

**MIDLANDS STATE UNIVERSITY**



**FACULTY OF EDUCATION**

**THE IMPACT OF INFORMATION AND COMMUNICATION TECHNOLOGY (ICT)  
BASED TECHNOLOGIES IN THE TEACHING AND LEARNING AT EARLY  
CHILDHOOD EDUCATION LEVEL AT RIVERSIDE STIMULATION CENTRE IN  
IMBIZO DISTRICT IN BULAWAYO METROPOLITAN PROVINCE.**

**BY**

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# APPROVAL FORM

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## **DEDICATION**

I dedicate this research to my father Agrippah Lion Ndlovu and my one and only daughter Melinda Stacy Ndove daughter, for their inspiration, prayers, support, encouragement and understanding.

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## ABSTRACT

The research focused into the impact of Information and Communication Technology (ICT) based technologies in the teaching and learning at Early Childhood Education (ECE) level settings in the context of the new curriculum in Bulawayo Urban schools. The study was conducted at Riverside Stimulation Centre in Imbizo District in Bulawayo Metropolitan Province. Ten ECE teachers formed the sample. Questionnaires were used to gather information from teachers. Focus groups interviews were used to gather information from ECE parents and guardians. Prior to the new curriculum teaching learners ICT at Early Childhood Education level using their own knowledge without the guidance of policy and structured syllabi. Therefore learners have been vulnerable to a number of risks depending on strength or weaknesses and competency of the ICT teacher. Risks were categorised as physical, social and psychological, affecting the ECE learner. However, the reviewed curriculum with reference to ECE has addressed topical issues via cross-cutting themes such as; Collaboration, HIV & AIDS, Heritage Studies, Human Rights, Child Protection, Gender, Environmental Issues and Disaster Management.

The researcher has noted that parents and school administration have not appreciated ICT because they feel it is not an examinable subject as well as the cost of acquiring of ICT devices to facilitate the learning course of ECE learners. On the contrary the ECE learners have received ICT education positively with excitement because it brings new learning dimensions- multi-media experiences; touch, feel, see, these stimulated at one go ( up- to- date visual, audio, and text- based data which is current) as opposed to traditional teaching and learning methods (textbooks that are outdated).

The researcher also noted that there is apathy in parents in the ECE activities which greatly affected progress of skills acquisition. There should be a positive relationship between parents, administration and teachers so that parents appreciate the value of ICT competency. Parents play a critical role in developing school interests by their children, that is, a good parent – child relationship yield positively as the child will have interest in his/ her school.

The researcher noted that the private sector has a tendency of investing at higher levels of education, that is, tertiary and polytechnic settings and ignores totally the lower levels like ECE. As a result the researcher recommends the private sector to plough back/ invest in the education of ICT skills at grass root levels like ECE levels.

The researcher recommends the Ministry of Primary and Secondary Education to prioritise giving the necessary and up-to-date skills in ICT teaching and learning. Also MoPSE should play a major role in facilitating schools in acquiring low cost ICT tools such as computers, laptops, tablets, multi-media devices (speakers, cameras) and access to affordable internet.

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## **CHAPTER ONE**

### **PROBLEM AND CONTEXT**

#### **1.0 INTRODUCTION**

Internationally, the role played by the use of Information, Communication and Technology (ICT) in the education sector has enjoyed maximum growth especially with various stakeholders focusing on investing heavily in the acquisition of ICT equipments. This study seeks to investigate the impact of ICT based technologies in teaching and learning at Early Childhood Education level at Riverside Stimulation Centre in Imbizo District, Bulawayo Metropolitan Province. This study therefore seeks to find the impact of ICT based technologies in the teaching and learning at ECE level.

#### **1.1 BACKGROUND OF THE STUDY**

There are a range of diverse definitions when it comes to the meaning of technology and what it constitutes in technology education. It is defined by Garrison and Anderson (2003) as the branch of knowledge that deals with the creation and use of technical means and their interrelation with life, society and the environment. Selwyn (2011) defines technology as the purposeful application of information in the design, production and utilisation of goods and services and the organisation of human activities. Therefore, technology education can be defined as integration, experience based instructional program designed to prepare a population. The population has to be knowledgeable about technology, its evolution, systems, techniques, use and social as well as cultural. Furthermore, technology education can be explained as the study and ethical practice of facilitating teaching and learning and improving performance by creating, using and managing appropriate technological processes and resources.

Information and Communication Technology broadly refers to all forms of technology used to create, store, process and use information in various forms.

Braun (2006) asserts that ICT encompasses equipment and services. ICT includes the computing industry ( hardware, software, inputs, outputs, networks-that's the internet and all related services); electronic data processing and display (such as photocopiers, cash registers, calculators and scanners, as well as myriad of less well known machines specifically tailored to production and manufacturing ); telecommunications and related services( such as fixed and cellular telephones, facsimile machines, instant messaging, teleconferencing, and so on); and audiovisual equipment and services ( including television, radio, video, DVDs, digital cameras, compact discs, MP3 players and so on.)

Increasingly ICT is becoming a more and more powerful tool for education and economic development. Unwin (2009) contends that ICT can be a catalyst by providing tools which teachers use to improve teaching and by giving learners access to electronic media that make concepts clearer and more accessible. Thus, ICT is mainly used for capacity development and citizen empowerment. Ultimately, ICT can enhance educational opportunities and outcomes for students, including learners who are intellectually challenged (Anderson, 2009). According to Kim (2009), ICT in education can serve the following purposes: restructuring education system, diversifying teaching-learning methods and practices, engaging all stakeholders of education and adapt rapidly to change in society and the environment, enhancing education efficiency, effectiveness and productivity.

Zimbabwe has been besieged by economic, social and political turmoil in the recent years which has had a devastating effect on its education system. The country nevertheless has a dedicated National ICT Policy Framework that was adopted in year 2005 and that make significance references to the promotion of ICT in education including informative use in educational institutions. Zimbabwe also has a vibrant civil society sector that promotes ICT for development and education, of which organisations such World Links Zimbabwe has played a pioneering role since the late 1990s.

Education is at the core of the knowledge economy and learning society. Correspondingly, the role and impact of ICT in schools particularly in ECD

settings is shifting dramatically. The traditional role of ICT has been that of a minor circular subject, sometimes called informatics, computer literacy or keyboarding. Alternatively, it has been used as instructional aids (computer-assisted instruction) to help students learn other subjects/ learning areas, such as Maths and Sciences. However, in some countries, ICT is now at centre of education reform efforts that involve its use in coordination with change in curriculum, teacher training and assessment.

According to the World Economic Forum's Global Information Technology Report, Zimbabwe is ranked 105<sup>th</sup> out of 115 economies in 2005-2006, based on a networked readiness index, which measured the degree of preparation of a nation to participate in and benefit from ICT developments. Hence the Zimbabwean government adopted a National ICT Policy in 2005. This was informed by both Harvard University guided e-readiness survey which suggested that the country was not uniformly e-ready and by a host of preceding general and sectoral policies including Vision 2020, the national science and technology policy adopted in 2002. As well as The Nziramasanga Education Commission Report which in 1999 recommended the promotion of the educational use of computers for teaching and learning in educational institutions. The policy's vision is to transform Zimbabwe into a knowledgeable based society by 2020, while its mission is to accelerate the development and application of ICTs in support of economic development. In 2003, the country of the highest literacy rates in the region with an overall rate of 90,7% according to the UNPD (male literacy 94,2%; female 87,2%). Introduction of ICT may increase these rates as its integration brings about a lot of benefits in the teaching and learning.

According to Odera (1991) governments around the world have been engaged in the process of implementing a wide range of ICT Applications. Countries have been classified by the United Nations according to their Computer Industry Development Potential (CIDP) as advanced or less developed (Mgaya, 1999). Zimbabwe has fallen into the less developed category. Developed nations are using ICT in their education systems. For example, in the United Kingdom, rising of standards of teaching and learning has become intertwined with the use of ICTs (Watson, 2001).

In a rapidly changing world, basic education is essential for an individual to be able to access and apply information. Such ability includes ICTs in the global village. The Economic Commission for Africa has indicated that the ability to access and use information is no longer a luxury, but a necessity for development. Unfortunately, many developing nations, especially in Africa, are still low in ICT application and use (Iyamu, 2005).

Although ICT is now at the core of education reform efforts, not all countries are currently able to benefit from the developments and advances that technology can offer (Anderson, 2002). Significant barriers that are often referred to as “The Digital Divide, limit the ability of some countries to take advantage of technological developments. Thus, developing countries are faced with challenges related to access and assessment when using ICT to improve and reform education. Due to the fact that much research in the area of effectiveness of technology in education has been conducted in technological advanced countries, but little has been done in the developing countries, few statistics are available from developing countries (Jhuree, 2005). According to Jhuree (2005), this might imply that the former countries now possess a wealth of knowledge, skills, expertise, and the competitive edge that most of the latter countries do not possess. On the other hand, as Jhuree (2005) suggests, that the latter countries can gain a lot from the expertise of their advanced counterparts. According to a study undertaken by Kozma and Anderson (2002), both developed and developing countries are beginning to use their investments in ICTs to reform education. Moreover, Rehbein (2004) claim that developing countries have become anxious about the widening gap between their reality and aggressive ICT policies of some developed countries. Consequently, there is more urgent need to improve the quality and equity of education to bridge the gap between developed and developing nations, and ICTs are perceived as necessary tools for this purpose (Rehbein, 2004).

Early Childhood Education learners are very inquisitive and eager to learn, explore, manipulate and discover on their own accord. They are eager for technology and it is important to give these kindergarten ample time and

opportunities to simply explore and manipulate, play, create, publish and use their imagination. Facilitators are encouraged to ensure that children adopt this current evolution of ICT technologies in the constantly evolving world. Integrating ICT when done well, not only reinforces technical skills learners need to thrive in the 21<sup>st</sup> century, but also increases learners' engagement and enhances learning. The current 2015-2022 Ministry of Primary and Secondary Education ECD curriculum accommodates computer and appliance play topics in its ICT syllabus.

However, despite increasing widespread adoption of technologies in virtually every aspect of education, significant challenges are inevitable and are preventing widespread effective implementation. According to Richey (2008) though some of those challenges are systematic and some are related to the technology themselves, teachers, parents and education leaders share blame as well. Hence, the purpose of this study is to look at the impact of ICT whether negatively or positively in the teaching and learning at ECD level. The researcher will try to come out with workable solutions and recommendations so as to improve teaching and learning holistically in the Zimbabwean education context.

Indeed, Information and Communication Technology plays a key role in enhancing the quality of education. However, successful implementation of ICT requires strategic planning. As Wagner et al (2005) observed that, research suggests that simply putting computers into schools is not enough to impact student learning. That said specific application of ICT can positively impact student knowledge, skills and attitudes, as well as teaching practices, school innovation, and community services. This has been a trend in most schools in Zimbabwe particularly those in rural areas where computer labs have been built and computers procured but hardly do they use them. This is attributed to the fact that teachers lack skills to integrate ICT into classroom teaching. Therefore, it is against this background that the researcher will focus on finding out the impact of computers to both teachers and learners.

## **1.2 STATEMENT OF THE PROBLEM**

For the first twenty years post independence, Zimbabwe boasted of the best and most vibrant and effective education system in the whole of Southern Africa. This

majestic status was largely attributable to the government robust focus on expanding access to education by building schools in marginalised areas, accelerating and training of teachers and providing the teaching and learning tools to the schools. The twenty first century saw revolution in the sector that was characterised by a paradigm shift that centred the learning process in ICT. Thus due to the advent of the information age Zimbabwe has somewhat lagged behind in the drive to embrace ICT in the educational system and consequently has witnessed a decline in the rankings of its education system on the global scale. The Information age dictates that learners should be equipped with requisite skills to competently engage and perform in the new information era in which they find themselves in. these skills commonly referred to as 21<sup>st</sup> century skills include inter-alia; critical thinking, problem solving, collaboration, creativity and communication (Pareja, 2012). The integration of ICT is said to enhance the adoptions of these skills. However, in spite of adoption of the national ICT policy in Zimbabwe and the widely publicized stories that when learning opportunities are presented by Information, Communication and Technology, they have great potential to develop 21<sup>st</sup> century skills, a lot challenges are being faced in the implementation of ICT. A simple placement of hardware and software do not necessarily mean ICT integration has been achieved (Earle, 2002). One of key failures of many past programs in Africa, and the rest of the world, has been that schools were provided with equipment but little to no support for teachers' professional development was availed and very little was done to ensure community involvement (Voogt, 2011).

Until in recent years, teachers at Early Childhood Education level classes had no formal syllabi to teach ICT. Finger (2009) states that teachers are the primary implementers of the revised curriculum, teachers' acceptance to change and high level teacher commitments are critical to successful implementation. Teachers are faced with emergence of a revised curriculum and therefore encounter problems as they have limited training in ICT. They are required to integrate new technologies into their classrooms yet unprepared as they lack proper skills to teach ICT as they find it quite challenging. Generally technology is not available in many schools as schools fail to make necessary adjustments due to shortages of resources. ICT based technology include numerous types of media that deliver

texts, audio, images, animation and video and also include technological applications and processes such as televisions, DVDs and computers, of which schools are failing to acquire. Therefore, the researcher noted with concern that there are a number of challenges affecting smooth delivery of ICT as a learning area and as well as integrated in other learning areas to the Early Childhood Education learners, hence affecting its effectiveness.

With the emergence of ICT it is now possible to improve efficiency and effectiveness in the education curriculum, by providing e-learning thus ensuring that students' acquired skills are rendered relevant in the information age in which they must be put to use. While benefits of ICT in the education sector cannot be understated, there are several concerns about its successes as well as the strategies to be adopted in the implementation of systems. For example, the initiative to digitalise the learning process may not be welcomed by key stakeholders like ECD parents. It follows, therefore, that this initiative should seek to address the concerns of all relevant stakeholders and also seek to gain their support if it to be successful. This study therefore seeks to decipher the challenges that have been faced thus far in the effective ICT implementation in Imbizo District in Bulawayo Metropolitan.

### **1.3 RESEARCH OBJECTIVES**

- 1.3.1** To identify the challenges that are faced in the effective ICT implementation at selected primary schools in Imbizo District.
- 1.3.2** To identify the attitudes of various key stakeholders in the drive to digitalise the learning process.
- 1.3.3** To identify ways in which various stakeholders may cooperate and participate in the initiative to digitalise the learning process.
- 1.3.4** To obtain an idea of the programs that would need financing with an idea to help the relevant stakeholders be able to allocate resources efficiently.

### **1.4. RESEARCH QUESTIONS**

This study seeks to provide answers to the following questions:

- 1.4.1 What policy structures are there to develop ICT competence of ECE teachers?
- 1.4.2 What role do parents have in the implementation of ICT at ECE level curriculum?
- 1.4.3 What are the areas of concern regarding children's safety and health in the digital world?

## **1.5 SIGNIFICANCE OF THE STUDY**

It is hoped that this study will assist in the ensuring the effective integration of ICT in schools in this country so as to make sure that Zimbabwe keeps in-step with the rest of the global village in the effective use of ICT. It is important that ICT should receive great attention especially in the education sector as this is where the human resource element in any country's economy is nurtured and developed. Thus whether Zimbabwe in all its sectors including non-education sectors, can keep in step with the information era, will depend on how effectively the integration of ICT is done in the education sector where the human resource element of any sector is brewed.

