal learning and engaging students to create and publish their own work for a worldwide audience make institutions more relevant, resulting in higher levels of student achievement. Computer technology enables timely and innovative assessments. Technology-based assessments can make tests easier to administer and score, answer the need for more frequent classroom-based assessments, enable teachers to expand feedback through better communications with students, and provide real-time feedback and guidance. Learning (Apple Education Inc., 2009).

The growing use of ICTs as tool of everyday life is increasing the quality of student learning. ICT is supporting changes to the way students are learning as they move from content centred curricula to competency based curricula; associated with the move from teacher centred form of delivery to student centred forms (Yusuf, et al, 2013). It improves the quality of instruction and encourages collaborative learning. ICT facilitates fast and accurate feedback to learners (Becta, 2003). It promotes deep learning and allows Educators to respond better to different needs of different learners (Lau & Sim, 2008). This activates paced learning and allows effective mapping of learning path ways. According to (Newhouse, 2002), ICT supported learning environments could be beneficial to a constructivist teaching approach. One of the major advantages of using ICTs in the education system has been to prepare the present and next generation of students for a workplace Where ICTs particularly computers internet and other related technologies are ever present. These computer savvy and technologically literate students possess the desired competencies to use ICTs effectively (Sharma, et al, 2011).

2.7 Summary

This chapter looked at what different scholars think about teacher attitude on the use of ICT in teaching and learning of Mathematics. The chapter discussed the use of ICT in teaching and learning in Zimbabwe and the world at large. The chapter also discussed the challenges and solution of using ICT in teaching and learning. Finally, the benefits of ICT use in Mathematics were discussed. The following chapter is going to discuss the methods that are going to be used to meet the objectives of this research.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 INTRODUCTION

The previous chapter looked at relevant and important literature review of the study. The researcher in this Chapter analysed the descriptive of the research design which was adopted in view of its perceived merits in context of the study. Factors which determine the choice of the design were explained. The chapter also included the description of the instruments, the questionnaire and interview guides and were used to collect data. Population, sample and sampling techniques were defined. Data procedures, collection, presentation and analysis procedures were also explained.

3.2 Research design

The researcher used descriptive survey method which is observation with an insight into the Nature and causes of certain problem and situation (Rakotsoane, 2012). Surveys have a higher Representation of population under study (Sincero, 2009). It is the design for the Collection of data which allows the use of various instruments and describing a population That is too large to observe directly. Descriptive survey is flexible and allows for various methods of collection of data (Sidhu, 2003). The use of descriptive survey enabled the researcher to obtain current information pertaining to the teacher attitudes towards the use of ICT in their teaching. Saunders et al (2003) say that research design allows methodological triangulation which helps to establish the degree of the data's validity. In this research the researcher used questionnaires for teachers and interviews guides for the School heads.

3.3 Population

A population is a whole group of people or items that share one or more characteristics (Latham, 2007). According to Chiromo (2009) population is a large group of people of relevant to the researcher. The target population for this research was Gweru urban Primary schools Zone B. The Zone has 100 teachers and five school heads.

3.4 Sample and Sampling procedure

Sampling is viewed as an act of selecting a suitable sample for the purpose of choosing characteristics of the whole population (Scott and Morrison, 2006). The researcher used purposive and stratified random sampling in selecting the targeted subject teachers who were informative on the topic of interests. Purposive sampling is mostly used the selection tries to make the sample representative depending on opinion and purpose (Chiromo, 2009). The aim of using purposive sampling was to come with respondents who would provide information to address the purpose of the study. Purposive sampling was used in selection of ICT teachers and school Heads. Stratified random sampling in selecting teacher participants. The technique was selected for minimizing bias and ensuring certain segments of the population were not overrepresented or under represented. A total of forty participants were selected. Five were Heads of schools and the other six were ICT teachers. Thirty five were teacher participants. The next section will

Look into the research instrument for data collection.

3.5 Research instruments

3.5.1 The questionnaire

Instruments are tools used for collecting information and data needed to find solutions to the problems under the study (Bell, 1993). There are many different sources of data collection (Creswell, 2009). However the method of data collection must suit the research under study. In the study the data was collected using three instruments which were questionnaires, observation and interview guide. The next section is going to explain fully the instruments.

Questionnaire is a tool for collecting and recording data about a particular topic (Kikles Council, 2003). Questionnaires give a cheap, quick and efficient way of obtaining large amount of information (McLeod, 2014). This was suitable for the study because the Researcher had limited

time and did not want to use much of teachers' teaching time. Besides being cheap to run they also cover many teachers at the same time saving time and provide anonymity as there are no names written on them (Chiromo,2009).

The questionnaire used by the researcher was made up of a list of questions with clear instructions and space for answers. . These questionnaires had closed and open questions which provided more information on the attitudes of teachers towards the use of ICT in teaching of Mathematics.

The major characteristic of questionnaire is that respondents offer data with limited interference on the part of research personnel (Sarankakos,1988). The questionnaires were administered personally to teachers who were part of the sample. The questionnaires collected information on the background characteristics such as teaching experience and on the computer competence of teachers, teachers' beliefs and attitudes on the use of ICT in their teaching of Mathematics, the usefulness and effectiveness of ICT in the Mathematics subject and what needs to be done to make ICT a major teaching tool in Mathematics. Both closed and open questions were used. Closed questions can be used to measure strength of attitudes (Mcleod,2014).This research also open questions. Open questions have the strength in allowing respondent to express themselves in their own words. However the Researcher had to guard against the limitations of Questionnaire which are lack of opportunity to probe and failure to understand questions. The researcher made the questions simple so that they could be easier to understand. On the cover letter to the Questionnaire the importance of the research was stressed to encourage a high response. The next chapter looked at Interview.

3.5.2 The interview

An interview can be described as a conversation with a purpose as the interviewee is induced to talk freely about themselves, their beliefs and experiences (Rakotsaone, 2012).It is structured conversation between researcher and respondent and involves face to face situations (leedy,1989).Interviews are different questionnaires as they involve interaction between researcher and respondent (Mcleod,2008). This method gives the researcher to observe body language and to probe the respondents (Chiromo,2009). During an interview the interviewer can exhibit some flexibility and repeat or rephrase questions so that the respondent understood what was meant by particular questions (Leedy,1989).

