

Enhancing Early Childhood Education through ICTs: An Investigation of Teachers and Students Experiences in Njombe District, Tanzania



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Abstract

This paper reports on a study carried out to investigate the use of ICTS to enhance early child education. The study was based on two objectives or research questions which were set. 250 respondents' children were purposefully-randomly selected. Information Communication Technology (ICT) is very crucial in modern life and civilization. Many people and societies of across the global have embraced the idea use of technology in communication. In Africa and Tanzania in particular, ICT based resource learning needs to be part-and-parcel of pupils in learning at an early age. At this early stage, children need to understand the importance of ICT. Educational centres need to be equipped with facilities to prepare themselves to meet the current needs of children in ICT matters now and in the future. The findings reveal that 59.3% of primary school pupils especially from private schools have knowledge of ICT through the use of smartphones found at their homes. The early experience of ICT among children in their early years of experience involves playing of games on phone of laptop.

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Key words: ICT, Early childhood education, Preschool and Primary school pupils

Introduction

In many respect, ICT is viewed in negative terms especially among children in developing worlds. Many parents would be of the view that there should be limitations on the time children can be in front of a computer or television on moral grounds. As argued by Cordes and Miller (2000) ICT brings about isolation in life, lack of good concentration, distorts child ability in language development among other. One of the most growing challenges among children in today's society is the problem of computer infatuation. Because of the incursion of online videos games and sites, a lot of children spend a significant part of their time playing such games.

At the same time ICT among children in education presents a new space to for them to learn about various methods of applying education in their lives. In its development plan (Tanzania Development Vision, 2025), The government of Tanzania stresses the need to have a society that is well educated and informed by 2025 to contribute to the national development goals (United Republic of Tanzania Planning Commission (2010). To achieve this, ICT is brings on board many prospects for attaining such goals, especially among children as a way bringing about national development.



Brief Background of ICT in Tanzania

ICTs in Tanzania have played a significant role in areas of investment and infrastructure development. As captured by United Republic of Tanzania Planning Commission (2010). The report further states, the Government of Tanzania has started on an ambitious journey to build a fibre project estimated to be over 10,000 kilometers. The fibre programme is the backbone forming the National ICT agenda. The fibre programme aims at drawing out potentialities in all citizens of the country in both urban and rural set-ups by establishing a special fund (Universal Communications Service Access Fund) geared at expanding communications services in areas perceived not economically feasible or marginally viable to provide communication systems.

In Tanzania like in other developing countries, apart from being a socio-economic development tool ICT can also assist to shape early education for the better. As a sector of public demand, ICT is a sector in the area of education among children growing over at 29% with the National government generating revenues of 1.3 billion dollars per year (Ministry of Finance and Economic Affairs, 2010), and providing employment (directly or indirectly) to over 60,000 people in the country; revolutionizing business sectors; providing access to information; and revolutionizing education sector.

Role of ICT in Education

ICT influence can be felt in aspects of education. ICT critically facilitates the transforms early childhood education through offering of knowledge and unprecedented opportunities in developing countries to enhance educational systems (Mikre, 2011). He further suggests, ICT improves: "...policy formulation and execution, and widen the range of opportunities..." p. 2). Despite some misgivings on ICT curriculum in preschools especially among children of ages between 2.5 to 6 years old in Flanders (Vanderlinde, van Braak, and Hermans, 2010) considering ICT by the Ministry of Education as a responsibility of the preschools themselves to choose the time when to start working with ICT, however, this in no way does it entail that preschoolers have never had an experience with ICT.

Teuwens, De Grooff, and Zaman (2012) argue that preschoolers have their first experience with Internet connections while at home. In the Netherlands as observed by McKenney and Voogt (2010), children engaging themselves playing games on the computer both at home and at school which exposes them to ICT. Another study carried out in United Kingdom (UK) showed that 53% of children aged zero to six use a computer at home almost every day (Marsh et al. 2005). It is also argued that Children in some parts of the world use ICT even before enrolling into school or know how to read and write' (Vandenbroucke, 2010). There is also also need to acknowledge the fact that there is now much information on early childhood and ICT in education spheres. But what is much available in many existing publications is on dangers of ICT on children or preschoolers (Bolstad, 2004; Yelland, 2005; Clements and Sarama 2003; Cordes and Miller 2000; Plowman and Stephen 2003) among others.

ICT status/trends in Tanzania

In the last two decades, there has been interest in ICT throughout Tanzania. Vision 2025 of Tanzania targets ICT as one major driving force to realization of the



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Vision. To this effect, in line with Vision 2015 the country singles out ICT as one of the key drivers to transform lives of many people. Specific developments projects in ICT are recommended which need to move from strategies and planning to implementation (Sida, 2001). Beside, Vision 2025 recommends moves calling for the nation to graduate from a least-developed country to a middle-income country by 2025; to transform from a low productivity agricultural economy to a semi-industrialized country (Rouse, 2017).