It is hoped, that the results of this study will inform amendments made to policies regulation of ICT integration and make them more effective and tailor made to fit the varying contexts in which they are to be applied in order that they may achieve the desired outcomes for which the makers are yearning for in crafting them. This in turn will benefit the beneficiaries of the ICT integration programs in that they will be better able to make full use and maximise their benefit from the various initiatives of the policy makers.

It is thus imperative to carry out the research in order to ensure that the ICT initiatives are more properly channelled to achieving the goals for which they have been brought into being so that they not merely a waste of time and resources by failing to scratch where it really itches. A study of the various challenges in the implementation of ICT integration is thus necessary to achieve effectiveness and efficiency of the integration programs. This proposed study is of paramount importance as it will go a long way in assessing the impact of ICT based technologies in the teaching and learning

at ECE level classes. Therefore, a study of such nature has a potential to suffice opportunities to ECD learners to be fully engaged and competent in this area of study. Hence the study will raise awareness and understanding of technology and has the potential for self-reflection to our teaching practices and their implications in learning process.

Furthermore, the acquired information on this study will add on to the existing body of knowledge. This data will help in benefiting to a range of different stakeholders like teachers and parents in planning and decision making to enhance effective teaching and learning.

#### **1.5.1 To the researcher**

The proposed study will be of significance to the researcher. New research experiences encountered in the proposed study will shape and sharpen the researcher's enquiry skills and analytic skills making her a better researcher. Furthermore, a study of this nature has a potential to expose the researcher to new literature which is critical in developing her scholarly and academic understanding. On top of that, the proposed research will also raise awareness of the phenomenon and expose the researcher to related studies and prior studies of the same nature on Early Childhood Education.

#### **1.5.2 To the university**

The proposed study will also be an eye opener to the university as well. It will generate empirical data on the impact/effectiveness of ICT based technologies in the teaching and learning at ECE level. The study has a potential to suffice new knowledge and influence the way ICT can be taught in schools. Furthermore, the study can be a referral point for future researchers; hence it lays a foundation prospective study in the early childhood education level. Midlands State University (MSU) can use the research as a general body of knowledge for understanding the importance of ICT in satisfying the three core human needs at once: to communicate, to learn and belong. The gathered information can be used as reference in its library archive.

### **1.5.3 To Early Childhood Education Learners**

The proposed study will hopefully enhance curriculum and experiences for children/learners. As ICT is revolutionising the world, our children live in, this research aims to provide the right kinds of experiences at the right time. As there is no question that today's society, ICT has become part of our everyday lives hence, this study has the potential to have clear impact developing the skills and knowledge that are essential in today's world.

### **1.5.4 To Early Childhood Educators**

The proposed study will be of significance to all early childhood educators and administrators. It will suffice knowledge on challenges faced by teachers when teaching ICT to ECE learners. Hence the study will raise understanding and awareness of our current teaching approaches, integration of ICT in all learning areas and the implication for effective delivery and learning process when teaching and learning. Therefore, the study has the potential to refocus our ways of teaching which eventually result in an effective learning process. The study if ploughed back to teachers has the potential to be incorporated in teaching of early childhood classes; that is ECD-A, ECD-B, Grade 1 and Grade 2, hence enhance performance.

### **1.5.5 To the Early Childhood Education parents**

The proposed study will be an eye opener to all parents, caregivers and guardians of ECE learners. It will bring out the knowledge on the impact of ICT based technologies to ECE children. The study will enhance clarity on the roles of the important stakeholders like parents for holistic development of children. It is also going to pave way for health relationships between schools and homes and try to bridge a gap between the two.

## **1.6 ASSUMPTIONS OF THE STUDY**

- ICT is important and an indispensable component of the learning process in the twenty first century.
- Greater integration of ICT in the education sector is feasible.

## 1.7 DEFINITIONS OF TERMS

**Computer** – it is a machine that automatically accepts, stores and processes data to produce information.

**Information technology** – is the science to managing and processing information using computers.

**Information and Communication Technology** – these are the range of tools and techniques relating to computer based hardware and software to communication including both direct and broadcast information sources such as CDROM and the internet and to associated technologies such as robots, video-conferencing and digital TV (QCA 1999a:184). In this study ICT refers to the computer and internet connections used to handle and communicate information for learning purposes. On top of that ICT is defined by Tomer (2002) as the application of behavioural and physical sciences concepts and other knowledge to solutions of problems. While Ramey (2016), defines ICT as a body of knowledge devoted to creating tools, processing actions and extraction of materials. The term ICT is wide and has many different contextual meaning. As used in this research, it pertains to the full range of computer related equipments, products, processes, educational software and also electrical household appliances.

**ICT Policy** – Procedures (rules) set to govern, guide users (teachers) on what is expected of them integrating electronic equipment across the curricula for teaching and learning purposes.

**Early Childhood Education** – According to Gordon and Brown (2004) Early Childhood Education, is the learning of young children from birth to eight years of age. In support of that Leer (2005) defines early childhood education as the learning experiences which children from range of zero to eight years enjoy at centres. While Morrison (2004) is of the same view that early childhood education is the critical stage of foundation that forms the

foundation of children's future, well being and learning. Essa (2011) defines early childhood education as the programme that facilitates learning of a child from zero to eight years. Thus ECE can be defined as a set of programmes that aim at developing the children holistically, that is physically, socially, emotionally, intellectually/cognitively, health as well as morally as from conception to eight years.

**Constructivism** – An education philosophy based on the assumption that learners construct their own knowledge from ideas, objects and events which they experience and encounter in relevant environments (Perkins, 1992).

### **1.8 LIMITATIONS OF THE STUDY**

The researcher is likely to face some time challenges carrying out this study, due to the fact that the study will be done during working hours. To curb this, the researcher will use lunch time hours and also arrange appointments to avoid inconveniencing the participants. It can be time consuming as the researcher will carry out interviews from one class to another and one school to another, dealing with children whom the researcher has to first build secure base/trust with in order for young learners to freely give out their views. Another challenge is that other teachers will be busy with their work planning and preparing for the following working day or sometimes some will be doing their marking. The researcher will resolve this challenge by taking advantage of staff developments and cocas meetings in order to reach out all the targeted area of the study. Since the proposed study will be done in Southern cluster which might hinder the production of rich detailed information as findings can only be generalised. However, the results may be transferred to homogeneity cases for policy making and decision making purposes (Patton, 1990). Another hindrance may be the fact that research will be self-sponsored, financial constraints such as transport and printing expenses cannot go unnoticed. Therefore, due to financial constraints, it is not feasible that all schools in Imbizo District be covered and thus sampling technique will be applied. The respondents could give responses that tend to cover up their weakness in using ICTs for the purpose of safeguarding their self-interests

and this may lead to false conclusions being arrived at as the information given will not be accurate.

## **1.9 DELIMITATIONS OF THE STUDY**

The proposed study will be conducted and confined to Riverside Stimulation Centre in the Southern Cluster, mainly targeting on Early Childhood Development classes. Participates are going to be ECD teachers, parents and learners. The study focuses on the finding the challenges associated with implementation of ICT at ECE level. The participants of the study shall be members of the community being the parents, caregivers/ guardians; teachers and school administration.

## **2.0 SUMMARY**

This chapter has sought to provide a comprehensive background to the research, statement of the problem, research objectives and questions, significance of the study, scope and limitations to be encountered in the course of the study. Chapter two shall present the literature review on the integration and implementation of ICT by schools as well as its conceptual framework. In summary the researcher is of the view that the proposal will go a long way in addressing the impacts of ICT based technologies in the teaching and learning at ECE level. As afore mentioned in this chapter ICT in ECD is new, hence teachers are still in the process of implementation it. Teachers are therefore in need of high level of support from various departments in order to see this go through, as well as adopting holistic approach to integrate ICT in all learning areas/ subjects.

## **CHAPTER TWO**

### **REVIEW OF RELATED LITERATURE**

#### **2.0 Introduction**

In this chapter, the researcher will review theoretical and empirical literature linked to the relevance of ICT in education, the impact/ influence of ICT on the teaching and learning process, policy structures that are there to develop ICT competence of teachers, roles of parents in the implementation of ICT at ECE level curriculum and the areas of concern regarding children's safety and health in the digital world.

#### **2.1 The relevance of ICT in education**

Riley & Reedy (2003) state that, use of ICT has become increasingly valuable in supporting learning across the curriculum. This implies that technological advancement invited positive innovations into the primary school curriculum, thereby improving not only the quality but also the output of the teaching and learning process at primary schools. The use of educational technology also made it feasible in the year 2006 for Zimbabwe to amend its Education Act of 1987, on issues to do with technology in education. UNESCO (2008) states that among its incremental policy objectives, the revised Education Act now aims at promoting ICT, computer education and e-governance.

The use of ICT in ECE settings motivates young learners and uplifts their cognitive capabilities and achievements (Ilomaki, 2008). In support of the above sentiments, Ellies (2009) states that it also reduces teachers' load and connects the school, home and the rest of the digital world. Generally, ECE learners are enthusiastic to use computers and when they are taken as an integral part of teaching and learning, they, take application of newly acquired knowledge and skills in real-life situations easier. Furthermore, Reich and Daccord (2008) assert that the use of ICT enables teachers to prepare online homework templates.

Petty (2000 P. 375) suggests that, “If we don’t teach our students how to find trustworthy computer resources, and how to learn from these, then we are not preparing them for real life...” In a nutshell, it is very relevant to use ICT in teaching and learning especially to the ECE learners. Young learners should be taught in a technological-oriented manner, and not the way we were taught earlier pre-ICT era, in order to prepare them for the digital world of the 21<sup>st</sup> Century. Young learners must be the main focus of ICT integration.

Use of ICT marries theory with practice and adoption of new technology in the early years classroom set ups, helps teachers to embrace change thereby teaching ECE learners for their future and not for present alone, if not worse still, for the past. This is so because what the words “teaching and learning” meant in the 19<sup>th</sup> century before the advent and launch of Zimbabwe’s ICT policy in 2007 cannot continue to mean exactly the same today (Januszewski & Molenda, 2008). The fact that lots of information on any disciplines are availed on the internet and World Wide Web (www) means that facilitators’ and learners’ performances are improved since learning tasks are being accomplished quickly (Pershing, 2006). Using ICT is usually skill-oriented, that promotes child-centred learning and ECE learners are subject matter that is up-to-date. Underwood and Underwood (1990) are of the idea that the use of ICT advocates for the process, rather than fact oriented curriculum where for example, the emphasis was put upon knowing that the capital of Zimbabwe is Harare, rather than upon acquisition of the atlas reading skills that help learners to retrieve such information by themselves.

Weigel (2001) propounds that using ICT in teaching and learning triggers deep learning instead of surface learning. Additionally, Januszewski and Molenda (2008) allude that the integration of ICT is in line with the paradigm shift in pedagogy since it promotes high learner participation, activity-based learning where learners shift from being mere recipients of knowledge from the teacher to being managers of their own learning. That is, in an ECE classroom setting, that offers hands on activities that offer a variety of multimedia facilities. Hence, long term mastery of concepts is enriched.

According to Singh, Sharma and Upadya (2011), the adoption of technology in classroom teaching and learning brings along the involvement of multi-sensory approach, that is well advocated for by different ECE theorists, educational philosophers and psychologists like John Dewey, Bruner, Vygotsky and Piaget among others (Price, 2009). Price (2009) states that investigations of Russian and foreign psychologists, accomplished following the guidelines of Vygotsky's school, indicate that children, who take part in cooperative work based on the use of ICT, carry out the process of genuine exploration (quasi-exploration), demonstrate interest and emotions that inspire their effective development. Ellis (2009) states that educators assert that there is correlation between good ICT integration with learners' attainment. ICT integration is also vital in improving instructions and arousing learners' curiosity and interests, thereby inculcating positive attitudes towards the whole learning process.

## **2.2 What policy structures are there to develop ICT competence of ECE teachers?**

Ministry of Primary and Secondary Education regards ECE as a central area for child's social, physical, intellectual, creative and emotional development (SPICE). To this regard, recommendations by Nziramasanga Commission of Inquiry brought with it the institutionalisation of the ECD program in the country and with several policy pronouncements to guide in its operations (Nziramasanga, 1999).

Manzini and Chiwaro (1995 P.1) define policy as "a statement of guidelines which govern how a group of people should behave in a given circumstances. Manzini further explains that policy gives direction and it influences behaviour of the tasked people in a given circumstance towards achieving the goals of the organisation. It would mean that without any form of guidelines in an organisation, there is bound to be confusion. Therefore having a policy would ensure that children have access to affordable ECD and that quality services are offered at all centres (Manzini and Chiwaro, 1995). Hence, in the Zimbabwean context, a policy would help Zimbabwe to meet the developmental needs of the children and emphasize the developmental

approach to early childhood education. The policies will also give stakeholders a focused approach to ECD initiatives, thereby improving quality of ECD outcomes. Makokoro (2017) states that Zimbabwe has reviewed its curriculum to produce a well-grounded learner, capable of contributing meaningfully to development of the country while leading a fulfilling and a happy life. He further states that the curriculum rests on four key pillars, these are:

- The legal and regulatory framework
- Teacher professional standards
- Infrastructure development
- Research and innovation.

Hence a developmental ECD curriculum that focuses on the development of the whole child, that is, Physical, Social, Emotional, and Cognitive among other domains. The children's needs and characteristics are catered for, that is their age, special area and their experiences. Characteristics of children: playful by nature, therefore ECD curriculum is play centred, It should be flowered with play. All learning experiences whether 3 year olds to 5 year olds should be through play (Stebbing , 1999). Each area of a curriculum thus emphasises on a certain aspect, but all in all these tiny combined bits combine to make a whole. These are designed in separation for the purposes of clarification.

This in turn means that the Zimbabwean children need an early foundation in literacy and numeracy while also being exposed to the fundamental concepts of science and technology (ICT), grounded in the literature and culture of our nation will develop citizens who are able to confidently move into the world of work and sustain their lives (Director's Circular Number 48 of 2007).

ECD was formally integrated into the education system in the year 2005 through the Statutory Instruments No. 106 of 2005 as well as Director's Circular Number 48 of 2007 and was annexed to existing primary schools. The circular states that there is need to build the capacity of existing educational officials to provide growing in the ECD Philosophy, approaches

and methods. According to these SI and Director's Circular, ECD curriculum was especially not to include formal reading and writing and number work as their learning was play-based. The 2016-2020 Education Sector Strategic Plan (ESSP) will focus on paving in the new curriculum, continual provision of professional upgrading, supervision and other support for the teachers. The ESSP will also focus on increasing access to the learning through early identification of children with specific learning needs and well equipped classrooms for science, technology, engineering and maths (STEM) and ICT. Having the right institutional architecture, great leadership, accountable management, efficient and effective resource utilisation, and quality service delivery, as well as pursuing first class data collection, research and analysis (Ministry of Primary and Secondary Education: The Curriculum Framework for primary and secondary education 2015-2022).

The Education Act revised in 2006 and other Statutory Instruments will need to be revived and revised and updated to be consistent with the provisions of the New Constitution. The Policy Framework will be reviewed, developed or rationalised. The ESSP commits to preparing and implementing policy on the following:

- School-level financing
- School feeding
- Inclusive education
- Assessment for the infant years
- Review and development of the assessment framework for new areas, policy and regulatory framework for teacher professional standards
- ECD policy and finalising and implementing the school health policy
- As well as ICT for the education sector (Sunday Mail, 2016 <http://zinecda.org/resources> )

According to UNICEF, Multiple Indicator Cluster Survey (MICS) 2014, Zimbabwe still has to invest ICT both in rural and urban schools and increase support for provision of learning materials such as appropriate textbooks and other teaching aids. Thus, considerable investment by the government

through adequate budget allocation to education and partnership with civil society organisations is needed.