In this study structured interviews were used, teachers and school Heads were expected to shed more light on using ICT in teaching and learning Mathematics. The researcher used standardised interviews with open ended interview questions which probed explanations. The questions had the exact wording and sequence which were determined in advance. The teachers answered the similar set of questions using Questionnaires; The heads of Schools used similar set of Interviews questions hence increasing comparability of responses. The interviewer picked up on non-verbal clues giving the researcher more insight on the teacher attitudes towards the use of ICT in their teaching and also had control over the answers. The interviews provide room for expressing views, elaborating one's point giving more objective data than questionnaires. The researcher obtained qualitative data with this type of interview.

Interviews were carried out face-to-face with the School Heads with a purpose to obtain more information on the attitudes of the teachers in using ICT in their teaching of ICT in Gweru Urban Primary School Zone B. They gave room for probing more information for further clarification. The interviewer gains more insight into the attitudes of teachers through gestures and facial expressions from the interviewee. The researcher had to guard against the limitation of the interview instrument that respondents might feel uneasy. The Researcher assured in advance respondents that the information given would only use for research purpose only and would not use be used to cause harm or threat to them. The next section looked at Observation.

3.5.3 The observation

Observation involves planning systematic recording general situations in areas under study (Selltiz, 2003). Observation can be viewed as the systematic description of events and behaviors, in the social setting chosen for study (Stake, 2010). Observations had enabled researcher to examine the ICT components and social setting of the area under study in Gweru Urban Primary Schools Zone B This Researcher used non-participant observation. The major advantage is that behaviour is recorded as it occurs. Observer being an outsider can see phenomena about a situation people take for granted(Mcleod,2014).The next section on Reliability and Validity issues

3.6 Reliability and Validity issues

Reliability refers to repeatability or replicability of results (Golafshanni,2003). It is practically impossible to use the same instruments and get the same results because attributes like attitude

do change over time. Qualitative research put emphasis on trustworthiness as well as quality (Golafshani,2003). This ensures that results are dependable. In this research trustworthiness was established through making sure that each school visited stamped the introductory letter. Reference to literature in showing that results obtained were applicable in other contexts in other countries

Reliability was ensured through pre-testing to check on similarities trends of meaning to participants through pilot study. The issue of confidentiality and anonymity was again assured to respondents.

Validity determines whether the research truly measures what it should measure (Joppe,2000).validity can be divided into external and internal . Internal validity refer freedom from making bias in forming conclusion in view of the data collected (Chiromo,2009). External validity refers the degree to which the conclusions can be generalised to a wider populations (Chiromo,2009).The researcher ensured the sample was representative of the whole population by carrying out a pilot study.

Credibility was ensured by the researcher by sourcing data from school Heads and teachers who are specialist in their field of work. This ensured the Credibility of the research.

3.7 Data collection procedures

A letter from Midlands State University requesting for being allowed to conduct a research was sought. Then the researcher sought permission from the Permanent Secretary of Education, Provincial and District Education Ministry of Primary and Secondary Education Offices. Permission was also sought from School Heads to carry out the research in Gweru Urban Zone B Primary Schools. When the permission was given a nod data collection started. The Researcher visited Heads of School when all were having their Zonal meeting at Matongo Primary school and made appointment for the interviews. Heads indicated their free time to have the interview. The Heads were interviewed on their stated dates and time. Responses from them were collected. The Researcher had to move from one School to another in Gweru Urban Zone B School. The objectives of the questionnaires were explained to participants and this was followed by distributing manually to teachers. questionnaires were collected soon after completion by the researcher.

3.8 Data management source

The data of the study was stored on multi-devices like mobile phone, computer hard drive removable flash disk. These were taken as ways of safe guarding data loss from viruses, theft and computer malfunctioning that might happen during the course of the study.

3.9 Data analysis plan

Data analysis can be viewed as designing appropriate analysis to conduct on each question, preparing data for analysing and summarising results (Cresswell & Clark, 2011). After the collection of data the researcher conducted a quantitative analysis of the qualitative data from the questionnaires, interviews. Reardon (2006) points out that quantitating data involves converting data into numerical codes. In this study the responses were converted into numbers and presented in the tables. In order interpret, organise and communicate numerical information graphs like pie charts and descriptive statistics like percentages were used in data analysis.

3.10 Ethical Considerations

Ethics are principled sensitivity to the rights of others (Cohen,2007). Important considerations were taken into account to protect the physical and mental integrity of the participants. In this study ethical concerns were mainly at avoiding harm, confidentiality, anonymity and avoiding harm to participants

3.10.1 Avoidance of harm

Participants were given the choice to withdraw at any time without suffering victimization of harm. School Heads and teachers were participants of this research.

3.10.2 Consent

Participants were informed the purpose of the investigation. Consent was sought before commencing of the study was done. The researcher asked for permission to carry out research in Gweru Urban Primary schools from Ministry of Primary and Secondary.

3.10.3 Confidentiality

The researcher gave assurance that the information would only be used for the purpose of the study and would be in any way used for other purpose.

3.10. Anonymity

All participants have the right to privacy and anonymity (Burns& Grove,2005). The information gathered and shared by every participant was not passed to others in any form unless specific consent had to be given. No real names were used in collecting data and analysis to ensure anonymity. Participants were asked not to write their names on questionnaires or question guides.

3.11 Summary

The descriptive survey was used to conduct the research. The purposive and stratified random sampling techniques were used to select the specific sample. The researcher used questionnaires to collect data and interviewed teachers to fill-in the gaps left by the questionnaires.

The interview guides were administered to school head and the ICT teachers and teaching documents such as scheme books were used to collect data. The chapter detailed how the data collected was going to be analysed to draw conclusions and meanings. The next chapter is on data presentation, analysis and discussion

CHAPTER FOUR

DATA PRESENTATION, ANALYSIS AND DISCUSSION

4.0 Introduction

This chapter mainly presents the overall findings of the research. Data collected for this research used methods and instruments examined in chapter three. Same data was gathered by both interviews and questionnaire. The questions stated in chapter one were used in the Presentation and Analysis. The questionnaire and interviews gathered the same data. For each research question, questionnaire and interviews results are presented followed by a discussion. At the end of it, the overall results are presented. Questionnaire and interviews results for every research question were presented followed by a discussion. Overall results are presented.