According to the Tanzanian Communications Act of 1993 Tanzania Posts and Telecommunications Corporation (TPTC) was dissolved and replaced by the Tanzania Telecommunication Company Limited (TTCL), the Tanzanian Postal Corporation (TPC) and the Tanzanian Communication Commission (TCC). These boards were given a responsibility of regulation of postal and telecommunication services. The roles of TCC in revolutionizing ICT included:

- Licensing telecommunications and postal operators, equipment vendors and contractors and monitoring their performance;
- Allocating and managing the radio frequency spectrum;
- Type approval and standardization of telecommunication equipment;
- Regulating telecommunication and postal tariffs;
- Numbering Administration; Law and Policy enforcement;
- Arbitration of disputes between operators and between operators and customers;
- Promoting competition in the postal and telecommunication industries; and
- Monitoring the quality of postal and telecommunication services. (Sida, 2001).

Overall, the need and development of ICT infrastructure in Tanzania is evident from the initiatives including a grouping called eThinkTank, a forum supported by the United Nations Development Program (UNDP). One of the main objectives of eThinkTank is to help harmonize the ICT Policy and regulatory environment in comparison with neighboring countries. This is done through electronic list server, businessmen, government employees, academics and donor organizations to exchange in ideas and aid to initiate programs aimed at the ICT sector. Currently, there are efforts to realize Vision 2025 through ICT ventures called eSecretariat (Sida, 2001).

To many, ICT use is a high level education achievement with special attention to children. Early childhood education in ICT translates into use of the computer (Plowman & Stephen, 2005). ICT has many useful applications in the education system. The use of ICT in teaching and learning process has shown to improving both teaching and learning process of pupils and teachers alike and students (Marsh, et al., 2013). ICT infrastructure enriches the learning experience of pupils. This is reflected in the National ICT Policy (Tanzania National information and communications technologies policy, 2003) when it alludes to ICT as enhancing effective delivery of education. The need to train teachers on different ICT models to assist in learning and teaching process of children in their early stages of education calls for improvement in technology. Improving the quality of delivering education should as well include distance learning. According to the United Republic of Tanzania, Ministry of Education and Vocational Training (2007), "Information and Communication Technology Policy for Basic Education (2007), asserts the



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amalgamation of ICT in teaching and learning process to empower teachers, leaders, school administrators, educators, and students to use ICT in their daily activities. This, the report goes on to say, will bring about improved quality of education.



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ICT and Young Children

Use of ICT among young children helps them develop problem-solving skills (O'Hara, 2008). A study conducted in United Kingdom, observed that children were using a digital camera to take pictures of the school environment. The nature the cameras were user friendly giving the children the opportunity to review, retain or delete their pictures. This immediate response of the camera enabled the children to realize that they were obscuring the images with their fingers. The simple operating features of the technology made children love the digital camera more. Once the children realized what was happening they became more systematic in their work, adopting a collaborative thinking approach.

Problem-solving innovations and motivational skills in the potential of ICT were further advanced in the children's efforts to develop more strategies in ICT. Also, for nursery school child, moving the mouse and pressing the button on the computer is an awesome experience (Ager, and Kendall. 2003). The children feedback by adopting a sequential approach in which movement and clicking of a mouse becomes operational, resulting in a distinctive means of learning and teaching young children. For example, a young child experiencing easiness in positioning the on-screen cursor as accurately as he or she wishes in order to be able to select different tools such as color options on the computer. Showing considerable concentration, perseverance and determination, young children gain techniques in which ICT operates.

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ICT and Early Childhood Education

Use of ICT in early childhood education appears a controversial topic. Some researchers view ICT education in early childhood education a threat to children's learning and children (Cordes & Miller 2000). They further argue that ICT use by children in preschool and early primary level education can lead to lack of exercise, isolation, poor concentration, and impaired language development among others. However there is a growing support for ICT use in early childhood education. A study carried in Flanders, the northern region of Belgium an ICT curriculum for compulsory education was launched by the Flemish government in 2007 (Vanderlinde, van Braak, and Hermans, 2009). This new ICT curriculum advocated for compulsory ICT attainment targeting only primary and secondary education (ranging from the age of 6 to 18 (Vandenbroucke 2007). However, preschools (ranging from age 2.5 to age six in Flanders) were not obliged to use or integrate ICT in their curriculum. The Ministry of Education considered this as the sole responsibility of the preschools themselves to choose the time integrate ICT with their children (Vandenbroucke 2007).