It will also be important to invest in teacher training colleges to ensure that there will be adequate human resources to meeting the population. Equally more important is the need to ensure that more ECD teachers are trained and deployed to the primary schools to support the MoPSE policy about providing quality services for young learners (Ministry of Primary and Secondary Education: The Curriculum Framework for Primary and Secondary Education, 2015-2022).

According to Noll (2006), society needs to fully support and promote ICT policies, availing resources and practices needed to make its integration a reality. This means that in the case of education, the government of Zimbabwe ought to put in place mechanisms that enhance efficient ICT integration in education. In most Zimbabwean primary schools, more funds ought to be mobilised and channelled towards purchasing more ICT human and material resources. Kyriakon (1998) conveys that infrastructure that includes classrooms and computer laboratories must be improved and or set up.

Since there are many policy structures that are there to develop ICT competence of ECE teachers, however, most ECE teachers are not comfortable to part ways with their tried and tested methods of teaching; paving way for new technological-oriented teaching techniques. Newby et al (2011) propound that change increases anxiety and allows for other mistakes and other problems to occur. On top of that, Cox, Preston and Cox (1999) explain that the majority offered to train teachers much on operating ICT tools with little training on the use of ICT effectively in classrooms.

No matter how highly literate one is, a primary ECE teacher must love team-teaching or inviting a resource personnel. This will assist in skills and even gain some within and across departments. Such an approach in an ECE setting allows room for learning from other fellow colleagues so that all teachers cease to be stumbling blocks to ICT integration. In fact, it must be the wish of every ECE teacher to strive to become effective user of ICT in

teaching and learning. With basic ICT skills, no teacher can feel threatened by the technological gap between the rich and the poor (Sawyer & Williams, 2005). Sawyer and Williams (2005) state that, uncertainty comes when some learners prove to know more about computers than their teachers. Teachers must avoid taking the little they know about ICT as a vehicle to uplift their social status (Sawyer & Williams, 2005). Instead, there is need for teachers to strive to know more given the nature of dynamism at the heart of educational technology.

For efficient integration, ECE teachers have to promote care of ICT resources like computers by the young learners. Teachers have to keep on researching on how to improve one's teaching with technology by attending workshops, meetings and ICT seminars. Embarking on in-service training is necessary to improve literacy skills. Stephens and Crawley (1994) state that teachers must bite the IT bullet or grab any opportunity given to them for further or initial IT training.

When parents, teachers and children collaborate towards the same goals it leads to improved academic performance (Byron, 2008). Time spent using any desktop computer application (and any other application) by a child should be comparatively short, not extending beyond 10-20 minutes at a time in the case of 3 year olds (Hayes & Whitebread, 2006). To understand all safety concerns appropriately, a systematic research is required. However, the only efficient way to eliminate or minimise potential harm is knowledgeable teacher. It is teacher's responsibility to critically consider proper forms of ICT and employ them to support creative play and expression, both through the selective use of particular software applications and through using a range of different forms of ICT, such as digital cameras, sound and voice recording devices, programming toys, educational robots sets, digital microscope, etc ( Kalas, 2010).

The Zimbabwean President Honourable Emmerson Dambudzo Mnangagwa launched ICT Policy to guide Zimbabwe's economic development through coordinated use of ICTs (Herald Newspaper, March, 2018). He states that the ICT policy together with the Innovation Drive, a policy to provide funding to

young innovators were launched at Harare International Conference Centre at a ceremony attended by the then ICT and Cyber Security Minister Super Mandiwanzira and several governmental officials. “This policy will undoubtedly provide strategic direction and guidance for sustainable National Economic Development through systematic and coordinated application of ICTs.” President said (Herald Newspaper, 2018).

The ICT policy is thus aimed at transformation, growth, inclusiveness, sustainability, innovation and partnership in the mainstream economy and puts in place institutional legal and regulatory frameworks in order to achieve its intended goals. It is therefore envisaged that all sectors of the economy and society at large will harness the power of ICT for the development of a nation. According to the President in the Herald of March, 2018, penetration rate rise of ICT is now at 95% and its geographical coverage is now at 75%. This entails that all sectors of economy including education sector have adopted the ICT policy.

ICT must be viewed as an economic enabler for the development and the establishment of sector appropriate solutions with comprehensive breath, depth, flexibility and applicability. To this end the importance of the ICT policy will go a long way towards making information technology revolution, the basis for ultimately transforming Zimbabwe into an e-society. The Zimbabwean government is making strides through investments in ICT backbone infrastructure, ICT education, research and development, the expansion of community Information Centres as well as ICT governance and training of ICT teachers in ICT usage.

The government of Zimbabwe is committed to continue supporting use of ICT in areas such as education, agriculture and tourism. The president challenged the educators to deploy ICT to advance and inculcate national identity, values and ethos as well as in defence of our national interests and cultural heritage. He further stated that we should always be alert to the need to protect the young and vulnerable from the vices associated with ICT's and the threat of cyber crimes. Parents or other persons responsible for the child should

always act in the best interest of the child (The African Charter on the Rights and Welfare of the Child, Article 20, 1999).

### **2.3 What role do parents have in the implementation of ICT at ECE level curriculum?**

Parental involvement is of paramount importance in the ECE curriculum (Statutory Instrument 106 of 2005). The S.I 106 of 2005 further encourages parents to have their children attend ECD before they start formal learning. Parents play a pivotal role in different sectors of the ECE setting. They are the main stakeholders since they are the ones who bear these little ones who are found at the ECE centre. Therefore, excluding them in the daily goings of the institution will impact negatively on the holistic development of the learners.

One of our country's major goals is to have universal access to education, that is starting from Early Childhood Development for all children from 0-6 years regardless of their socio-economic status, colour, religion and cultural background. Therefore, the policy seeks to increase access and equity to ECD through the primary education systems (The African Charter on the Rights and Welfare of the Child, 1999, Article 11). The Education Act of 1973 and its Statutory Instrument 72 of 1973 stated that nursery education was predominately for non-blacks (Manzini & Chiwaro, 1995). This implied that very few blacks who had the cash muscle could afford pre-school before Independence. The SI 72 of 1999 was instituted to repeal the SI 72 of 1973 and 1979 and to remove the discriminatory provisions and regulate the expanded National Early Childhood Development Programme (Manzini & Chiwaro, 1995). In 1999 a Commission of Enquiry into education and Training Report of 1999 led by the Commissioner Nziramasanga was set up to look into the education system in Zimbabwe and recommended for an increased access into ECD and that preceding year of Grade one is made a prerequisite for entry into Grade one.

The Statutory Instrument 106 of 2005 encourages parents to have their children attend ECD before they start formal school. It sets guidelines for the requirements of ECD centres giving specifications on enrolment, type of classrooms, outdoor play space and toilets provision at a ratio of 1:8, health

and sanitation facilities, standard of cleanliness of buildings and premises, staffing and staff details. PEDs are directed to close all ECD Centres that operate outside registration parameters failing to meet the stipulated requirements for registration. A teacher pupil ratio of 1:20 was mandated by the Statute.

Hence, parents have to be aware of this so that they take their children to proper ECE centres that meet the government's requirements. Secretary's Circular Number 2 of 2014 state the effectively continuous assessment to proceed to the next level of learning and remedial measures be put in place earlier to address learning gaps (ERI Implementation). It states that reading forms the cornerstone of the Infant School Module in all schools. This implies that the homework given for Grade 1 and 2, parents have to assist at home reading structures given to learners. This circular states that all children to be enrolled for ECD-A which had lagged behind over the years, hence, the adoption of the Zim-Asset Quick Win Operational Strategy.

We can hardly imagine an education institution (of any stage) today without any presence of ICT. More and more children encounter computers before they go to the school, even before they go to preschool. It is then natural to notice that they are exposed to both positive and negative impacts of digital technologies. Therefore, ECE cannot ignore any of them. It must look for procedures and strategies on how to engage ICT so that we achieve our learning objectives in a more effective, authentic and actual way (Resnick, 2009).

ICT can help children to develop their competencies even before they go to school. As Siraj-Blatchford and Whitebread (2003 P. 19) point out that, "Young children today are growing up in a world, which not only contains but is increasingly shaped by ICT." This digital world has an impact in children's culture, in the sense that they spend most of their play time glued to the electronic gadgets. Parents are sometimes unaware of their children's exposure to these technologies and the material that can be transmitted via them. Hence, they are encouraged to monitor their children's use of ICT at home. In other cases, many children have much greater access to new ICT at

home than they do in educational settings. Communication between parents and educators about children's experiences in this area is non-existent (Staker, 1993).

Parents must be aware that children with special educational needs can be helped through use of ICT tools. ICT plays an important role in supporting children with special needs. As Cole points out in Price (2009:105), that "ICT ensures that all children regardless of ability or difficulty can be included in appropriate and meaningful learning opportunities". This implies that ICT enables children with special education needs, through various means, to access a broad and balanced curriculum, one that they might otherwise be denied. UNICEF The State of the World's Children in a Digital World (2017) state that excluded and marginalised children, digital tools and connectivity have also helped minority groups feel more integrated in their communities and opened new windows for expression, networking and political activism and social inclusion. This means that many of the world's ECE learners with disabilities are isolated and struggle with stigma and discrimination and social environments that does not accommodate their needs or support realisation of their rights. For example, they are more subject to adult intervention than their peers, which result in limited capabilities. ICT or digital communication offers them a way to express themselves, make their own choices and participate in decisions affecting them. ICT also has the potential to facilitate communication with friends and reduce feelings of isolation.

Children are curious and ask questions. They like to tell and listen to stories about themselves, other people and things. They like to draw houses, animals, trees, their parents, fairy-tale personages, among others. They like to make something, they like to play and interact with other people and animals. ICT can help ECE children do many of these things mentioned. ICT can deliver content and activities that originate and support strong and productive emotions for children. Eventually they can serve as the environment and the tools for development (Wang, 2005). Vygotsky distinguished psychological tools from technical tools and provided, "examples of psychological tools and their complex systems: language, different forms of numeration and counting, pneumo-technic techniques,

algebraic symbolism, work of art, writing, schemes, diagrams, maps, blue prints, and all sorts of conventional signs, etc. (Vygotsky, 1930). ICT tools are technical tools in the Vygotsky sense as tools to change external objects, at the same time they can be integrated with psychological tools.

Parents at home inculcate learning environments that are designed to strengthen equity and gender equality. This is also done at school to bridge the gap. They promote children's linguistic development and make cultural diversity visible (National Core Curriculum for Early Childhood Education and Care, 2016). Adult supervision in ECE setting is very crucial as the vast majority of young learners rely on adult guidance to help learners who use technology as an additional tool (UNICEF- The State of the World's Children in a digital World, 2017). Technology offer extra ordinary opportunities for all society including children and young people. The internet allows for global exploration which can also bring risks, often paralleling the offline world.

How is a child's development affected by social relationships and the world around them? Ecological systems theory provides one approach to answering this question. According Urie Brofenbrenner (2005) known for Ecological systems theory, being a co-founder of Head Start in America, a child's growth is affected by different environments/spheres/ systems. These systems are graded into five categories, these are, micro-system, meso-system, exo-system, macro-system and chrono-system. Per theoretical construction, each system contains roles, norms and rules which may shape psychological development. Parents are found in the inner sphere which is the micro-system. In this first level, according to Brofenbrenner (2005), is the system closest to the child and the one in which they have direct contact. Some examples will be home, school and day-care centres. A micro-system typically includes family, peers, or caregivers. Relationships in a micro-system are bi-directional. In other words, the reactions to the people in the micro-system will affect how they treat one in return. This is the most influential level of the ecological systems theory. Hence, in the ICT context, parents have to allow/ control/ monitor their children when using ICT devices.

## 2.4 What are the areas of concern regarding children's safety and health in the digital world?

According to Flynn and Mandell (1998) the use of computers in ECE settings dates back to the late twentieth century. However, earlier researches such as Waldorf School discourage television for young children. Waldorf education is not anti-television but it would be unrealistic not to acknowledge the value and importance of technological media in children's culture. Waldorf does have legitimate concerns; however, about the extensive impact these media have on child development (Steiner, 2000). Computers are not used in Waldorf schools. Waldorf does not follow the popular trend of introducing young children to computers. Introduction of technological devices is carefully controlled in Waldorf classrooms because children need to fully develop visualisation, conceptualisation, and abstract and logical thinking skills before they can fully appreciate and benefit from the use of technology (Steiner, 2000).

Incorporation of ICT in teaching and learning, results in both positive and negative impacts. This implies that use of ICT is an imperative change that brought both opportunities and challenges to the teacher and the young learners. Singh et al (2011 p. 47) contended that, "The use of ICT is capable of reducing the load and teachers' tension through its great potentiality to relieve teachers from their routine duties." In corroboration, Leach (2008) asserts that the planning and preparation for teaching and learning becomes more efficient with the use of ICT. This is so because teachers' and learners' work is finished earlier due to computerisation.

What are the potential benefits and perceived risks on integrating ICT into early childhood education, one may ask, while all enthusiastic educators in the field highlight numerous and productive forms of integrating ICT into preschool learning and play, there are many writers in ECE who present an assortment of safety concerns. As stated in New Zealand Council for Educational Research (2004) or Stephen and Plowman (2003), there is less evidence about the degree to which ICT assume a real risk to children, at the same time, most authors agree that early childhood educators need to be

aware of the debate about ICT use by young children, particularly regarding the use of desk top computers. The Alliance for Childhood (2000) argues, for the removal of computers in American schools, as they consider that the use of computers is dangerous for children's physical, emotional and intellectual development. On the other hand Jones (2002) disputed these claims, as his research indicates that children were spending far more time watching television than working on computers.

The use of ICT sheds off teacher-talk and end up interactive in nature (Baron and Bransford, 1993). This perception concurs with Morrison (1997) who adds that the intended outcome of integrating ICT is positioning learners into contact with appropriate teaching aids in a well set up environment ready to evoke learning. Therefore, the implementation of ICT results in child-centred learning and motivates both the instructor and the learners. As usual, grasping of concepts by young learners who are actively involved in their e-learning is enhanced and application into everyday circumstances is enabled too.

ECE learners learn through play (Stebbing, 1999). In support, of that Vygotsky in Gordon and Brown (2005) state that play is children's natural language. They also learn at their own pace and so, ICT integration enables ECE facilitators to cater for individual differences. Computers limit rote memorisation and do not allow stretching of learners' imagination as video and animation can be used to illustrate most abstract concepts in a specific subject (Stephen and Crawley, 1994). More so, ICT makes teachers to be researchers in the education field since they would access information of recent case studies researched anywhere around the globe via internet.

Use of ICT enables teachers to lead, manage activities and control discipline among children in the class. Somekh & Davis (1997) went on to say that a teacher with relevant ICT technical knowhow easily gain and remain in control of the class. This definitely results in more organised learning. The integration of ICT promotes learning that caters for all the domains (cognitive, affective and psychomotor) as outlined by the Bloom's Taxonomy. Again, teachers end up planning and preparing for their lessons fully in order to attract attention of

young ECE learners. Haag, Cummings and Rea (2004 p. 4) add that, "...when you make a presentation, you want to grab the attention of your audience immediately". This can be in the form of rhymes and songs as well as animation stories. Young learners' attention will be drawn at once hence, introduction of a lesson and lesson development will smoothly sail through.