4.1 Data presentation, analysis and discussion

Data from each research question was presented and analysed in form of tables and pie charts. The results of the findings are discussed. Tables and Pie Charts were used for presenting data. Percentages and frequencies were used for presentation and analysis.

4.2.1 Research question 1: The use of ICT in teaching mathematics scare me.

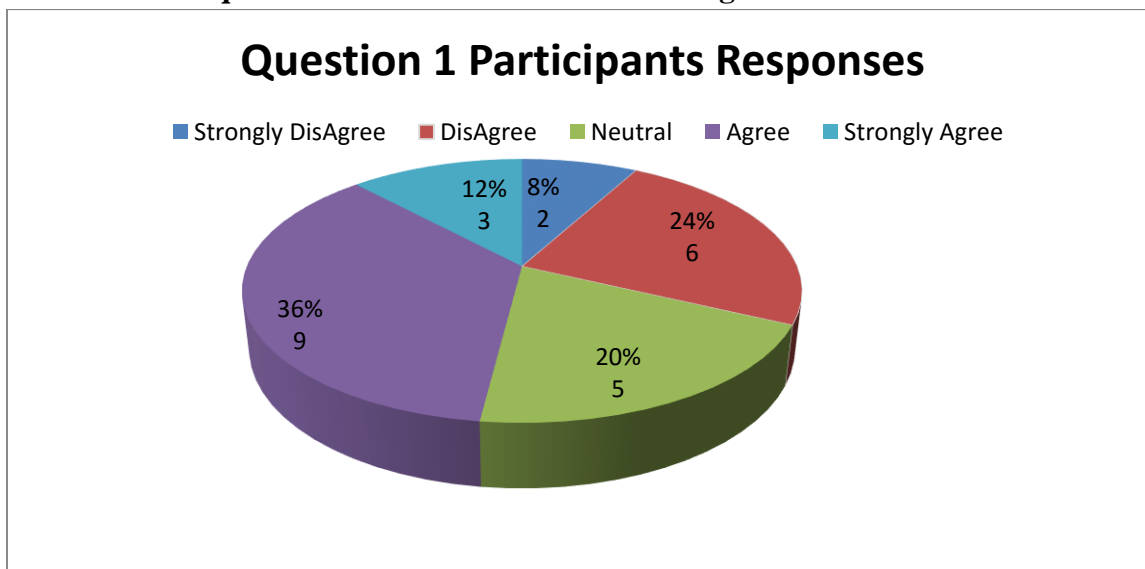


Figure 1 Showing teacher's perceptions on teaching and learning of Mathematics using ICT.

Research question 1 required the participants to show respondent perceptions on the use of ICT in teaching Mathematics. The Questionnaire responses are illustrated in figure 4.1. The responses

in figure 4.1 that indicate 'agree' constitute the largest part of 36 %. On the same research question the researcher interviewing the Head said:

“Most teachers are scared of using ICT tools like computers.”

Observations made by the researcher on participants' perceptions on use of ICT in teaching Mathematics revealed that some interviewees were not comfortable in responding to questions on ICT.

Discussion

Questionnaire and Interview data reveals that largest percentage of respondents are scared of using ICT tools in teaching and learning Mathematics. The pie-chart shows that only least number of participants are not scared of using ICT tools in teaching and learning Mathematics. Yieldrin (2000) concur with an idea that some teachers have technophobia of technology which contributes to the development of negative attitude towards the use of ICT in teaching and learning Technophobia often results in lack of confidence Becta (2004) identified lack of confidence as the major impediment to the use of computers in classrooms. As shown through findings and literature review, teacher perception on ICT use is a critical component in ensuring effective use of ICT in teaching and learning of Mathematics. The next section discusses data for research question 2.

4.2.2 Research question 2: I need to be trained to use ICT tools and online resources.

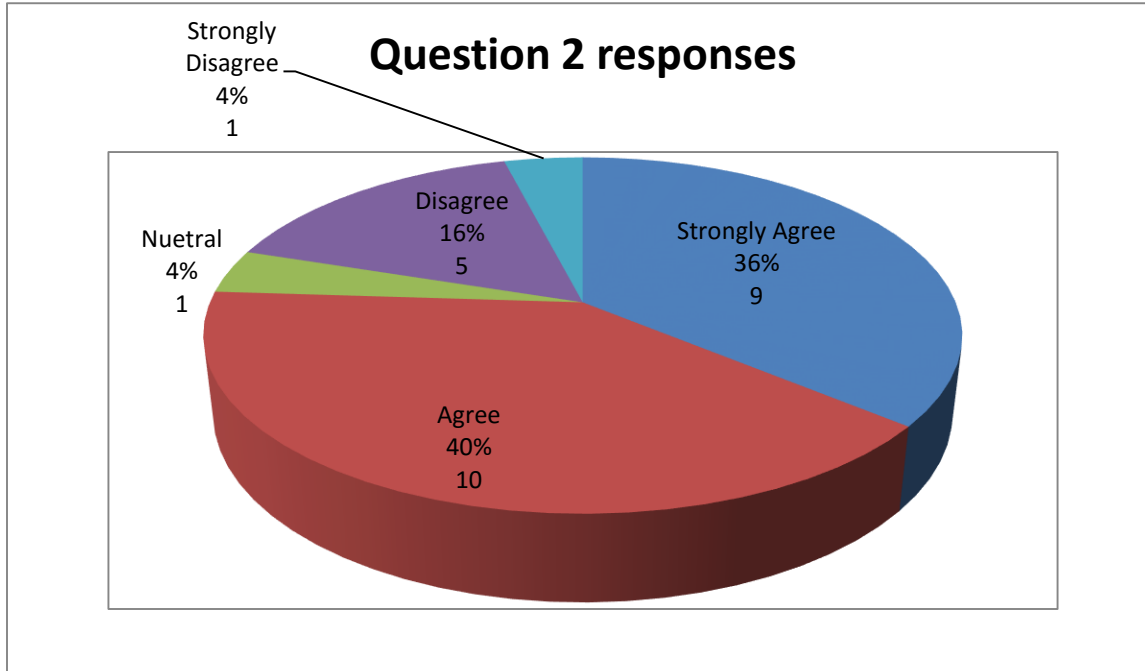


Figure 2 Showing ability on the use of ICT tools use.