According to Teuwens, J., De Grooff, D. and Zaman, B. (2012). preschool children have their first encounters with ICT (Internet) at their homes. In the Netherlands for example, McKenney and Voogt (2010) in their study observed that playing games at home and at school on the computer is an activity young children most of the time do. Marsh et al. (2005) contacted a study conducted in the United Kingdom (UK) parents whose results indicated that 53% of children aged zero to six years use a computer at home on a daily basis. McKenney and Voogt (2010)



have also argued that, “there is little dispute that today, children are using ICT even before they know how to read and write” (p. 656).

Bolstad (2004) in his study showed that ICT use in young children’s learning, presents new opportunities to make the learning process in early childhood education more practical. For example, it stimulates innovativeness and play, cognitive development and social interaction, (Vanderlinde & van Braak, 2015). On his part Morgan (2010) in his study argues that the use of ICT leads to more interactive learning experiences with teachers in control. The use of technology in early education is therefore a useful tool in the learning process (Bolstad, 2004; Morgan, 2010).

At the same time, in the use of ICT, teachers need to be aware of their duties in guiding the children. ICT should be free from causing any harm on children. Morgan (2010) advocates for a child-centred pedagogy. However, Plowman and Stephen (2006) cautions, ICT should not be used as a free activity on children as they tend to get frustrated and quickly proceed to another activity. Furthermore, Terreni (2010) alludes that free play does not guarantee effective or creative engagement or development in ICT of children but still need support and guided interactions. All these studies point to the need for good understanding of the experiences of teachers and students in the use of ICT as the basis for better planning for application of ICT in education. This is the focus of this study.

Statement of the Problem

ICT plays a very crucial role in modern world. Unfortunately, the challenge in the use ICT in early childhood education especially among rural children of Njombe (a town in the southern of Tanzania) is high. According to Menda (2018) Tanzania is a rural country with 80% of the population living away from urban centers. Like most developing nations, Tanzania most rural dwellers lack adequate social amenities. The role of ICT in early childhood education is not felt much among pupil from low backgrounds (Malero & Manyilizu, 2015). For rural children to make any connectivity with the rest of their counterparts, ICT developments can make a difference in the education of pupils in early education. Education is one of essential social services in both rural and urban Tanzania, but is deprived of quality infrastructure, trained teachers and financial resources in rural primary schools. For any future developments to be achieved in the ICT sector there is need to understand the current status, and experiences of key players in ICT. This will allow for better planning. Therefore, this study objective is to investigate the experiences of teachers and pupils in Njombe district of Tanzania.

Research Questions

This study was guided by the following research questions:-

- i) What is the level of ICT access among preschool or primary children Njombe district of Tanzania?
- ii) What is the perception among teachers and students on the benefit of ICT among preschool or primary children Njombe district of Tanzania?

Theoretical Framework

Cognitive Theory of Multimedia Learning

This study was guided by the Cognitive Theory of Multimedia Learning



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(CTML). This theory is adopted because it provides guidelines needed in designing multimedia learning materials, including learning educational technologies from motion pictures to computer; based tutoring system. The theory emerged from other theories such as, Clark & Paivio's (1991) dual coding theory, Baddeley's (1992) model of working memory, Chandler & Sweller's, (1991) cognitive load theory, Wittrock's (1989) generative theory, and Mayer's (1996) SOI model of meaningful learning.

Cognitive Theory of Multimedia Learning theory, argues that learner have in their possesses a visual information processing system and a verbal information processing, which allows auditory narration to go on in verbal manner and animation at the same time to go in visual style. This theory emphasizes cognitive processing by learners in collaborative learning processing as the fundamental element to unlock additional learning capacities. This can be associated electronic-capacity framework (Vanderlinde & van Braak, 2010). For the theory, learners get it "more deeply from words and pictures than from words alone" (Mayer, 2009, 47). In addition, the theory focuses on instructional media in the light of how human minds work through three assumptions in learning through multimedia (Mayer, 2002, 49):

- i. There are two separate channels (auditory and visual) for processing information (sometimes referred to as Dual-Coding theory);
- ii. Each channel has a limited (finite) capacity (similar to Sweller's notion of Cognitive Load);
- iii. Learning is an active process of filtering, selecting, organizing, and integrating information based upon prior knowledge.

Keeping in mind that most of the sampled respondents especially among children had no much ICT exposure, visual or auditory learning is very important as learning preference as it allows them to see the computer applications by constructing or remembering mental images. Through visual learners are able to read, observe, and the display data by some use of visual aids. Through visual learners (children) also get familiar with ICT by playing online games, watching movies, pictures, and graphs which helps them integrate the subject with ICT.