On the contrary, it would be naïve to assume at this level that the incorporation of ICT brings in only favourable influence to the teaching and learning process. To that end, Noll (2006 p. 346) propounds that, "Despite great strides in incorporating ICT into schools, we still fall far short of providing a seamless, convenient, robust and reliable technology support structure for all students and teachers in the United States." This implies that worldwide, the inclusion of ICT comes with its own challenges.

Sawyer and Williams (2005) postulate that, some learners end up developing internet addiction where they become lazy to think and spend more time on unfruitful activities on computer gadgets like laptops, I pads, smart phones as well as tablets at the expense of school work. In this way, the teaching and learning process is affected negatively by technology. Again, teaching and learning is jeopardized by technology when learners access untrustworthy sources of information on the internet and inevitably master unauthentic subject-matter. Teachers need to be well versed with computer skills first. Otherwise use of these diverse tools must be well thought out before each and every lesson execution to avoid impairing the whole teaching and learning process. This is why Kyriakon (1998 p. 45) argue that, "The golden rule pertaining to the use of various ICT resources is always checking their quality, readiness and appropriateness for the lesson." Special care must be taken by ICT teachers to see that students are not abusing ICT facilities by watching pornographic material

As ICTs rapidly penetrate all regions of the world, children's experiences are increasingly informed by the use of these technologies. Global concern is callusing around the need o understand how to reduce the risk of harm children face online while maximising their opportunities for learning, participation and creativity (Mario and Azevedo, 2017). It is important that the

ways young people use the internet are considered when online technologies, networks, services and policies are developed, however, there is still insufficient robust evidence from most middle and lower income countries on how internet use impacts children's well-being and what risks and opportunities they encounter online (Stoilova, 2016).

To meet this need of evidence, UNICEF office of Research, Innocentia, coordinates and facilitates cross national research on children's internet use into the Global world. The Global Kids Online Network was created in order to develop a research toolkit and central coordination of resources and expertise to support national partners in generating and sustaining a vigorous evidence base (Winther, 2017).

Such international projects are conducted in partnership with the London School of Economics and Political Science and the UK kids online network, as well as in collaboration with a number of researchers and experts from different parts of the world (Children's Rights in the Digital World 2017). The purpose of the mentioned projects is to enable researchers globally to gather evidence to understand how children's rights are being enhanced or undermined in the digital world age.

The concern also on children's safety is in the context of using computers in particular, playing games. Gottesman (2000) asserts that, the only efficient way to eliminate or at least minimise their effect in real life settings is to involve a knowledgeable teacher. It is the teachers' responsibility to appraise proper forms of ICT critically and employ them to support creative play and expression, not only through the selective and supported use of particular software applications(including computer games), but also through the use of a range of different forms of ICT (for example, digital cameras and other tools for recording and communicating, programmable toys, educational robotics construction sets, or digital microscope, etc)...both indoors and outdoors, for a range of different learning and play activities (New Zealand Council for Educational Research, 2004 p. 23). Concerning health of ECE learners, besides addiction to games, learners can be affected by using old monitors which is a risk to their eye-sight. Video gaming offers a range of exciting

interface experiences for children, however, some of these are designed for adults. There is a generational digital divide between parents and children which means that many parents do not feel empowered to manage risk in the digital world in the same way that they do in the real world.

Children who depend on technology for play and entertainment grossly limit their creativity and imagination as well as optimal growth of their sensory motor skills Brofenbrenner (2005). This means that sedentary bodies bombarded with chaotic sensory stimulation are resulting in delays in attaining developmental milestones, with subsequent impact on basic foundation skills for achieving literacy causing France to ban all “Baby TV” (Berkes, Colding, and Folke 2001). Violent content found in media has had such impact on child aggression that the United States has classified media violence as a public health risk (Berkes et al 2001). Students entering schools struggle with discipline and attention skills required for optimal learning, thus causing major behaviour management problems for teachers in the classroom. Thus technological advancements has indirectly contributed to physical, psychological and behavioural disorders thereby directly interfering with the micro-system as suggested by Brofenbrenner’s framework.

On the other hand, the merits of use of ICT is that the evidence from the Corporation for Public Broadcasting’s “Ready to Learn” initiatives indicate that when television shows and electronic resources have been carefully designed to incorporate what is known about effective reading instruction, they serve as positive as powerful tools for teaching and learning at ECE level (Pasnik et al 2007: Neuman, Newman and Dwyer 2010: Corporation for Public Broadcasting 2007). The educational content is what matters, not the format in which it is presented (Wainwright and Linebarger, 2006).

In conclusion, a number of advantages that are associated with ICT implementation can be exploited teachers and learners to bring about efficient teaching and learning in and outside the classroom. A deeper understanding of the negative influences of ICT on teaching and learning in primary schools also help teachers to avoid problems associated with the incorporation of

technology in classroom practice. The benefits of integrating ICT in teaching and learning outweigh the costs.

## **2.5 Summary**

Most of the ECE educators, in contrast to the young children in their care, started to use ICT in the adult age and therefore present a certain degree of resistance to the use of computers in early childhood education. In line with the current trends in teaching and learning of every discipline taught at primary schools, the relevance of ICT cannot go unmentioned. A number of reasons were put forward to justify the inclusion of ICT in education. With technological innovations, education can remain an indispensable tool for social transformation. Nevertheless, ICT integration is being crippled by numerous problems that can however, be addressed through in-service training, parental involvement, establishing and upgrading school infrastructure and procuring some more recent ICT resources. In a nut shell, the chapter reviewed literature on necessity of ICT integration, challenges involved in trying to incorporate ICT and suggested possible solutions that can be implemented to enhance effective teaching and learning with technology in ECE settings.

## **CHAPTER THREE**

### **RESEARCH METHODOLOGY**

#### **3.0 Introduction**

In this chapter, the researcher will focus on the research design, population and sample, sampling procedures, research instruments, data collection procedures and analysis. Detailed explanation and justification for choice of descriptive survey, that is, the research design to be used in this research will be given. Issues related to reliability and validity of the triangulated research instruments (questionnaires and interviews) will be explained also. The consideration of validity and reliability, research ethics as well as triangulation will help to minimise both subject and researcher biases.

#### **3.1 Research Philosophy and Paradigm**

This study is founded on the philosophy of quantitative research paradigm which affords the researcher an opportunity to directly interact with all the participants. Best (2007) posits that the merits of the descriptive survey design are that, it may be used as a pre-cursor to future research because it can be helpful in identifying variables that can be tested. Best (2009) further say that, descriptive survey design allows for a multifaceted approach to data collection analysing. The descriptive survey design has its limitations for example, descriptive studies cannot be used to correlate variables or to determine cause and effect. Thus the researcher will use triangulation to mitigate this demerit.

#### **3.2 Research Designs**

In this study, the researcher will use the descriptive survey design. The researcher decided to use this design because it will help her to find the responses which will be relevant to the study. According to Cohen et al (2011) surveys gather data at a particular point in time with the intention of describing the nature of existing conditions. The descriptive survey design helps to elicit important data about opinions, attitudes and practices about something. The descriptive design for this study is comprised of quantitative methods of data

collection. According to Babbie (2009), a research design is a strategy for conducting a research study to examine testable research questions of interest. In support of that, Omari (2011) also defines a research design as a distinct plan on how problem is tackled. On the same note, Kowalczyk (2003) propounded that a descriptive survey is a study design to depict participants in accurate way.

### **3.3 Population, Sample and Sampling**

#### **3.3.1 Population**

Pilot and Hungler (1999 p. 37) refer to population as, “an aggregate or totality of all the objects or members that conform to a set of specifications”. Neuman (2000) defines population as a large group of people from which a select smaller group is selected. Population is then viewed as number of inhabitants within a defined area but of the same species thus, in research, population means a group of people who are directly linked to the research topic under study. Gorard (2001) posits that population generally is a large group of people or individuals or objects that is the main focus of as scientific query. Charumbira (2009 p. 36) defines a population as, “the set of people or entities to which findings are generalised”. In other words a population is simply a group of people of interest to the researcher. The population for this research consists of ICT teachers and parents of ECE learners, in Bulawayo Metropolitan Province.

#### **3.3.2 Sampling**

Stake (2007) defines a sample as simply a subset of the population. LoBiondo-Wood and Haber (1998) and Pilot and Haber (1999) view sampling as a process of selecting a portion of the population to represent the entire population. A sample according to Johnson and Christensen (2004) is a set of elements taken from larger population. Thus, it is that part of population that would actually be observed by the researcher in the study. Thus, this study used ECE teachers and ECE parents because they are directly linked to the ECE learners and they mingle daily. Convenience sampling, a technique sometimes called accidental was not adopted because of shallow

information/data and lacks intellectual credibility. Higginbottom (2004 p. 15) define the convenience sample as, “consisting of respondents who are readily available and easy to contact”. However, purposive sampling was adopted to select both school ECE parents and teachers. Purposive sampling enables the researcher to access relevant people with an in-depth knowledge on particular issues by virtue of their profession, (Cohen and Mannion, 2000). The researcher feel that the participants in the purposive sampling will be chosen because they are believed to facilitate relevant information needed in relation to the problem under investigation.

### **3.4 Research Instruments**

The researcher will use interviews and questionnaires to collect data from respondents. Questionnaires will be used because they collect data from a wide range of respondents while giving respondents privacy and time to think and provide answers. Thus, achieving high objectivity and is going to be used teachers who are literate (Sanzoni, 2011). While focus group interviews will be conducted with ECE parents.

#### **3.4.1 Closed and Open Ended Questionnaires**

Questionnaires will be used by the researcher to gather information under study. Chiromo (2006 p. 24) views a questionnaire as, “that form of enquiry, which contains a systematically compiled and organised series of questions that are sent to the population samples.” A combination of both closed ended or structured questionnaires will be used and also open ended or unstructured questionnaires will be used. According to Charumbira (2009) open ended questions generate details and allow the respondents to suggest a wide range of possibilities unknown to the researcher. This will allow the researcher to obtain information that might be missed if she uses closed ended questions. Open ended questions permit the researcher to get information that reflects the perception and attitudes of teachers in the use of ICT in their daily teachings. With open-ended questions, the respondents will freely state their opinions and have a feeling that their input valuable to the study. Open-ended questions offer freedom and spontaneity in answering, there is opportunity to probe (Ahmad, 2012). Open ended questions however, demand more effort

from the respondents and so very few open ended questions will be asked to mitigate the disadvantages. All administrators and teachers will be subjected to this type of questions, it will be ideal because they do not require extended writing and thus easy to process. They however, make the respondents lose spontaneity. The further probing in the open-ended questions reduces or assuages the demerits thereof.

On the other hand, closed-ended questions reduce irrelevant answers by the respondent to obtain standardised answers. According to Charumbira (2009) they provide the respondents with limited set of response choices. However, if questionnaires are poorly constructed, they may result in unfavourable and slow responses which may not give the desired responses. There is no way to tell how honest a respondent is being. People may read differently into asked questions. In order to counter some of the weaknesses, it is imperative to avoid asking double barrelled questions.

### **3.4.2 Interviews**

Interviews were used as another tool for collecting information in this study. Borgan and Biklen (2007) view interview as a purposeful conversation between two people. In other words, an interview is a determined conversation whereby an interviewer asks questions and the interviewee responds. According to Fraenkel and Wallen (2003) the purpose of an interview is to find out what is in the mind of the respondents. In this study, the researcher conducted interviews with focus group of ECE parents. The researcher asked a series of questions and probed further for more information. The structured interviews gave the researcher an opportunity to clarify questions that the participants were not familiar with.

However, interviews may have some shortcomings in the sense that interviewee may provide responses that he or she thinks are wanted by the interviewer. In some cases the interviewee may not be willing to provide information which they considered to be sensitive and not for the outsiders to hear as a result they may decline to answer some questions. In some instances the interviewees may choose to provide counterfeit information which obviously compromises the validity of the findings. In this study, the

ECE parents gave information willingly and actively responded to questions asked. However, they have their weaknesses as they are time consuming in terms of setting up, interviewing and reporting. On top that, the participants, may provide responses they presume are desired by the interviewer. On the other hand they may withhold important information which they consider to be sensitive. As a result this, compromises the validity of the outcome of the research.

### **3.5 Data Collection Procedures**

The researcher sought permission from the Riverside Administration since the research was done within Riverside Stimulation Centre setting. Seeking consent from the participants was of paramount importance, meaning that the researcher sought informed consent from the respondents before carrying out the study. She fully explained the purpose of the study as purely academic and assured the respondents that the information gathered would be solely for academic purposes only and would be accorded the confidentiality it deserves. Distribution of questionnaires preceded the conducting of interviews. Questionnaires were collected by administrators on behalf of the researcher as this was convenient and insured all distributed questionnaires would come back as within a relatively short period. ECE parents as they come to drop and pick their ECE children at the centre, were asked to give fifteen minutes of their time, to answer questions over a glass of cordial drink/ water and some biscuits so as to relax.

### **3.6 Data Presentation and Analysis Methods**

Sage (2007) emphasises the three Ps; person, process and presentation as key issues. That is, the researcher's views and choices in research journey, design and methods to be used, quality of data gathered and display of findings and your theoretical interpretation of your analysed data (Gibich, 2007). Thus, information will be presented in graphs, tables and percentages. Descriptions will be employed using information and extracts from the questionnaires and the observation schedule.

### **3.7 Validity and Reliability**

Threats to validity and reliability can never be completely erased, rather the effects of these threats can be attained by attention to validity and reliability through a piece of research (Cohen, Manion & Morrison, 2006). Cohen et al (2006) further content that reliability is a necessary but insufficient condition for validity in research. It is a necessary pre-condition for validity and validity may be a sufficient but not necessary condition of reliability. In qualitative research, validity is measured in terms of truthfulness of findings, comparability of results and to some extent translatability. Truth, value or credibility refers to the accurate presentation of information from the researcher's perspective and sustaining evidence (Thomas, 2009). The author will achieve validity in this study by presenting the questionnaires and observations to the supervisor for comment (Vuta, 2011 p. 54), developing draft of research instruments and to ask post graduate students to review (Kitu, 2011 p. 37), prior to the fieldwork. Data collection instruments will be reviewed, discussed and refined by the researcher's supervisor (Leno, 2010 p. 44). Thus, validity is an important component of a research study.

#### **3.7.1 Reliability**

Reliability is measured in terms of dependability, conformity and observer agreement. Thus, dependability referring to adequacy of describing the changes in context during the study including the appropriateness of the method used to arrive at results (Samkange, 1980). The researcher will achieve reliability in this study by using the parallel form, reliability where different versions of assessment tools will be administered to probe the same construct, skill and knowledge base to the same group of individuals. The scores from the two versions will correlate in order to evaluate consistency of results across alternate versions (Phelan & Wren, 2005-2006).

### **3.8 Ethical Considerations**

Ethics are the norms or stands for conduct that distinguish between right and wrong. They help determine the differences between acceptable and unacceptable behaviours on the part of the researcher and the integrity.

Reliability and validity of the researcher's findings rely heavily on adherence to ethical principles (Miller & Bell, 2002). The handling of ethical issues such as human rights especially with regards to ECE learners, learners with special educational needs, animal welfare, compliance with the law, conflict of interest, health and safety standards, greatly impact the integrity of the research project and can affect whether or not the project receives funding. However, Clarke (2006) observes that in some cases, ethical issues are at variance with values of subjects, communities, societies and create dilemmas and tension. These have to be dealt with in all cases. The participants were assured of benefiting immensely in the study in the sense that the research was an eye opener to both interested ECE stakeholders. Thus, the researcher will have to achieve ethical considerations by asking respondents to sign consent forms to participate in the research study. Assurances were given to the respondents on the confidentiality, and dignity with which information they provided will be handled. The researcher respected the participants' views and upheld their anonymity. They were allowed to withdraw from participating even if the research was not yet complete. The respondents have a right to withdraw from participating (Cohen et al, 2011).