Research question 2 required the participants to show ability on the use of ICT tools and online resources. The number of respondents that indicated the need for training constitute the biggest number while smaller number indicated that they do not require training on the use of ICT tools. Interviewing the Head on the same question reveals the following;

“Though we need training on use of ICT tools we rarely have workshops and staff development on ICT use due to limited number of experts on the subject area.”

Discussion

Questionnaire responses showed that a large number of participants showed the need to be trained on use of ICT tools with 10 participants indicating Agree, 9 strongly Agree, 1 neutral, 4 disagree and 1 Strongly Disagree. All Interview responses showed that they need training on use of ICT tools. The findings of the Research concurs with the study by Balankat et al (2006) who have shown that many teachers do not use ICT in teaching because of lack of ICT skills. Shoopps study (2005) revealed that teachers did not believe that they were being supported and guided on the integration of ICT into their teaching which is agreement with Research findings. The next section discusses data for Research question 3.

4.2.3 Research question 3: ICT tools helps one to teach effectively

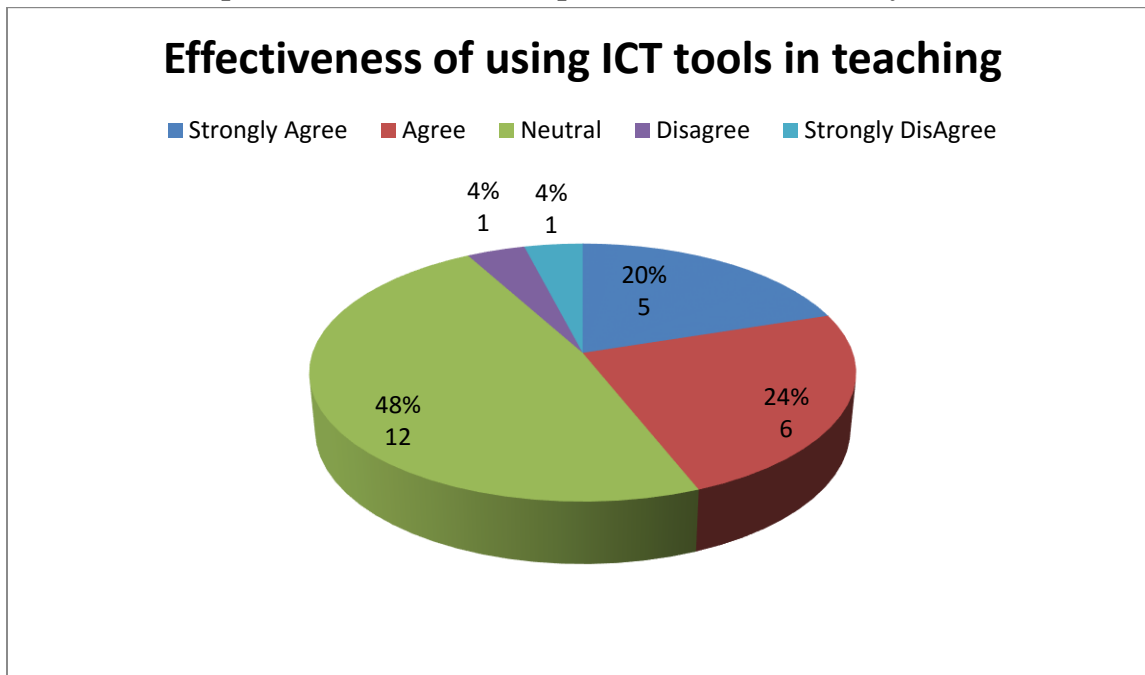


Figure 3 Showing Responses to Participants understanding of the effectiveness of ICT tools in teaching and learning Mathematics.

Research question 2 required the participants to show their understanding of whether ICT tools are effective in teaching Mathematics. The pie chart shows responses of the effectiveness of ICT on teaching and learning mathematics concepts. A big number of 12 Respondents were neutral and small number of 3 constituting the respondents who do not agree on the ICT tools enhance learning and teaching. While 5 and 6 respondents agree and strongly agree respectively that ICT enhances the understanding of mathematics concepts. Respondents through an interview indicates that ICT tools helps student understand concepts effectively.

Discussion

Questionnaire results reveal that the biggest number of participants are not aware of effectiveness of ICT tools. It was indicated by 12 participants who were neutral they showed they could not disagree or agree. This concurs with literature Review findings that Some teachers believe that ICTs have the potential to improve teaching and learning, but almost equal numbers of them still find it difficult to understand the specific benefits of ICTs or how it

can be used to achieve maximum results(Korte & Husing, 2007) in (Mwalango, 2010). 8% of the respondents through a questionnaire do not believe that ICT tools are the most effective in teaching and learning. This in agreement with literature review in an Empirical Survey carried out in Europe which points out that a fifth of European teachers believed that the use of ICT in teaching did not benefit their students' learning (Korte & Husing, 2007) in (Mwalango, 2010). The next section discusses data for Research question 4.

4.2.4 Research question 4: ICT tools are not conducive for good teaching and learning of Mathematics because they create technical problems.