Methodology and Research design

Sampling and Sample Size

The sample for this study totaled 250 participants which included preschool teachers, primary school teachers and children (i.e., primary school children) selected from 25 schools in Njombe, Tanzania. This involved both male and female respondents with 88.7%, representing teachers of early childhood education, and 11.3% representing pupils as recipients of ICT education. An average of 44.8% was preschool teachers, 55.2% teach in primary schools.

Data Collection Methods

Questions in the questionnaire were captured the three levels/categories of the participants (i.e., preschool teacher, primary school teachers and pupils/ children). The first part of the questionnaire aimed at capturing ICT knowledge and benefits among teachers of both preschool and primary schools respectively on different ICT topics as shown in Table I. The second set of the questions aimed to understand the type of ICT gadgets children know (computer, laptops, tablets, and smartphones).



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Discussion of Findings

Level of Access to ICTs to teachers and pupils

Among the pupils, more than half of them (75 pupils, 58.3%), and 150 teachers (100%) were knowledgeable in ICT. Further, in the study, there were two categories of teachers: The first category of 49 (32.6.0%), were full time teachers with expertise in teaching ICTs and 101 (67.4%) of the teaching staff taught ICT related courses. Among the students, 56 (74.6%) lack access to computer while 19(25.4%) have good experience of exposure to ICT based on their background. The statistics show that majority of pupils with good experience in ICT. This may be because most were sampled from private schools with their counterparts coming from public schools within the geographical area of research.

Out of 69 pupils who responded showing familiarity with ICT, 59.3% owned (or use their parents) smartphones, 34.7% use school computers, 6.0% use laptops at home. It is evident that smartphones experience among children especially in private schools is increasing at high rate. This could mean the smartphones can be used in teaching and learning could improve education standards. Teachers who are experts in ICT, the lack of well-equipped laboratories with modern ICT components pose as a hindrance to their full implementation of ICT program especially for pupils in public schools with poor backgrounds. The respondents' characteristics and responses can be summarized as shown in Table 2.

Perceptions among teachers and pupils on the benefits of ICT

From the data collected, most of pupils 69(92.0%) indicated that ICTs are useful in their lives. They gave one use of ICT as in children's' both at home and at school something they are much acquainted with. Notably only 8.9% of the students were not aware of ICT and its importance in their lives.

The above findings suggest that ICT use in Njombe District Tanzania among children in their early years of education is low. Majority of the respondents lack exposure and experience in ICT. While ICT continues to advance in Tanzania with the passing of the National ICT Policy in 2003 whose main theme for the policy is to assist all Tanzanian citizens achieve the 2025 millennium development goals (Tanzania-ICT-Policy, 2003), the reach of ICT advancement is yet to be realized in Njombe. Despite some children showing knowledge of ICT through audio and video equipment TVs, smartphones majority lack the understanding of ICT through a format platform in the education system. A conclusion can be made that Njombe continues to lag in its implementation widening the digital gap. Some contributing factor (see results above) faced in the implementation of ICT in school especially among preschool and primary levels of education are:

Lack of qualified experts (teachers) in ICT is one of the challenges facing the ICT development in the Njombe region. Majority of the teaching stuff who handle ICT classes lack the prerequisite skills to handle to programmes in ICT. Therefore in order to address the need for ICT learning and teaching among children in early education requires more teachers to be trained in the field.

Conclusions and Recommendations

This article has investigated at the issues relating to the role ICT in early childhood education in Njombe, Tanzania. However, for any ICT policy to have



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positive impact on the lives of the children, keeping in mind of some misgiving of ICT on children development, children need to be taught the importance of ICT in their lives. ICT has great potential in the dissemination of knowledge. Currently, it appears educational policies are not in the right direction with regards to have sufficient teachers who trained in ICT to deliver on pupils' needs.

Based on the study and knowledge gathered above, this study makes a number of recommendations. First, there is need to review the national ICT policy in Tanzanian to establish a curriculum for ICT in preschools (pre-primary) and primary schools. This curriculum should target all schools both private and public schools, rural and urban alike. At the moment it appears, ICT is available in few private school and public school alike, but mainly those located in district headquarters with ICT facilities. Secondly, there is need for more teachers to be trained in the ICT curriculum to teach children including those in the remotest part of the country. Thirdly there is need for the government to address the infrastructural requirements for ICT use and teaching. Critical among these is the need to improve rural electrification to support ICT. The need to expand the use of ICT would improve the quality of education. Finally, there is need to encourage stakeholder participation should be encouraged in implementing ICT activities. This will ensure the strategy for ICT improvement in education is inclusive and addresses the needs of every sector in the society.

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