### **3.9 Summary**

This chapter dealt with the research philosophy and methodology; research designs, population and sampling, research instruments and data collection procedures, presentation and analysis, validity and reliability as well as ethical considerations. The researcher also gave reasons for using sampling techniques. The plans for data collection were laid down and measures taken by the researcher in order to guarantee validity and reliability of the study. The next chapter will deal with data presentation analysis and discussions.

## CHAPTER FOUR

### FINDINGS, ANALYSIS AND DISCUSSIONS

#### 4.0 Introduction

This chapter focussed on presentation, analysis and discussion of data gathered from the research field. The main focus of the research study was to investigate on the impact of ICT based technologies in the teaching and learning at ECE level classes. The chapter unfolds in different sections. A detailed discussion covering all the data gathered in this research, which include Section 4.1 that dealt with findings from the policy structures that are put in place to develop ICT competence of ECE teachers. Section 4.2 that dealt with roles of parents in the implementation of ICT at ECE level curriculum classes. Section 4.3 dealt with areas of concern regarding children's safety and health in the digital world.

#### 4.1 Findings from Research question one, which says “What policy structures are there to develop ICT competence of ECE teachers?”

The data for teachers was derived from the teachers' questionnaires. The return rate was 100%. The information for the parents was resulted from focus group interview guide. A group of five parents were interviewed as a group, first group preferred to use Indigenous language (IsiNdebele) while another group of five parents preferred to use English language as a medium of communication. Both groups were recorded on the smart phone. ECE teachers' questionnaires were distributed to both ECD-A, ECD-B, Grade 1 and Grade 2 classes.

##### 4.1.1 Findings from the questionnaire

**Graph 4.1. Bio-data – Teachers’ qualifications, teaching experience and institution attended. (n=10)**

	HIGHEST QUALIFICATION								INSTITUTION				TEACHING EXPERIENCE (years)			
	CE/DE GENERAL	CE/DE ICT	CE/DE ECE	UNDERGARD GENERAL	UNDERGARD ICT	UNDERGARD ECE	MASTERS IN ICT	MASTERS IN ECE	SELF TAUGHT ICT	COLLEGE (ICT)	UNIVERSITY (ICT)	UNTRAINED IN (ICT)	LESS THAN 5	5 – 10	11 – 19	20+
n	4	1	2	0	1	1	0	1	0	4	2	4	0	2	2	6
%	40%	10%	20%	0%	10%	10%	0%	10%	0%	40%	20%	40%	0%	20%	20%	60%

In order to find out about policy structures that are put in place to develop ICT competence of ECE teachers, the researcher used a questionnaire. The researcher inquired from teachers whether they had undertaken any course in ICT and the highest professional qualification they hold. Moreover, the researcher asked the institutions where they attained their ICT skills and length of experience in years. Almost all (100%) teachers who participated in this research showed that they had been in service for more than five years which qualifies them to be called senior teachers. Only three (30%) had degree qualifications. Two (20%) of them had Bachelor of Education Degrees in Early Childhood Education (BECE) and the other one (10%) had Masters of Education. These few teachers revealed that they received ICT orientation from respective universities and colleges they had attended. Amongst the Diploma in Education holders, only one (10%) specialised in Information,

Communication and Technology from teachers' college. The other nine (90%) teachers received ICT exposure as a club at colleges and workshops taking place at cluster levels.

Exactly eight (80%) out of ten teachers had more than ten years of teaching experience and one teacher (10%) did Computer Science and holds a Certificate in Data Networks Administration. That teacher had less than ten years of teaching experience.

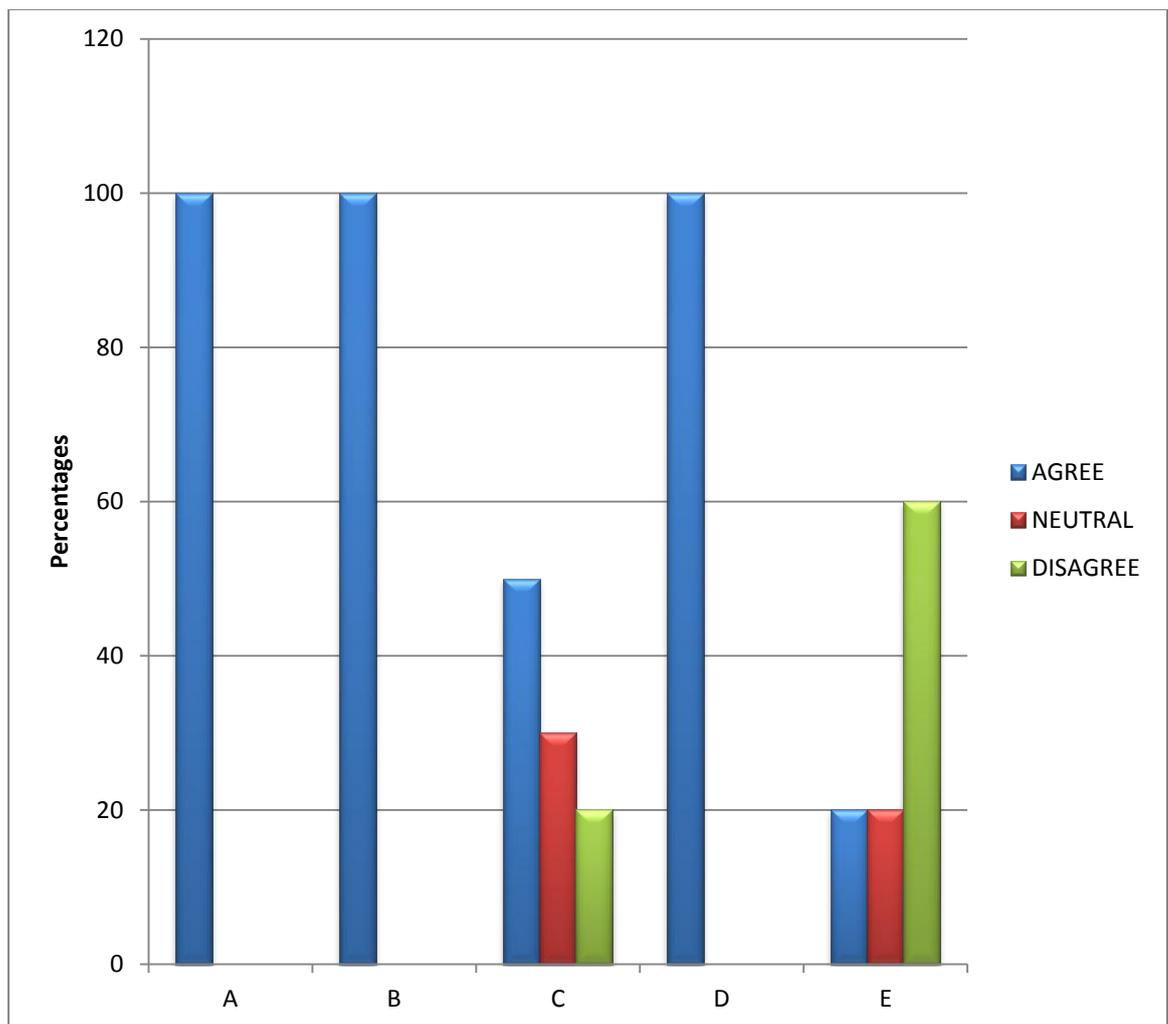
The findings obtained, especially on institutions where teachers attained their ICT skills revealed that most of them learnt ICT skills on their own. It was also clear that Diploma in Education stands out to be the dominating qualification for teachers in the schools studied. Only three (30%) teachers indicated that they had never been oriented in ICT. To summarise these findings on teachers' qualifications, teaching experience and where they acquired ICT skills, the researcher used the above Table 4.1.

The table 4.2 illustrates teachers' views on the National Policy Structures that are there to develop ICT competence of ECE teachers in Bulawayo Metropolitan Province. In these tables, strongly agree and agree are viewed as "agree" and strongly disagree and disagree are taken to be "disagree".

**Table 4.2 ICT Policy Structures** **n=10**

	<b>Aspect</b>	<b>Agree</b>		<b>Neutral</b>		<b>Disagree</b>	
A	Are you aware of any educational policies that are meant to develop ICT competency in ECE teachers?	10	100%	0	0	0	0
B	Do you believe it is vital for ECE teachers to have ICT competency?	10	100%	0	0	0	0
C	Has the Zimbabwean government done enough in availing policies that develop ICT competency in teachers?	5	50%	3	30%	2	20%
D	Do you think the private sector or interested stakeholders have a role to play in developing ICT competency in ECE teachers?	10	100%	0	0	0	0
E	Are there any sound or constructive school based ICT policies that are benefiting ECE teachers?	2	20%	2	20%	6	60%

**Graph 4.3 ICT Policy Structures**



**KEY to the Graph**

- A** Educational ICT Policies
- B** ECE Teacher Competency
- C** Government Involvement
- D** Private Sector Involvement
- E** School Based Policies

In the table and graph 4.2, 100% teachers agree that the private sector like Non- Governmental Organisation like UNESCO and UNICEF have a role to play in developing ICT competency of ECE teachers. 60% of teachers concur that they do not have school based ICT policies in their schools of which it has negative impact on the development of ICT to ECE learners

found in those institutions. Although 50% agree that the Zimbabwean government has done enough in availing ICT policies, 30% are not sure of it, they are uncertain about any availing of ICT policies in the country. 20% disagrees as they mentioned that though policies might have been availed but the implementation of it in schools is taking slow motion as administrators are prioritising other projects like inclusivity, Visual and Performing Arts among others at the expense of ICT. All participants 100% agreed that it is necessary for ECE teachers to have ICT competency so as to teach learners proper curriculum. On top of that 100% agreed that they are aware of ICT policies that are designed to equip ECE teachers, they mentioned that they once head the ICT policy launch by the Ministry of ICT and Cyber Crime, but they are not implemented properly due to various reasons like lack of expertise, lack of ICT laboratories or proper infrastructure or devices. Teachers also mentioned that ICT policy makers do not take into consideration teacher: learner ratio, or device: learner ratio as in most schools the population is high learners scramble for a desktop or some desktops are outdated and not functioning or have outdated software.

#### **4.1.2 Findings from interviews**

The responses were from the focus groups of ECE parents. These were subdivided into two groups, taking into consideration of the language use. Those who preferred English as a medium of communication were grouped alone (5 parents) and those that preferred Indigenous language (5 parents) were the second group to be interviewed. The parents were assured of confidentiality and the findings were recorded on the smart phone

Pertaining ICT policy making and implementation most parents are aware of global, national and schools ICT policies. They even stated that, *“Even the then President of the Zimbabwe Comrade Robert Gabriel Mugabe once launched the ICT policy, and helped the implementation of ICT teaching and learning by donating computer devices to high schools around the country.”* Though these devices (desktops) were donated to the Secondary schools, they had the hope that the programme will zero down to the Primary schools, particularly Early Childhood Education classes. Participant 7 said he was not

aware of educational policies encompasses ICT. She said, *“I have no idea of any policies, though I hear from media like radio and television, thought that it ends there.”* This implies that a lot needs to be done to educate the citizens of Zimbabwe about anything that concerns education of our children.

Concerning ECE learning areas like Family and Heritage studies, Participant 1 said, *“ FAREM is a bit interesting as it is a new learning area and its integration into ICT is fairly new, it helps to a certain extent as some heritage data has not been full captured, for example no folktales on Google.”* Participant 2 further asserted that, *“In Mathematics and Science, ICT does cater at greater extent in this learning area, there is lot of content, ICT by its nature is scientific.”* One participant said, *“English Language, Indigenous Languages, Visual and Performing Arts, Mass Displays and Physical Education, Family and Heritage Studies, parents stated that ICT helps integrate these subjects in a holistic manner.”* They of the idea that, *“Although not much has been done on Indigenous languages as most staff found on ICT is western and nor little information about cultural folktales are found in the computers.”*

*“ICT laboratories and ICT rooms are inadequate”* according to Participant 5. They said there are no proper rooms for their children to conduct ICT lessons. Participant 6 alluded this by saying, *“Even if one room has been set aside, no air conditioning, not carpeted, no child sized computers found there as stated by ICT national standards.”* Unlike, those ICT rooms found the schools are catering for every child found at the school hence young learners are deprived.

Learners with Special Educational Needs were found in the school under study. Parents with such children were asked whether their children were offered inclusive education. All participants involved were of the idea that, *“The government and the school were doing well in this area.”* Most learners with educational challenges were catered for. Parents with children with hearing impairment (H.I) stated that their children were not offered hearing devices. Participant 3 said that, *“They are expensive to purchase them, hence we think if the private sector together with the government would work*

*together to help our children.*” This means that if all interested stakeholders would come together and work towards the Zimbabwean child, parents’ burden would be lifted

The researcher asked the parents about appropriateness of ECE infrastructure. Parents resoundingly agreed that, *“ECE settings where our children are, have child sized furniture, that is, chairs and tables as well as the indoor and outdoor play areas were adequate.”* When asked about the WASH program -Water and Sanitation Health program, Participant 7 was happy to state that, *“All is catered for as the child sized toilets and water basins are found in the ECE centre as well as running water taps, and the school has a borehole and tanks used for water harvesting and storage.”* Though one participant felt that, *“We want the boys’ toilet to be separated from girls toilet.”* The researcher took note of that as this will avoid learners being abused in these ablution buildings.

The question concerning ECE curriculum encompassing ICT as a learning area and its integration in all learning areas was an eye opener as some parents were not aware of. Some stated that they cannot meet demands of ECE new curriculum demands. Participant 9 said, *“Since the new curriculum has been introduced in year 2017 we were thinking learners will be offered a full package, but it seems in some areas like ICT its not well balanced, we expect to receive homework online that”.* In support of that Participant 10, stated that, *“ The new curriculum according to my observation is too demanding on the parental side as we are expected to buy ICT devices for our children, of which we cannot afford the prices of laptops, in cases where I have my own personal device, we compete with my children to use it.”* Their worry was also particularly on the number of learning areas as well as the time slotted on each learning area hence learners were no longer given enough time for free play. One parent mentioned, *“Educational policies like Education Act, Education for All (EFA), African Charter on the Rights and Welfare of the Child, as well Convention on The Rights of the Child as stipulated to govern the ECE curriculum.”* This showed that some parents are aware of their children’s rights and responsibilities as well as policies that govern educational sector

When participants were asked to comment on anything pertaining topic under discussion, Participant 1, freely stated that, *“The curriculum itself does not allocate sufficient time to ICT as a learning area, in timetables one hour is blanketing ICT per week per class, it is not enough compared to other learning areas”*. This implies that, the curriculum planners and developers did not give justice to ICT as a learning area, the implementers are not to be blamed. Participant 2 also stated that, *“ICT teachers suffer, in the sense that they become resource persons for the whole school, which creates a bigger load on ICT teachers as professionals”* Instead of focussing on teaching they become part of administration and typing pool processes. The same participant said, *“ICT teachers become resource teacher for other teachers found in that institution. The ICT teachers become jack of all trades and that impact negatively on ICT teaching and learning, hence ECE learners do not fully gain ICT skills”* this might imply that even the learning time on timetable is limited, that little opportunity is hindered as their ICT teachers are not always available as they will be doing administrative work.