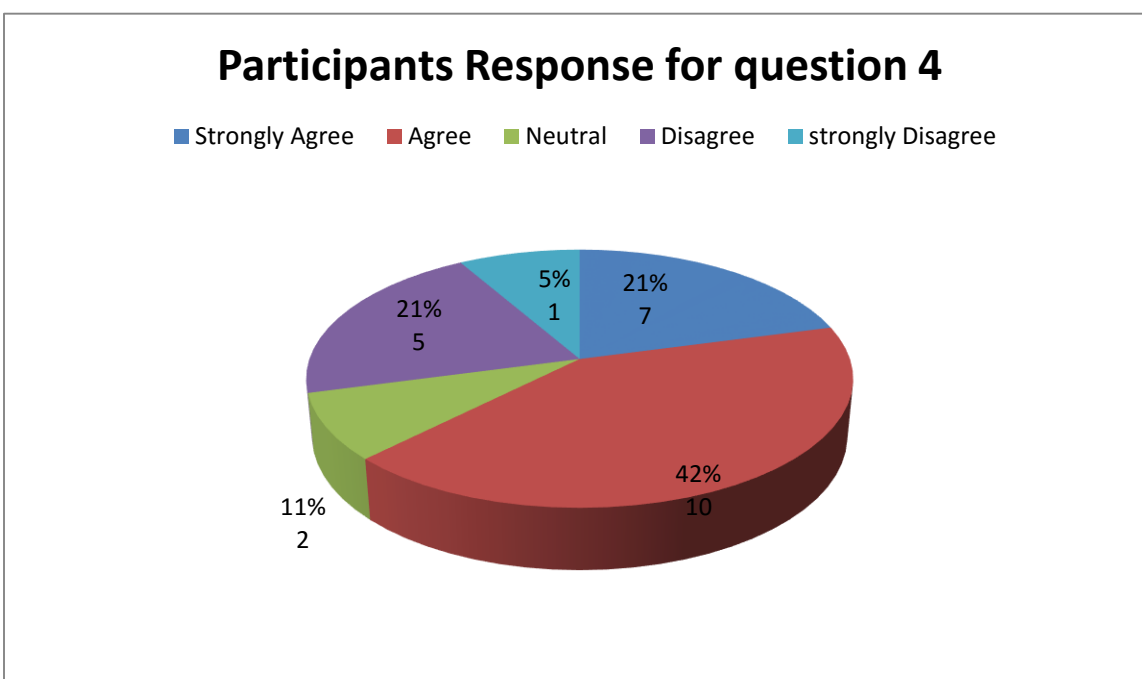


Figure 4 Showing Participants' response on whether ICT is not conducive for good teaching and learning because of technical problems they create.

Research question 4 required the participants to indicate whether ICT tools are conducive or not for good teaching and learning of Mathematics because of technical problems. Figure 4 shows that a total of 17 participants are in agreement with the research question, 2 are neutral while a combination of disagree and strongly disagree constitute a total of 6. The researcher observed a number of computers not functioning well in computer Labs during data collection visit to Schools. Through an interview the participant reveals the following:

“computers lying idle over there often malfunction , the teachers have abandoned them because they create technical problems during the course of their lessons.”

Discussion

Questionnaires showed that a large number of participants believe ICT tools are not conducive for teaching Mathematics because of technical problems they create. Interview responses showed that ICT tools are not conducive to teaching and learning of Mathematics. The findings concurs with Unwin (2005) in Ndibalema (2014) that policies seem to place a great emphasis on providing ICT infrastructure to schools rather than their use in teaching. However there is not much information on how ICT are being used by teachers in the classrooms. lack of knowledge is a serious obstacle to the use of ICT in primary and secondary schools (Pelgrum,2006). It is apparent from research findings that conducive environment for an effective use of ICT needs to be supported by technical people who are experts in repairing and maintaining the ICT tools and gadgets. The next section discusses data for question 5.

4.2.5 Research question 5:*What tools and methods do you use in teaching and learning mathematics?*

Table: 4.1 showing participant Responses to tools and methods they use.

Traditional Tools		ICT Tools	
Tool	Frequency	Tool	Frequency
Teacher centred methods	20	Calculators	10
Counters	6	Online resources	3
Clock faces	10	Graphic calculators	1
Chalkboard	20	Laptops	4
Textbooks	21	cellphones	3
pens	11	Child centred methods	8
Rulers	8		
Abacus	6		
Number lines	7		

Research question 5 required participants to give tools and methods used in teaching Mathematics. The results of the respondents to the questionnaire are as illustrated on table 1. It reveals that teacher centred methods, chalkboard and textbooks were the traditional tools and methods with the highest frequency of above 20 followed by pens, ruler, abacus, number lines with a frequency ranging from 6 to 11. The table shows low frequencies for ICT tools and methods. Observation by the researcher reveals that most participants used traditional tools and methods in teaching and learning of Mathematics. In an interview with a participant the following was revealed:

“Most teachers use the traditional tools and methods they are used to in teaching and learning.”

Discussion

On the Questionnaire participants responses indicate that a large number of tools and methods used in teaching and learning Mathematics are traditional tools and methods and a smaller number are ICT tools and methods. Both interview and observation shows traditional tools and methods are the most used in schools. The frequency of traditional tools and methods are higher than ICT tools. The finding concurs with literature review findings that Some teachers prefer to stick with tried and tested methods which they believed would enable them to predict and control outcomes easily (Ndibalema, 2014). Thus the attitude of teachers towards ICT is important for the proper meaningful use of ICT tools. The next section discusses data on research question 6

4.2.6 Research question 6: What are the challenges of using ICT in teaching and learning Mathematics?

Table 4.2 showing participants responses to Challenges experienced when using ICT in teaching Mathematics

Challenges	Frequency	Percentage
Technophobia	13	52
Lack of training	11	44
Lack of technicians	8	32
Internet challenges	6	24

Lack of understanding ICT tools	13	52
Lack of ICT gadgets	3	12
Virus problem	7	28
Software unavailability	3	12
Power cuts	6	24

Research question 6 required participants to give Challenges of using ICT in teaching and learning Mathematics. Table 2 shows that Technophobia and Lack of understanding ICT tools are the biggest challenges. It was indicated by 13 participants as shown on the table. The second is lack of training with the least being lack of time. The researcher observed that some teachers could not use Laptops in computer Laboratory. In an interview the participant said:

“Teachers need training on ICT so that the fear of using ICT tools will disappear .”

Discussion

Questionnaire results showed that technophobia and Lack of understanding ICT tools are the biggest challenges of using ICT in teaching and learning Mathematics as shown in table 2. Lack of training is the second with 11 participants indicating it. The least challenge was lack of time. Observation revealed lack of knowledge on using laptops. Interview showed that lack of training and technophobia are major problems in using ICT teaching and learning. Thus scholar like (Karsenti, et al, 2009) agree with the findings. They say teachers fear change, lacks qualifications in ICT skills and develops negative attitude towards the use of ICT in teaching. The education system of teacher training is lagging behind on the requisite ICT training of teachers. Similar findings by Teo (2008), Ayadin (2012) are in agreement with the Research findings when they point out that teachers lacked sufficient training, demonstration or advice to use ICT in classroom instruction and that some teachers’ literacy were restricted to use of internet, email not teaching tools. From these research findings and literature the challenges are a true reflection

of problems of using ICT in teaching and learning Mathematics. Following is the discussion on research question 7.

4.2.7 Research question 7: *What are the ICT Solutions to the challenges that enhance teaching and learning of mathematics?*

Table 4.3 showing solutions to the challenges in ICT use in Mathematics.

Solution	Frequency	Percentage
Training of teachers	14	56
Provision of generators	9	36
Provision of internet	10	40
Provision of ICT gadgets	8	32
Staff Development	7	28
Buying anti -viruses	6	24
Creating time for teachers to Learn ICT	5	20

Research question 7 required participants to give solutions to the Challenges of using ICT in teaching and learning Mathematics. Table 2 shows that the highest suggestion was teacher training followed follow by provision of internet and on third position was provision of generator as back power. The least was creating time for teachers to learn on ICT tools. The interviewee was asked solutions to the challenges of using ICT tools and said:

“Teacher training is the major solution to the challenges of using ICT and schools must buy generators for power back up.”

Discussion

Questionnaire provided many solutions to challenges on ICT use in teaching and learning of mathematics. Training of teachers was the most given response with 14 participants while provision of internet was the second indicated by 10 participants. Other important suggestions were provision of generator as power back up, provision of ICT gadgets, staff Development and the least being creating time to learn ICT tools. Through Interviews the following responses were given as solution. Training of teachers, provision of internet and staff development. The findings

of this research agree with literature review which points out that Pre-service teachers can also provide opportunities for experimentation with ICT before using in the classroom teaching (Albirini,2006). In agreement with the Research findings Hubbard (2008) point out that teacher training colleges need to be prepared for ICT development not just for current conditions but to changes that will occur in the future .The next section discusses data for Research Question 8.

4.2.8 Research question 8: what are the benefits of using ICT in teaching and learning?

Table 4.4 showing participants’ response on benefits of using ICT in teaching and learning.

Recommendation	Frequency	Percentage
Improves quality of instruction	8	32
Fast and accurate feed back	8	32
Technology based assessment make testing easier to administer	6	16
Respond to different needs of individuals	5	20
Prepare learners for work workplace	3	12
Computer technology engages students in learning to create their own content	3	12

Research question 8 required participants to give benefits of ICT in teaching and learning. Table 4 shows that the highest recommended benefits of ICT were improving quality of instruction and fast accurate feedback indicated by 8 participants. This was followed by Technology based assessment which make testing easier to administer. Other significant benefits were its respond to different needs of individuals, prepare learners for work workplace and Computer technology engages students in learning to create their own content.

During an interview the interviewee said:

“The benefits of ICT in teaching and learning mathematics is its accurate fast feedback and it improves the quality of learning and teaching.”

Discussion

Questionnaire findings showed that improving the quality of instruction and fast accuracy feedback are the most suggested benefits indicated by 8 participants followed by Technology based assessment which make testing easier to administer. The interview showed that the major benefit of ICT in teaching is its accuracy feedback and improves the quality of instruction. The findings of the Research concurs with the literature Review that It improves the quality of instruction and encourages collaborative learning and ICT facilitates fast and accurate feedback to learners (Becta, 2003). The next section summarises this chapter.

4.3 Summary

This chapter discussed and analysed the data for this Research. Some of the findings were the biggest percentage of respondents are scared of using ICT tools in teaching and learning Mathematics. The need to be trained on use of ICT tools came out as the major need for teachers to effectively use ICT tools in teaching. The major challenges technophobia and Lack of understanding ICT tools are the biggest challenges of using ICT in teaching and learning Mathematics. The most recommended benefits of ICT were improving quality of instruction and fast accurate feedback. The next chapter will summarize the findings, draw some conclusions as well as give recommendations according to the findings of this research.

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.0 Introduction

This chapter's main purpose is to summarize the research, draw some conclusions as well as give recommendations according to the findings of this research. It will start by giving a summary of the research. After that some conclusions will be drawn based on the research findings while recommendations will be made at the end of this chapter. The next section is the summary for the findings.

5.1 Summary

The research looked at teacher attitude on ICT use in teaching and learning of Mathematics in Zimbabwean Primary schools. The study was necessitated by lack of meaningful ICT usage in teaching and learning Mathematics in the schools. The research answered five research questions which are What are the attitudes of the teachers towards the use of ICT tools in their teaching? Are the Mathematics teachers using ICT in teaching and learning? What are the challenges of using ICT in teaching and learning of mathematics? What are the ICT Solutions that enhance teaching and learning of mathematics? What are the benefits of ICT in teaching and learning of mathematics? The study would improve the use of ICT in teaching and learning of mathematics in Zimbabwean schools. The study is also envisaged to benefit the Ministry of Primary and Secondary Education. The study was restricted to schools in Gweru Urban Zone B Primary Schools in Gweru Midlands Province in Zimbabwe. Chapter two reviewed literature related to teacher attitude on the use of ICT in teaching and learning of Mathematics to give Research focus. The chapter discussed the use of ICT in teaching and learning in Zimbabwe and the world at large. The chapter also discussed the challenges and solution of using ICT in teaching and learning. Finally, the benefits of ICT use in Mathematics were discussed. Chapter three highlighted the research methodologies that were employed to gather the required data. Questionnaires, interviews and observations were used to collect data. A sample of 50 participants was selected from a population of 100. Chapter four presented the data, analysed and thoroughly discussed it.

5.2 Findings and Conclusions

Research findings revealed that most teachers are scared of using ICT tools and a least number of teachers are not scared of using ICT tools in teaching and learning .Thus it is major impediment to the use of ICT In the classroom. It can therefore be concluded that there is need for an intervention change strategy in attitude and perception of teachers towards the use of ICT since they are critical component in ensuring effective use of ICT.

It was also revealed that a bigger number of teachers are not aware of the effectiveness of ICT. A large number of participants showed the need to be trained on the use of ICT in teaching and learning of Mathematics. Thus it can be concluded that lack of the awareness of ICT effectiveness can be caused by lack of training of teachers in ICT use.