#### **4.1.3 Discussion of research question one which says “What policy structures are there to develop ICT competence of ECE teachers?”**

The majority of the teachers who took part in the study were of the view that the Zimbabwe Education Policies particularly in ICT category, have been crafted and designed well but the implementation is lacking due to ICT competencies in teachers and the lack of resource materials The findings showed that teachers’ competencies were of utmost importance for the holistical development of ECE learners and effective implementation. Potter and Darbyshire (2005) and UNESCO (2004) are of the view that ICT competencies are concerned with the ability to;

- Know when to apply or develop a particular skill in using an ICT resource
- Be aware of the reasons for using ICT and its effect on both users and context, and
- Have a critical and confident attitude to learning with the technology

To collaborate that, Mishra and Koehler (2006) assert that technological, pedagogical and content knowledge are essential for teachers for successful

integration of ICT into education. Teachers' competency is classified under four categories. These are; Technological Competency (TC), Pedagogical Competency (PC), Didactical Competency (DC), and Social Competency (SC) (Mishra & Koehler, 2006).

- ✓ **Technological ICT Competencies** – these competencies are related with teachers' knowledge and technical training that how to use and maintain ICT equipments and software. The competencies involve the skills to operate modern technologies such- computer, internet etc. participant 1 said, "*We lack skills on managing, operating and using ICT software*". This implies that ECE teachers are not skilled in programming and publishing hence the learners' education is at stake.
- ✓ **Pedagogical ICT Competencies** – these are related with teachers' instructional practices and knowledge of the curriculum and requires that they develop applications within their disciplines that make effective use of the ICT to support and extend teaching and learning. This is a generic form of knowledge that is involved in all issues of student learning, classroom management, lesson-plan development and implementation and student evaluation. It includes knowledge about technique or methods to be used in the classroom, the nature of the target audience, and strategies for evaluating student understanding. Participant 2, stated that, "*ECE curriculum is pregnant with events hence time to single out ICT as a learning area is hard rather integrate ICT in all learning areas*". This shows that the participants are aware of the demands of the Zimbabwean Education's revised/new curriculum on the teacher and learner.
- ✓ **Didactical ICT competencies** – these competencies are related with subject knowledge of the teacher that is to be learned or taught. Teachers must know and understand the subjects that they teach, including knowledge of certain facts, concepts, theories and procedures within a given field, knowledge and explanatory frameworks that organise and connect ideas and knowledge of the rules of evidence and proof. Teachers must also understand the nature of knowledge and inquiry in different fields. Participant 3 alluded that, "*We lack ICT knowledge hence, no justice is done to the ICT as a subject/ learning area as well as ECE learners*".

- ✓ **Social ICT Competencies** - social competencies are related to the understanding of teachers with social and ethical issues surrounding ICT and apply that understanding in their practice ( Mishra & Koehler, 2006).

In relation to that, participant one said, “ *Teachers need to know about what ICT can provide*”. In support of these sentiments, participant 2 said, “*Teachers need competencies for successful instructional use of ICT. Apart from the strategy of ICT in the Zimbabwean ECE curriculum last year, 2017, some confusion is found about ICT competencies to be acquired by teachers. It is very sad to say that India Teacher Education Programs does not include ICT competencies to prepare the future teachers ( UNESCO, 2004) .*

It has been revealed in present study that among the technological ICT competencies that teachers need to develop, the highest scoring item is the development of the competency to use ICT skills in developing and presenting information. Freedman (1999) presents technological key ICT skills in four main areas of knowledge namely; hardware, software, curriculum and general knowledge. These key ICT skills are not limited to knowledge of technical skills such as key boarding and technical use of some software packages. They include the ability to recognise when and how to apply ICT to the solution of the problem.

Another finding of this study is that teachers need to develop three main pedagogical ICT competencies in priority basis and these competencies are ; prepare ICT-based learning environment, designing effective learning experiences and creating rich learning environments with the support or integration of ICT, and understanding of computer technology can enhance student learning. This type ICT-based education offers opportunities for spiritual, moral, social and cultural development of pupils (DfEE &QCA, 1999).

It is interesting to note that all respondents agree that teachers need to develop competencies in using ICT as a didactical tool in the class as well as implement cooperative learning strategies using ICT. Participant 4 supported this by saying, “*Using ICT as a didactical tool implies using it to establish dynamic and powerful instructional strategies and environment.*”

An interesting finding of this study is that teachers need to develop two main social ICT competencies in priority basis and these competencies are: demonstrating knowledge and skills for using technology in ethical, legal and safe ways, and able to use humour and good manners during the teaching process. This is evident in the sentiments that were aired by participant 5 who said, *“Measures should be taken to make sure learners are safe from immoral information.”* Others social ICT competencies are comes after the above two competencies.

Amvaminds and Norwish (2002), postulates that teachers cannot promote ICT education while they lack experience or encouragement. This is supported by Ainscow and Farrell (2003) who pointed out that the majority of the teachers feel they have got difficulties to work without ICT resources for learners and themselves. This is in agreement with one participant who said, *“ If workshops are conducted and resources are provide especially to the kindergarten group of learners, it would not be a task to implement ICT education.”* Banks (2000), noted that teachers should acquire skills needed to translate knowledge into effective enriched curriculum. This means that ECE teachers should be trained in ICT so as to allow proper equitable, holistical education opportunities to all the learners.

## **4.2 Findings from the research question two, which says, “What role do parents have in the implementation of ICT at ECE level curriculum?”**

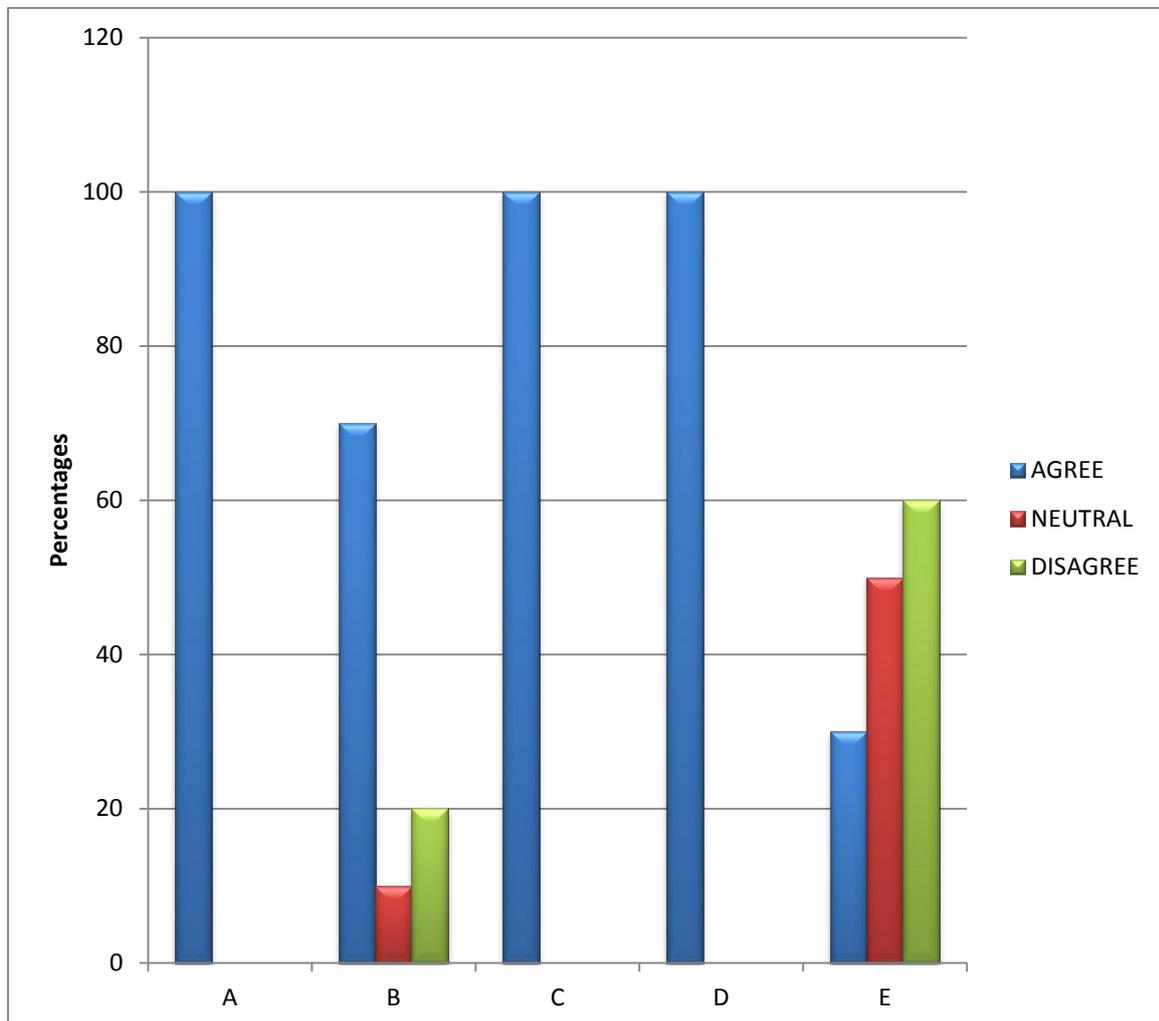
Parental involvement is of paramount importance in the ECE curriculum. Parents play a pivotal role in different sectors of the ECE centre, they can be in SDC, Procurement team as well as Disciplinary committee. Therefore their inclusion will impact positively on the child holistic development

### **4.2.1 Findings from the questionnaire**

**Table 4.4 Parental Involvement in the ICT –ECE Curriculum****N=10**

	Aspect	Agree		Neutral		Disagree	
A	Are parents in your school instrumental in support of ICT based school events such as consultation days at ECE level?	10	100%	0	0	0	0
B	Do parents at ECE level afford learning ICT devices for their children?	7	70%	1	10%	2	20%
C	Does ICT literacy of parents affect their support of ICT education at ECE level?	10	100%	0	0	0	0
D	Are parents willing to take part in fundraising activities that develop ICT teaching and learning?	10	100%	0	0	0	0
E	Do parents have adequate knowledge on the demands of the new curriculum at ECE level?	3	30%	5	50%	2	20%

**Graph 4.5 Parental Involvement**



**KEY to the Graph**

- A** Parental Support on School based Events
- B** Affordability of ICT Devices
- C** Effects of Parental ICT Literacy
- D** Fundraising Activities
- E** Knowledge on ECE Curriculum

All participants (100%) who were asked whether ECE parents were influential in the school based activities responded positively because they mentioned that ECE parents are active in all the school programmes that involve their

children. Since parents are the main stakeholders of the ECE curriculum, their involvement is of paramount importance. Without them there is no ECE to talk about since they are ones who give birth and bring those learners in the ECE setting. One participant mentioned that parents have to be involved so as to avoid the home-school gap. 70% of teachers agreed that parents afford ICT devices, while only one teacher (10%) was not certain about it since some parents cannot afford fees that means gadgets can be regarded as luxury. 20% disagreed, that means they were of the notion that ECE parents cannot afford ICT devices, they are expensive to buy, maintain and installing educational software. One participant mentioned that parents are forthcoming but do not have enough funding. All participants (100%) agreed that ICT literacy of parents affect their support of ICT education. This means that those ignorant of globalisation changes will lag behind in development while those abreast of globalisation demands of ICT will always support their learners.

#### **4.2.2 Findings from interviews**

Parental involvement in ICT/ECE programs as SDC- School Development Committee members, being in the SDF- School Development Fund, Procurement Boards, being Board members or through provision of toys or toy making and sourcing and managing outdoor play materials. Parents felt that they are not fairly represented in these organisations. One participant mentioned that, *“Meetings are done during late hours to accommodate those who work late hours, but we dismiss late from those meetings, as a result we do not attend those selection meetings hence the members selected do not fairly represent us as ECE parents in decision making boards”*. This means that those who sit in the chair meetings have to pull up their socks and give fair, equitable opportunities for all departments, ECE (Infant) and junior schools. Participant 2 co-operated these sentiments by saying, *“Some SDC members do not even have children learning in the institution they are involved in”*. This implies that there is no fair selection and representation of current ECE parents.

On the issue of administration’s ICT budgeting, financial, human and material resource base, parents stated that the administration tend to side line ICT as

a learning area and ECE classes. Participant 3 said, *“Though we pay computer levy, nothing new has been done as most computers found in the laboratory are outdated and have been donated by well wishers or friends of the school”*. They felt short changed financially as they hear from the learners (their children) that they only participate in ICT lessons twice a week according to their timetable. Participant 5 stated that, *“They are different aspects on administrators, they sort of look down on ECE especially when it comes to ICT, they think they are young and they cannot cater for that level, rather cater for senior group of children and they at least gather concepts faster and in a mature manner*. This might imply that the administration has little knowledge on the demands of the ECE curriculum or on the importance of catching them young.

School fees were debatable among ECE parents. All most all participants stated that they struggle to make ends meet. Participant 6 said, *“Payment of school fees is a challenge due to prevailing economic situation of our country”*. In support of that, Participant 7 said, *“The government is doing justice to cater for underprivileged parents by introducing BEAM program as well as interested stakeholders like private sector like Econet Wireless through Capernaum Trust, we have immensely benefited from these programs.”* Though they were of the idea that, *“The selection committee or criterion should be transparent as deserving learners like vulnerable groups, like learners with disabilities and orphans should be given first preference”*. These programs alleviate struggling parents and they praised the school for availing such existing opportunities for their children.

#### **4.2.3 Discussion of research question two, which says, “What role do parents have in the implementation of ICT at ECE level curriculum?”**

Most children have two main educators in their lives, their parents and their teachers. Parents are the prime educators until the child attends an early years setting or starts school and they remain a major influence on children’s learning throughout school and beyond.

Parental involvement is of paramount importance in children’s learning. Participant 1 indicated that, *“Without us there nothing to talk about at ECE*

*settings*". This is in line with different instruments that guide ECE learning. Universal Declaration of Human Rights (1946), article 26, says, everyone has a right to education. And it conveys that elementary education shall be compulsory. MDG- Millennium Development Goals looked at provisions of education and care among all age groups including zero to eight years. Minister of Women Affairs was quoted in MCDWA (1986 p. 12) saying, "in conformity with the UN recommendations, my ministry has resolved that the zero year olds programmes shall hence forth be called Early Childhood Education and Care (ECEC)."

International Policy Instruments like Jomtien Conference on Education for All in Thailand (5-9 March 1990), delegates from 155 countries including Zimbabwe agreed to make primary education accessible to all children including the zero to six years. Dakar Conference of 2000, says that all signatories to this conference must take education accessible for all the zero to six year olds. Parents were alleviated by the Nziramasanga Commission (1999), which found that the private pre-schools were expensive and it was recommended that ECD-A and ECD-B should be integrated in formal schools. This was mentioned by one participant who mentioned that, "*It was overdue for the Zimbabwean government to consider attaching ECE classes to formal schools because we were milked by the private sectors which are charging exorbitant amounts for the education of our children*".

The 2015-2022 Education Sector Strategic Plan (ESSP) focuses on implementation of the new curriculum, ICT being included. Parents took part in curriculum designing and are still taking part in the implementation and will do the assessment and evaluation of the programme as well. This is mentioned by participant 3, who stated that, "*We are not aware of the new curriculum demands, but we are willing to help where we can*".

Positive impacts of parental involvement on student academic outcomes have not only been recognised by school administration and teachers, but also by policy makers who have interwoven different aspects of parental involvement in new educational initiatives and reforms (Graves & Wright, 2011). This is supported by participant 5 who said, "*ECE parents and guardians should work*

*like hand and glove with ECE teachers to lay good foundation for their children”.*

Parental involvement is defined by Grolnick and Slowiaczek (1994 p 238) as “the dedication of resources by the parent to the child within a given domain” and Larocque, Kleiman and Darling (2011 p 116) who state that, “family involvement can be generally defined as the parents’ or caregivers investment in the education of their children”, to more specific ones that perceive parental involvement as, “parents’ behaviours in home and school settings meant to support their children’s educational progress” (El Nokali, Bachman, &Voltruba-Drzal, 2010 p 289). This implies that parents get involved in their children’s academic work by helping homework and providing stationary, toys as well as payment of school fees. Participant 6, commented by saying they, “*We can afford learning ICT devices for our children*”. This is in line with one participant who aired his view that, “*As parents we want to know everything that revolves around our children at school even at home*”.

There were several findings regarding the relationship between parental involvement and student (ECE) academic achievement that were supported by the majority of meta-analysis. Parental expectations reflect parents’ beliefs and attitudes toward school, teachers, subjects and education in general. As children are likely to harbour similar attitudes and beliefs as their parents, having high parental expectations appears vital for academic achievement of children. This is supported by participant 1 who said, “*Most parents are aware of the importance of ICT in life and so they are willing to assist and participate in the learning of their children*”.

The findings regarding the impact of parental involvement when it was defined as homework assistance, or at least homework checking, were surprising, especially taking into account that one of the most commonly practised forms of at-home involvement is homework assistance (Pezdek, Berry and Renno, 2002). The synthesized findings implied that there was no positive relationship between ICT homework assistance and student academic achievement. In some instances, homework assistance was even negatively correlated with learner achievement (Hill & Tyson, 2009; Jeynes, 2005). One of the most

plausible explanations of these results is that most parents are not trained to teach certain concepts, regardless of their difficulty, or they may not be familiar with appropriate teaching methods. In either case, ECE learners are not likely to benefit much from this type of involvement. The level of homework involvement may also be greatly influenced by children’s need and request to receive assistance from their parents. It has been noted that even higher involved parents are less likely to become involved in their children’s homework assignments unless they are approached by their child or the child appears to need their help (Zellman &Waterman, 1998). These sentiments were collaborated by one participant who said, “ *Our ICT literacy affect the support of ICT education of our children at ECE level, in the sense that more literate I am, the more I assist, then vice-versa*”.

#### 4.3 Findings from research question three, which says, “What are the areas of concern regarding children’s safety and health in the digital world?”

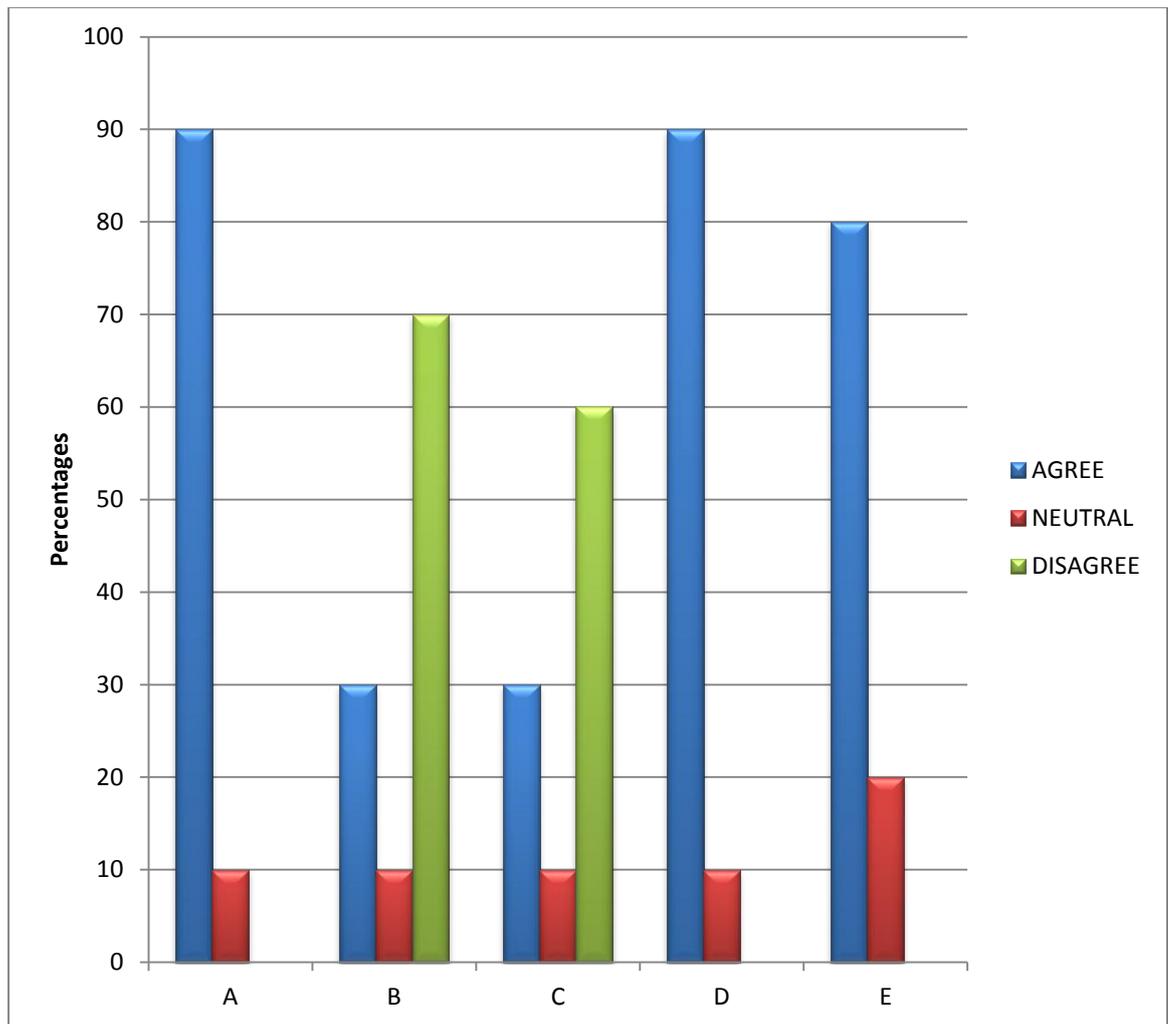
The use of ICT is an imperative change that brought both opportunities and challenges to the teacher and the young learners. It would be naive to assume at this level that the incorporation of ICT brings in only favourable influence to the teaching and learning process but risks is inevitable.

##### 4.3.1 Findings from the questionnaire

**Table 4.6 Children’s Safety and Health in the Digital World.**

	<b>Aspect</b>	<b>Agree</b>		<b>Neutral</b>		<b>Disagree</b>	
A	Are there proper ICT mechanisms put in place to promote a safe and healthy environment at ECE level?	9	90%	1	10%	0	0
B	Do you believe that ICT presents risks to learners at ECE level?	3	30%	1	10%	7	70%
C	Do children who come from disadvantaged background have a challenge in grasping ICT concepts as compared to their counterparts?	3	30%	1	10%	6	60%
D	Do you think teachers have a capacity to protect ECE learners from risks that are caused by the use of internet?	9	90%	1	10%	0	0
E	Are ICT policies in Zimbabwe adequately enough to protect children’s health and safety?	8	80%	2	20%	0	0

**Graph 4.7 Children’s Safety and Health**



**KEY to the Graph**

- A** Proper ICT Mechanisms
- B** Risks Factors of ICT on ECE Learners
- C** Influence of Learners’ Background on ICT learning
- D** ECE Teacher Capacity on Child Protection
- E** Zimbabwe’s National Policy on Child Protection

After eliciting data on the areas of concern regarding safety and health of learners in the digital world, most participants (80%) alluded that the ICT policies raises awareness of precautions to be taken when using internet as a

teaching and learning method. Teachers indicated the passwords as well as child lock on some devices are employed to avoid learners to have access to unnecessary information. Although some participants (20%) were of the idea that besides the Zimbabwean ICT policy being implemented, children will always be children, meaning that, they can access some data that is not meant for their consumption.

On the notion of capacity in child protection, teachers showed that they have a capacity to protect young learners from cyber attack or internet as they are the ones who daily plan the ICT activities that take part at the ECE setting. The participants agreed (90%) that the teachers play the loco-parentis role to the learners, hence, their health and safety is not at stake. They mentioned that the ECE learners have minimal risk of internet use since they operate ICT gadgets/ devices under adult supervision. On the contrary, one participant (10%) said ECE learners are only at school for less than five hours for the day care centres that offer half-day activities, therefore, what happens outside the ECE premises they would not know.

According to participants (60%), children who come from disadvantaged background/families are not affected in the use of ICT. Since young learners are inquisitive they will grasp concepts taught like their peers, even constant exposure /use of ICT devices will allow them to grasp well. On the other hand, 30% participants agreed that poor background can affect learning, since their self esteem will be low and they will be shy to manipulate and afraid to touch keypads of a laptop or the clicking the mouse. Some peers and teachers also are to blame as they stigmatise such learners. As well as the children coming from a well up background, these learners will be gifted and would not be afraid to manipulate, create and publish anything on the computer, even simple things like booting the desktop and clicking the mouse and keyboard pads. Their finger dexterity would be fully developed and hand - eye coordination would be excellent since they are familiar with ICT devices from home.

When asked whether ICT presents risks to learners at ECE level, participants 70% disagreed, 10% were not sure, and 20% said yes. For those who

disagreed, they all mentioned that young learners are always under adult supervision when operating the ICT devices, hence less risks, except if that trusted adult exposes those young minds to elicit data and dangerous games. Participants said ICT presents risks, in the sense that;

- i) physically,
  - Dangerous radiation emitted by computing devices damage delicate children skin.
  - Bad sitting posture.
  - Eye problems.
- ii) psychological
  - Addiction to the use of the devices.
  - Addiction to games.
  - Exposure to explicit information found on internet.
  - Limited physical activity whilst using the computing devices impacts negatively on the physical development of children. Children use the mind instead of their bodies at the end of the day.
- iii) Social
  - Children lack social skills as they spend most of their time glued to the devices.
  - Language will not develop fully as they are always quite looking at the screen, or bad strong language is learnt.
  - Cultures and norms are not learnt on the devices, culture is learnt through interaction with immediate environment.
  - Hunhuism/ ubuntu and patriotism is negatively affected as learners are exposed to foreign and western cultures that contradict with our traditional norms.
  - Participants suggested that measures should be taken to make sure young learners are safe from information with immoral practices.

On the question of whether proper mechanisms are put in place to promote a safe and healthy environment at ECE level, 90 % participants agreed as they said most ICT laboratories have rules and regulations. Learners are taught not to bring liquids like water and juice in the computer room, as well not to actually eat in the laboratory. Learners are told safety precautions when

handling devices like using computers with dry hands, even to check on sockets that have electrical faults not to be used as they will destroy their computers. Learners are told proper language use when operating ICT devices, therefore mechanisms are there. While the other participants 10%, were of the idea that teachers are not strict on mechanisms as they allow learners to make noise and disturb others during ICT lessons even bringing their personal devices in the premises.

#### **4.3.2 Findings from interviews**

Regarding areas of concern regarding the internet on ECE level children; Parent 1 said that, *“The fact that internet has no harm on ECE learners as young learners usually access internet under adult supervision, hence they worry less”*. This implies that Wi-Fi and internet connections can only be monitored by adults. Participants talked of passwords and child lock on their devices so as learners would not access irrelevant information. One participant though said; *“These young learners have sharp minds that they can unlock these devices or can find other means of accessing data without parents’ knowledge”*. This implies that we can not underestimate the capability of young learners when they can do intellectual wonders.

When the participants were asked about the preparedness of ECE teachers to teach ICT at ECE as well as the risks that ICT can bring on ECE learners, they alluded that the teachers are fully prepared as they are trained to develop different skills (PIES- Physically, Socially, Emotionally, Intellectually), protect learners and act as loco-parentis to young learners. One participant was aware that, *“ECE curriculum has to do with holistically development of learners hence health and safety is included”*. Though one participant had to differ by saying, *“In the school where my children are enrolled, there is only one ICT teacher who takes the ECE learners on that learning area”*. This implies that all other ECE teachers have skills gap, and limited access to resources.

#### 4.3.3 Discussion of Research Question 3, which says, “What are the areas of concern regarding children’s Safety and Health in the digital world?”

ICT in schools has taken several forms during the years it has been used. Technology inventions did not appear out of blue into school; all technology is a continuum of the previous experiments and experiences of technology, stimulated by socio-economic and cultural factors (Basalla, 1987). The implementation of ICT was thought to bring about some changes in education and schools. Initiating and establishing a sustainable change in school, the use of ICT like any other change, is a difficult task, because, as Cuban et al, (2001) say, established practice are taken for granted and are seldom questioned by policy makers, practitioners, researchers, or tax payers. Although there were ideas, beliefs and expectations about the nature of this change, it was as if the change process itself was only minor concern. However, risks have been discovered on the ECE learner’s health and safety. As participant 1 alluded that, “*We can applause for the introduction of ICT in the reviewed curriculum, but its effects on the long run will be realised in our children*”. This implies that parents as major stakeholders are aware of the risks of ICT though it has been adopted by the international world; hence, they would want to keep abreast with globalisation issues.

Safety and Security with ICT means that different policy documents have been crafted; these are Health and Safety Policy, Child Protection Policy as well as Legal requirements of data protection (UNESCO, Policy Brief, 2012). As a result, practitioners to be aware of health and safety issues of ECE learners. Participant 2 collaborated with this statement by saying, “*At ECE level, the risks are minimal, since the young learners operate ICT devices under adult supervision*”. This means that teachers act as loco-parentis to learners therefore their safety is not at stake.

It would be a mistake to misinterpret the concept of ICTs in education as computers or merely learning about computers. On the contrary, we have to capitalise on the fact that ICTs comprise a rich set of digital tools, environments and procedures, which could be employed for complex support of all developmental domains of children. When planning the ICT equipment,

we should keep in mind such broad intention- and thoroughly consider so called developmental appropriateness of our choices (UNESCO, 2012).

To avoid risks like stereotyping at ECE, support methods should be adopted. Play (role-play) and imitation are central to the processes of learning in the early years. Artefacts such as toys and other manipulatables (functioning or pretend, including ICT tools) provide important symbols for the children to play with, a wide range of visual objects and environments. Participant 3 mentioned that, "*ECE learners use symbols or representatives to understand abstract information, hence use of ICT devices is encouraged in their daily activities at the ECE centre*". This means that ICT applications should be integrated as far as possible with other established ECE practices (play, project work) which make the ECE curriculum relevant to the children. Encourage working in collaboration in a range of different ways in interacting with technology (ICT Infant -ECD A-Grade 2 Syllabus, 2015-2022). This is supported by participant 4 who said, "*Joint attention and children learning to share and being engaged jointly provides a cognitively challenge for young children*". Through working together, it gives them sense of security and assurance as they scaffold each other; this is supported by Vygotsky, (1939) in Learning Through Play, (Stebbing, 1999).

There are risks associated with successful transformation of ICT because of different factors, which may slow down successful initiated process of integration of ICT into ECE or even completely stop it. These include;

- lack of professional development,
- lack of understanding and or confidence,
- lack of support,
- lack of educational resources,
- lack of continuation (Kalas, 2012).