The finding also revealed that the frequency in use of traditional tools and methods are higher than that one of ICT tools and methods and a large number of participants that believes ICT tools are not conducive for teaching Mathematics because of technical problems they create. Thus it can be safely concluded that the low usage of ICT tools and methods in preference of out dated traditional tools and methods can be as result of technical problems they create that means the technical problem needs to be seriously looked into for an effective use of ICT in teaching and learning.

The research also revealed that technophobia and Lack of understanding ICT tools are major challenges of using ICT in teaching and learning Mathematics. The research also showed that other challenges of significant strength are lack of training and internet challenges. Thus it can be safely be concluded that the major challenges of technophobia, Lack of understanding ICT tools, lack of training and internet challenges need to be addressed for a successful use of ICT on teaching and learning.

It was also revealed that training of teachers was the most given response as the solution to the challenges of using ICT in teaching and learning Mathematics . Other important suggestions were provision of generator as power back up, provision of ICT gadgets, staff Development and the least being creating time to learn ICT tools. Thus it can be concluded that training of teachers is critical solution to the challenges that requires first priority.

Finally, majority of the participants also revealed that the recommended benefits of ICT were improving quality of instruction and fast accurate feedback. Followed by Technology based assessment makes testing easier to administer. Other significant benefits were it respond to different needs of individuals, prepare for work workplace and Computer technology engages students in learning to create their own content. Thus it can be safely concluded that teachers are aware of the benefits of ICT in teaching and learning Mathematics but they lack the necessary training in its use.

5.3 Recommendations

The following recommendations come from the research conclusions and are as follows:

- The government through the ministry of primary and secondary schools help in the training of teachers in ICT so that they can effectively ICT in teaching and learning of Mathematics.
- Schools can engage into ICT staff development programs and training to encourage teachers to use ICT tools without fear.
- The government can also provide internet connectivity to schools to enable them to use ICT resources on the internet.
- The government can electrify schools and provide generators so that electrical power should always be available to avoid technical problems during the use of ICT tools in learning and teaching.
- The government can provision of ICT gadgets so that schools fully utilise ICT tools in teaching and learning Mathematics.
- The government can also provide schools with technical support in form of technical experts who will repair and maintain ICT gadgets.

In conclusion, since the study was only limited to Primary Schools in Gweru Urban the results cannot be generalized to include other schools in Zimbabwe. Thus, there is need for further studies. Further studies can go on to the expansion of the study to include other Primary schools within Zimbabwe.

References

- Anderson, J. (1997). Integrating ICT and Other Technologies in Teacher Education: Trends, Issues and Guiding Principles [Electronic Version].
Infoshare: Sources and Resources Bulletin, pp. 33-35. Retrieved 7 March 2010 from www.unescobkk.org/fileadmin/user_upload/ict/e-books/.../4integrating.pdf.
- Albirini, A. (2006). Teachers' Attitudes Toward Information and Communication Technologies. The Case of Syrian EEL teachers *Computers & Education* 47,373-398.
- Ally, M., Grimus, M., & Ebner, M. (2014). Preparing teachers for a mobile world, to improve access to education. *Prospects* (00331538), 44(1), 43-59. <http://dx.doi.org/10.1007/s11125-014-9293-2>
- Ajzen I (1991). The theory of planned behaviour. *Organizational Behaviour and Human Decision Processes*, 50(2):179-211. Available at <http://www.nottingham.ac.uk/~ntzcl1/literature/tpb/>
- Bell, J. (1993). *Doing Your Research Project. A Guide for First-Time Researchers in Education and Social Sciences*. Buckingham: Open University Press
- Burns, N & Grove, SK. 2005. *The practice of Nursing Research: Conduct, critique, and utilisation. 5th Edition*. St. Louis: Elsevier.
- Balanskat, A, Blamire, R, & Kefala, S. (2006) . *A Review of Studies of ICT Impact in Schools in Europe*: European Schoolnet.
- British Educational Communications and Technology Agency (Becta) (2003) Primary schools ICT and standards. Retrieved June 13, 2008, from <http://www.becta.org.uk>.

Bayraktar, S. (2001/2002). A meta-analysis of the effectiveness of computer-assisted instruction in science education. *Journal of Research on Computing in Education*, 34 (2), 173

Chiromo, A. S. (2009). *Research Methods and Statistics: A Students' Guide*. Gweru: Midlands State University.

Christmann, E., Badgett, J. & Lucking, R. (1997). "Microcomputer-based computer-assisted learning within different subject areas: a statistical deduction". *Journal of Educational Computing Research*, vol.16, no.3, p.281-296.

Creswell, J. (2009). *Research Design. Qualitative, Quantitative and Mixed Methods Approaches (3rd ed.)*. London: SAGE Publications.

Cohen, L., & Manion, L. (2000). *Research methods in education*. London: Routledge

Corlett, D., & Sharples, M. (2004). *Tablet technology for informal collaboration in higher education*. Proceedings of mLearn 2004: Mobile learning anytime everywhere (pp. 59–62). London: Learning and Skills Development Agency.

Cox, M. J., Preston, C., & Cox, K. (1999, 2-5 September). *What motivates teachers to use ICT?* Paper presented at the British Educational Research Association (BERA), University of Sussex, Brighton

Empirica (2006) *Benchmarking access and use of ICT in European schools 2006: Final report from Head Teacher and Classroom Teacher surveys in 27 European countries* Germany: European Commission

Fullan, M. (2003). *The Moral Imperative of School Leadership*. Thousand Oaks,

CA: Corwin Press.

Golafshani, N. (2003). Understanding Reliability and Validity in Qualitative Research. *The Qualitative Report*, 8(4), 597-606.

Hennessy, S., Deaney, R. and Ruthven, K. (2003),
Pedagogic Strategies for Using ICT to Support Subject Teaching and Learning: An Analysis Across 15 Case Studies. No. 03/1. University of Cambridge.

Keitel C (1997) Numeracy and scientific and technological literacy.
In AJ Bishop (ed). *Mathematics education: Major themes in education*. London: Routledge.

Howie, S.J., & Blignaut, A. S. (2009). South Africa's readiness to integrate ICT into mathematics and science pedagogy in secondary schools.
Education and Information Technology Journal, 14(1), 345–363. <http://dx.doi.org/10.1007/s10639-009-9105-0>

Karsenti, T. (2009). Pedagogical use of ICT. *Teaching and reflecting strategies*. Ottawa: IDRC.

Korte, W.B., & Husing, T. (2007). Benchmarking access and use of ICT in European schools 200 Results from Head Teacher and A Classroom Teacher Surveys in 27 European countries
eLearning Paper, 2(1), 1-6.

Keller, P. (2000). A review of recent developments in the use of information communication technologies (ICT) in science classroom.

Australian Science Teachers Journal, 46(1), 33-38.

Nziramasanga, C.T. et al. (1999). Report of the Presidential Commission of Inquiry into Education and Training. Zimbabwe: Zimbabwe Government. Retrieved from <http://hdl.handle>

McLeod, S. A. (2007). *Psychology Research Methods*. Retrieved 20 August, 2016 from www.sim

Majumdar, S., and Park, M., 2006. *Pedagogical Framework for On-line learning*, Published in the book entitled "Transforming TET Institution: The CPSC way: Book published by CPSC, ISBN : 971-8557-70-9. [Ply psychology.org/research-methods.html](http://www.plypsychology.org/research-methods.html)

Polly, D. (2014). Elementary school teachers' use of technology during mathematics teaching. *Computers in the Schools*, 31, 271-292. <http://dx.doi.org/10.1080/07380569.2014.969079>

Pannen, P. (2009) E-Learning: An Introduction. Presented at the *E-Learning Workshop* for lecturers of Universitas Indonesia, Jakarta, May 12, 2009

Pelgrum, W.J. (2001). Obstacles to the integration of ICT in education results from a worldwide educational assessment. *Computers & Education*, 37, 163-178. *Fred Zindi and Fenton Ruparanganda 235*

Schuck, S., Maher, D., & Perry, R. (2015). *Moving classrooms to Third Space learning*. Report. Sydney: Microsoft.

Smith, R. (2000). The future of Teacher Education: Principles and prospects. *Asia-Pacific Journal of Teacher Education*, 28(1), 7-28.

<http://dx.doi.org/10.1080/135986600109417>

Tella, A., Tella, A., Toyobo, O. M., Adika, L. O., & Adeyinka, A. A. (2007). An Assessment of Secondary School Teachers Uses of ICTs: Implications for Further Development of ICT's Use in Nigerian Secondary Schools. *Online Submission*, 6(3).

Unwin, T. (2005). Towards a framework for the use of ICT in teacher training in Africa. *Open Learning: The Journal of Open and Distance Learning*, 20(2), 113-129. *Report of the Becta Digital Video Pilot Project*.
http://www.becta.org.uk/research/reports/docs/dvreport_241002.

Teo, T. (2008) Pre -service teachers' attitudes towards computer use. A Singapore survey. *Australian Journal of Educational Technology*, vol. 24, no. 4, pp. 413-424.

Waxman, H.C., Connell, M.L. & Gray, J. 2002. *A quantitative synthesis of recent research on the effects of teaching and learning with technology on student outcomes*. Naperville, Illinois: NCREL.

Yelland, N. (2001). *Teaching and Learning with Information and Communication Technologies (ICT) for Numeracy in Early Childhood and Primary Years of Schooling*. Canberra:DETYA.

Yildirim, S. (2007) "Current Utilization of ICT in Turkish Basic Educational Schools: A review of Teacher's ICT use and Barriers to Integration". *International Journal of Instructional Media*, vol. 34, no.2, pp.171-86

Yousuf, M.I. (2007). *Using Expert's Opinions Through Delphi Technique. Practical Assessment, Research and Evaluation*. Volume 12,

Number 4, pp. 1 – 8.

Appendix A: Questionnaire for teachers

Dear Participant.

My name is ANTONY MAKONO. I am an Under Graduate Bachelor of Computer Science in Education candidate in the Faculty of Education at Midlands State University under the supervision of Dr Kangara. The title of my dissertation is TEACHERS' ATTITUDES ON THE USE OF ICT IN TEACHING AND LEARNING OF MATHEMATICS IN GWERU URBAN SELECTED PRIMARY SCHOOLS Within the context of this study, it is necessary to determine some factors that are asked in this questionnaire.

Please take note of the following:

- Your participation in this study is completely voluntary and you are free to withdraw from the study at any point.
- Your participation in this study does not include any compensation.
- Confidentiality will be maintained and your identity will in no way be linked to your responses to the questions.
- You will be provided with feedback from the results when the study is completed.
- **Indicate with a tick in the appropriate box**

Indicate by ticking in the appropriate box.

	Strongly disagree	Disagree	Neutral	Agree	Strongly Agree
1. The use of ICT in teaching scares me.					

	Strongly disagree	Disagree	Neutral	Agree	Strongly Agree
2. I need to be trained me to use online teaching resources					

	Strongly disagree	Disagree	Neutral	Agree	Strongly Agree
3. ICT tools helps one to teach effectively					

4.I do not think computers are conducive for good teaching because they creates technical problems					
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5.What tools and methods in teaching and learning Mathematics do you use?

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6. What are the challenges of using ICT in teaching and learning of Mathematics?.....

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7.What are the ICT Solutions that enhance teaching and learning of Mathematics?.....

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8.What do you think are the benefits of ICT in teaching and learning of Mathematics?.....

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Please provide any other comments in the following text box.

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I would like to thank you in advance for agreeing to be one of the participants. Your participation in this study is greatly appreciated.

If you have any questions, please do not hesitate to contact the researcher at 0777945778 or e-mail to antonymakono@gmail.com.

Regards,

Makono Antony

Undergraduate Candidate at Midlands State University.

Appendix B: INTERVIEW GUIDE FOR THE SCHOOL HEADS

1.What ICT gadgets and tools do you use in teaching Mathematics?.....
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2.How often do you have ICT training workshops at the school for the teachers?.....
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3.What tools and methods do teachers use in teaching and learning mathematics?.....
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4. What are the challenges of using ICT in teaching and learning Mathematics?.....
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5.What are the ICT Solutions to the challenges that enhance teaching and learning of Mathematics?.....

6. Is there anything you would want to be done at your school to promote the effective use of ICT in Mathematics and school as a whole?.....
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7. What are the benefits of using
ICT?.....

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