These are supported by almost all participants who resoundingly said, "*Lack of skilled personnel, national and administrative support, unveiled human and financial as well as material support, hinder ICT implementation and progression*".

At the same time, most participants agreed that early childhood educators need to be aware of the debate about ICT use by young children, and the need to safeguard children's health and development, particularly regarding the use of desktop computers. One particular participant said, "*The risk of ICT on ECE learner is on the physical part,(eyes and sitting posture) as young learners are to develop gross motor skills but they end up developing fine and eye-hand motor skills first*". The above listed statements were agreed upon by the respondents as the roles of the teachers in reducing risks of ICT within the ECE context.

#### **4.4 Summary.**

This chapter presented data in terms of research questions and tables and graphs were used to summarise responses given by participants who were classified as ECE teachers and ECE parents. The chapter also analysed responses got through interviews. Generally, inferential information derived from gathered data showed that there were numerous ICT challenges affecting its integration in teaching and learning. It also revealed the impact of ICT based technologies in the teaching and learning at ECE level both negative and positive impacts. However the researcher was able to reveal a number of solutions that could be put in place to address multiple challenges being experienced in teaching and learning in ECE grade level.

## CHAPTER FIVE

### SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

#### 5.0 Introduction

This chapter dealt with the summary, conclusions and recommendations of the whole project. The summary brought together the interconnected ideas raised earlier on in previous chapters of this document. The conclusions were related to the findings of this research. Recommendations are suggestions of what could be done in the future to bring about improvement in the use of Information, Communication and Technology in teaching and learning in Early Childhood Education settings.

#### 5.1 Summary

We live in a technologically fast changing world. We are already witnessing some of the significant social, economic consequences of ICT and its impact on education. A new era of education has been started which necessarily demands a new role of teacher, learner, and education system. In the era of ICT, it will be very difficult for countries like India to cross the digital divide, if concerted efforts are not made to promote ICT education. One of the strategies to be adopted in this regard is the production of teachers who have developed competencies for the successful instruction use of ICT in education. Those teachers are called 21<sup>ST</sup> century teachers who will possess the technological, pedagogical, didactical and social competencies in them and they will shape the personality of the young ECE learners on constructivist level.

The main purpose of this research study was to investigate the impact of ICT based technologies in the teaching and learning of ECE level classes. The research was carried out in Imbizo District in Bulawayo Metropolitan Province. Basing on the research questions that this study sought to answer, it was necessary to focus much attention on ICT challenges and their possible solutions. A variety of ICT challenges found out in this research study included inter-alia;

- **Cost** - the ICT tools required are costly for both teachers and learners, thus limiting resources available
- **Special Needs Education (SNE)** - there is huge deficit of ICT hardware and software that is tailor-made for the learners with SNE.
- **Internet Access** – there is limited internet connections/ access available for both ECE facilitators and learners, this adversely affects the availability of current teaching and learning materials.
- **Top-down hierarchy**- in ordinary primary schools, ICT implementation has often been top-down process, in which schools or teachers cannot control or influence the events in any significant way. The pressure to use ICT in teaching and learning practices has been strongly characterised as coming from outside the school, as well as in the case of implementation practices. Holistic approach is needed, that is the change process, with ECE settings as the centre of change and ECE facilitators as an intrinsic part of the change process.
- **Time allocation** – the ECE national, together with school based timetable is allocated very minimal priority to ICT education, as a result time allocated to ICT lessons is little (15 minutes by 2 days) per week.
- **Parent and Stakeholder Support** – the success of ICT use as a methodology requires parental support but there is limited support given by parents.
- **Skilled Personnel** - teachers' lack of ICT skills affects the smooth running of ICT lessons.

The multiple strategies worth employing in dealing with numerous obstacles to ICT integration included in-service training on the part of the teachers, parental involvement in ECE curriculum planning and implementation, reviving timetable giving equal opportunities to all learning areas, working with stakeholders like service providers like Tel-One or Econet to install internet router for ECE learners download on You-tube the rhymes, stories and plays obvious with the assistant of the ECE facilitator, as well as purchasing child friendly laptops that children with special needs educational challenges will be able to manipulate and access. These were in line with literature reviewed that indicated the need by all stakeholders like parents, teachers, the

government representatives like the Ministry of Primary and Secondary Education (MoPSE) to spearhead teaching with technology.

A descriptive survey was adopted to enable gathering of data through such research instruments as questionnaires and observations. Sampling was done using both probability and non-probability techniques and data gathered was presented using tables. A detailed discussion of all the data obtained from participants in the research field was done. In conducting this research, the researcher observed the importance of research ethics like the principle of informed consent, privacy and confidentiality.

## **5.2 Conclusions**

With reference to the results of this inquiry, the researcher concluded that while it is our country, Zimbabwe's Ministry of Primary and Secondary Education's goal to promote ICT in education, efficient implementation has not yet been achieved in ECE settings of Bulawayo Metropolitan Province. In reality, adequate funding of ICT policy from National to school level is necessary if ICT integration is to ultimately improve classroom practice. A wide range of obstacles were present at ECE centres studied around Imbizo district. As found by the study, different mechanisms can also be put in place to counteract those ICT challenges being met in teaching and learning at primary schools.

From the arguments raised by the respondents who took part in this project, it was crystal clear that the use of ICT in teaching and learning has more strengths than weaknesses. It can be justifiably concluded that it is a worthwhile engagement at all times to integrate ICT in classroom practice. In fact, the use of ICT in teaching and learning is in line with current trends and globalisation in the education sector. Generally, the researcher concluded that most if not all learners, parents and ECE teachers at infant school level accepted that ICT has an overriding capacity to turn around instruction and improve how the ECE curriculum can be designed, planned and then implemented at primary school level.

Finally an important remark: Is technology always for the good? During the years of ICT implementation, there have been teachers and other school-related persons, who have criticised the role of technology in education. It has been easy to neglect criticism in schools and among teachers as change resistance, as it has sometimes been, but there is also relevant criticism and scepticism about the use of ICT in teaching and learning at ECE level. Concentrating too much, or at the expense of pedagogy, on technology, hides the need for improving pedagogy, in areas such as, for example, more efficient and meaningful information-processing and knowledge creation skills.

### 5.3 Recommendations

To ensure the development of teachers' ICT competencies, the following recommendations are made:

- ICT should be a compulsory course in all teacher training colleges. Teacher training/ preparation should not be based on training for “Computer Literacy”, but should prepare teacher for using technologies to construct, represent and share knowledge in real life authentic contexts. Research shows that teachers tend to teach the way they were taught (Ball, 1990, Lortie, 1975).
- On the basis of research, an innovation model of pre-service teacher education should be developed that full fill our present requirement. It should be remembered that the model has the potential to equip that knowledge and skills and train our future teachers that confidently provide knowledge and instructions in the classroom with the help of modern technologies keeping in view Zimbabwean (National) and the International (Global) standards.
- Computers and internet should be provided in the schools so as to provide access to ICT to both teachers and learners.
- Professional Development Programs (PDP) should be organised for the teachers in which emphasis should be laid down on the development of ICT- pedagogical competencies.
- Sufficient facilities and resources should be provided to in-service and pre-service teachers to practice the ICTs in teaching-learning process. They

should be given environment in which they develop their ICT based competencies.

In light of the purpose and findings of this study, the researcher found it necessary to recommend that:

- ✓ Early Childhood Education facilitators/teachers must be capacitated to play their role towards preparing young learners for the demands of the dynamic digital world during their pursuit and after accomplishment of informal and formal schooling (catch them young).
- ✓ School heads and other educational leaders at district level and provincial level need to spearhead establishment of Information, Communication and Technology learning resources fund, technology committees at all levels so that each and every department; whether Infant / Early Childhood Education department or Junior Level department at a school can have its own set of Information, Communication and Technology resources to enhance the quality of lesson delivery.
- ✓ Early Childhood Education teacher training on ICT through in-service, workshops and seminars ought to concentrate on how best technology can be used in teaching and learning (literacy/numeracy application) instead of focusing much on how certain ICT tools like computers are operated.
- ✓ There is need to prioritise funding of ICT policy by the government and the Ministry of Primary and Secondary Education to enable ECE centres to afford to employ computer specialists and then refurbish or establish reliable electricity supply networks, computer laboratories, internet connections and access and other facilities that bring about efficient integration of ICT in teaching and learning.
- ✓ The parents as stakeholders are encouraged to monitor and buy if possible, laptops for their children, as well as assisting learners their ICT homework that can be delivered by the teacher through e-learning platform. Students' ICT skills are often learned in informal learning contexts, at home and with friends.

- ✓ While no single curriculum or pedagogical approach can be identified as best, children who attend well - planned, high quality early childhood programs in which curriculum aims are specified and integrated across domains, tend to learn more and better prepared to master the complex demands of formal schooling.

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## APPENDIX A

### QUESTIONNAIRE FOR TEACHERS

#### Introduction

I, Mollet Ndebele a student at Midlands State University (MSU) in the department of Applied Education, currently studying for Bachelor of Early Childhood Education degree. I am carrying out a research on the impact of Information, Communication and Technology (ICT) based technologies in the teaching and learning at Early Childhood Education (ECE) level. This research is purely for academic purposes. The data collected for this study will be treated with strict confidentiality and will only be used for research purposes.

#### Instructions

- Answer as honest as possible
- Do not write your name or any particulars that would suggest your identity
- Circle/ tick the figure corresponding to your level of agreement / disagreement. Where comments are requested, write in the spaces provided.

#### SECTION A - BIODATA

GENDER	HIGHEST QUALIFICATION	LEANGTH OF TEACHING EXPERIENCE WITH ECE LEARNERS
Male <input type="checkbox"/>	CE/ DE (General) <input type="checkbox"/>	< 5 Years <input type="checkbox"/>
Female <input type="checkbox"/>	CE / DE ( I C T ) <input type="checkbox"/>	5- 9 Years <input type="checkbox"/>
	Undergraduate ( Other ) <input type="checkbox"/>	10 – 14 Years <input type="checkbox"/>
	Undergraduate ( I C T ) <input type="checkbox"/>	15 – 19 Years <input type="checkbox"/>
	Masters Degree ( Other ) <input type="checkbox"/>	20 + Years <input type="checkbox"/>
	Masters Degree ( I C T ) <input type="checkbox"/>	
	Others (Specify)..... ..... .....	

## **SECTION B**

NATIONAL POLICY STRUCTURES THAT ARE THERE TO DEVELOP INFORMATION, COMMUNICATION AND TECHNOLOGY (ICT) COMPETENCE OF EARLY CHILDHOOD (ECE) TEACHERS.

**KEY: Strongly agree = SA**

**Agree = A**

**Neutral = N**

**Disagree = DA**

**Strongly Disagree =SD**

<b>Aspect</b>	<b>SA</b>	<b>A</b>	<b>N</b>	<b>D</b>	<b>SD</b>
Are you aware of any educational policies that are meant to develop ICT competency in ECE teachers?	5	4	3	2	1
Do you believe it is vital for ECE teachers to have ICT competency?	5	4	3	2	1
Has the Zimbabwean government done enough in availing policies that develop ICT competency in teachers?	5	4	3	2	1
Do you think the private sector or interested stakeholders have a role to play in developing ICT competency in ECE teachers?	5	4	3	2	1
Are there any sound / constructive school based ICT policies that are benefiting ECE teachers	5	4	3	2	1

Comments

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**SECTION C**

PARENTAL INVOLVEMENT IN THE IMPLEMENTATION OF INFORMATION, COMMUNICATION AND TECHNOLOGY (ICT) AT EARLY CHILDHOOD EDUCATION (ECE) LEVEL CURRICULUM.

<b>ASPECT</b>	<b>SA</b>	<b>A</b>	<b>N</b>	<b>D</b>	<b>SD</b>
Are parents in your school instrumental in support of ICT based school events such as consultation days at ECE level?	5	4	3	2	1
Do parents at ECE level afford learning ICT devices for their children?	5	4	3	2	1
Does ICT literacy of parents affect their support of ICT education at ECE level?	5	4	3	2	1
Are parents willing to take part in fund-raising activities that develop ICT teaching and learning?	5	4	3	2	1
Do parents have adequate knowledge on the demands of the new curriculum at ECE level?	5	4	3	2	1

Comments

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**SECTION D**

AREAS OF CONCERN REGARDING CHILDREN’S SAFETY AND HEALTH IN THE DIGITAL WORLD.

<b>ASPECT</b>	<b>SA</b>	<b>A</b>	<b>N</b>	<b>D</b>	<b>SD</b>
Are there proper ICT mechanisms put in place to promote a safe and healthy environment at ECE level?	5	4	3	2	1
Do you believe that ICT presents risks to learners at ECE level?	5	4	3	2	1
Do children who come from disadvantaged background have a challenge in grasping ICT concepts as compared to their counterparts?	5	4	3	2	1
Do you think teachers have a capacity to protect ECE learners from risks that are caused by the use of internet?	5	4	3	2	1
Are ICT policies in Zimbabwe adequately enough to protect children’s health and safety?	5	4	3	2	1

Comments

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**SECTION E- COMMENTS**

BRIEFLY COMMENT ON THE CHALLENGES ASSOCIATED WITH USING ICT AS A TEACHING METHODOLOGY.

(a) List challenges you are facing in the table below:

	<b>ICT CHALLENGES</b>
i	
ii	
iii	
iv	
v	

(b) What may be the causes of some ICT challenges at your school?

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(c) Do you think it is necessary to incorporate ICT in teaching and learning process at ECE level classes?

Yes

No

If yes give reasons for your answer

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(d) What do you suggest can be done to support ECE teachers in their use of ICT in teaching and learning at school?

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**SECTION F**

TEACHERS' PERCEPTION ON ICT

<b>QUESTION/ STATEMENT</b>	<b>SA</b>	<b>A</b>	<b>N</b>	<b>D</b>	<b>SD</b>
Use of ICT motivates teachers and learners	5	4	3	2	1
Incorporation of ICT makes teachers' role complicated.	5	4	3	2	1
The use of ICT is meant to replace the teacher.	5	4	3	2	1
ECE centres usually have adequate ICT facilities.	5	4	3	2	1
Teachers should help schools in turn be helped by schools to solve ICT challenges	5	5	3	2	1

## APPENDIX B

### PARENTS INTERVIEW

#### FOCUS GROUP INTERVIEW SCHEDULE FOR PARENTS

##### Interview Questions

1. To what extent does ICT help learners to fully participate in these learning areas:
  - a) Family and Heritage Studies
  - b) Maths and Science
  - c) Indigenous Languages
  - d) Physical Education and Mass displays
  - e) Visual and Performing Arts
  - f) English Language
2. How prepared are teachers to teach ICT at ECD level?
3. Does school administration cater for ICT at ECD level? Financially (budgeting) and resources (human and materials).
4. Would you say there are adequate classrooms, ICT laboratories or ICT rooms for ECE learners?
5. In your opinion, do you think the teachers are adequately trained or staff developed in ICT?
6. Are all parents of ECE children able to pay school fees?
7. Do ECE learners with special educational needs supplied with assistive devices to use during ICT lessons?
8. Are there any child sized furniture, toilets and hand basins age appropriate and child friendly?

9. What are the areas of concern regarding the internet on ECE level children?
10. Are you aware of ICT Policies that govern ECE curriculum? If any, name one you know.
11. Are you involved or fairly represented in decision making of ECD programmes of your school?
12. Would you like to add or expand on issues we have been discussing? If so, go ahead.

*Thank you.*