International Journal of Economics, Commerce and Management
United Kingdom Vol. III, Issue 12, December 2015
http://ijecm.co.uk/ ISSN 2348 0386

CHALLENGES OF ADOPTION OF INFORMATION COMMUNICATION TECHNOLOGY ON TEACHING AND LEARNING IN PUBLIC PRE-SCHOOLS IN NORTH RIFT REGION, KENYA

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Abstract

Given that the implementation of information communication technology (ICT) in teaching pre-school learners has worked in various parts of the world, it is prudent to investigate; adoption of ICT in the Kenyan context. The purpose of this study is to evaluate challenges of adoption ICT on teaching in pre-schools in North Rift Kenya. The study used combination of descriptive and exploratory research designs. The target population comprised teachers and head teacher drawn from 6728 pre-school in the 6 counties in North Rift Region. The study employed stratified sampling and random sampling method. To collect primary data, questionnaires and interview schedules were used. Quantitative data collected were analyzed using descriptive statistics. Findings showed that schools lack adequate funds to adoption of ICT in pre schools, classrooms have not been renovated in readiness for the ICT adoption, computer labs are not in place and there is also lack of book manuals by KIE for ICT adoption It was clear that training levels of teachers in the use of computers in public pre primary schools was wanting given that only a few had trained in computer usage due to the fact that teachers did not rely on computers in the learning process Since teachers are central in the adoption of ICT in pre primary schools, there is need to provide them with necessary knowledge, skills and understanding to successfully integrate ICT into everyday educational practices The Ministry of Education should develop a policy to guide the use of computer in public pre primary so as to heighten ICT knowledge and competence in all public pre primary schools in the country.

Keywords: ICT Adoption, Attitude, Policies, Awareness, Resources, Challenges

INTRODUCTION

Integrating efficient ICT teacher preparation programs is an important part essential for successful, wide-ranging school reforms (Khan, Shamim & Clement 2012). However, While ICT continues to advance in western and Asian countries, African countries still experience a lag in its implementation, and that continues to widen the digital and knowledge divides. In a recent study by Kiptalam*et.al* (2010), observed that access to ICT facilities is a major challenge facing most African countries, with a ratio of one computer to 150 students against the ratio of 1:15 students in the developed countries

Sutton (2013) pointed that, in Pacific Island, Manukau, most pre-school learners had access to ICT equipments through a dial up connection where one computer was used for administrative purposes while one digital camera was used to record children's learning process. In India the high percentage of staff and students support the use of ICT in services but there are also some concern like majority of services have a digital camera for staff use, very limited access to computers, a need for training in the use of computers with children (McDermott, 2011). At present, ICT is not widely used in early childhood education practices. Since the role of technology in early childhood education is very controversial, parents and educators are very concern about the benefits or harm that it can have on the young children. Critics state that the use of technology in schools will be the time, money and childhood itself by speeding up the process and cutting down on essential learning experiences while proponents propose that children should have the possibility to make use of those new technologies.

Currently it is almost impossible to come across an educational institution without an ICT existence. More and more children encounter a computer before they go to school (Siraj-Blatchford & Whitebread, 2008). Their exposure to the influence of ICT is becoming quite noticeable. Thus, early childhood care and education cannot disregard the impact on these children. Indeed, early childhood practitioners are looking for better ways to adopt ICT so that the learning objectives of pre- school children are achieved in an efficient way with all the requirements (Kalas, 2013).

With the materialization and increase of personal computers, it is clear now that teaching need to be revolutionized by the having more sophisticated information and communication technology (ICT) (Collins & Halverson, 2010; Gao, Chee, Wang, Wong, & Choy, 2011). However, teachers' usage of the ICT facilities has not realized the pedagogical affordances of ICT in creating learners' cantered lessons (Lim & Chai, 2008; Liu, 2011; Wu, Lee, Chang, & Liang, 2013). The need for logical theoretical framework to guide the creation of new practices associated with the integration of ICT is one of the important issues that need to be addressed (Mishra & Koehler, 2006).

In East Africa, most teachers do not adopt ICT into their instruction as it should be, because of several interconnected factors, such as manipulative, non-manipulative and teacher factors. Manipulative factors include beliefs, skills and commitment of teachers, ICT, knowledge, availability of ICT resources, whereas non-manipulative factors include age, gender, religion, educational experience, computer experience, national policy and external supports. This implies that ICT integration is not dependent on one factor, but to several interrelated factors that directly or indirectly affects the use of ICT into classroom instructions (Tedla, 2012).

According to Ndiritu (2013) Countries that have succeeded in harnessing the potential of ICT have been said to have taken a positive step towards a greatly expanded economic growth, improved human welfare and stronger forms of democratic governance. It is in this regard that the Kenyan government has invested a lot of funds in ICT infrastructure including digitization of educational materials through Kenya Institute of Education for achievement of vision 2030. This is geared towards the improvement in the quality of education. The investment is likely not to bear fruits unless the training of teachers is put on the forefront. There should therefore be an emphasis of training teachers in ICT because they are the central forces in tapping the learning potentials created by ICT. Teachers of all levels from pre-primary to university must be trained in ICT if the vision is to be realized. The quality and orientation of education at each level and the link with the demand for skills are critical for mastering technology. Although research has suggested that part of the difficulty in adopting innovation or reform relates to teachers themselves, it is important to establish the effects of adoption of ICT for teaching and learning in pre-schools.

Research Problem

Many of the ICT projects such as Laptop projects in primary schools in Kenya have yet to beadopted. The ICT project implementation initiative is dominated by technical, procurement and human resource challenges. There is a shortage of ICT trained teachers in public primary schools. The literature reviewed indicates that the number of the trained teachers is far much below the target. The researcher has also noted that most public primary schools have no electricity power supply; also the classrooms are not designed to accommodate computers. According to Mingaine(2013) there are many challenges that hamper efficient implementation of laptops including cost of infrastructure, electricity, teachers' skills and leadership. While other countries have achieved over 41% implementation of ICT in secondary schools, the percentage in Kenyan schools remains very small (Laaria, 2013). In addition, Wafula (2014) show that major challenges faced by the schools which have contributed to the unpreparedness for the laptops implementation included lack of adequate training in ICT for teachers and

administrators, limited computer hardware dedicated to administrative work, lack of time and absence of appropriate administrative software. However, these studies were only conducted in one region and only in upper primary schools but not in pre schools in the country where the distribution of the resources differs, hence generation of the results was limited. Further, the study did not consider both rural and urban schools. The researcher therefore investigated challenges of adopting Information Communication Technology in teaching and learning in pre-schools.

EMPIRICAL REVIEWS

Richardson, (2005) reported that ICT-related Initiatives are adopted and implemented by education systems with greater appreciation of their complexity. A major aspect of the complexity involved with ICT integration into education systems is based on the many factors involved with it including factors associated with the human side of the integration such as teachers, on-going support, trainers, and head teachers and the technological side of it including access to computers, technical support, and the e-materials. Study by Teo (2012) on teachers' attitudes towards computer use in Singapore, found that teachers were more positive about their attitude towards computers and intention to use them, than the helpfulness of computer towards teaching and learning. These studies reveal that teacher's skills, perceptions, and attitudes influence adoption and use of ICT in schools. Shamir & Kelly (2012) argue that the useful knowledge of teachers with a positive attitude towards ICT affects their teaching strategies and their interest to implement changes to their work. However, no significant connection was found between a positive attitude towards ICT integration in the kindergarten and the use of content websites. Teacher's attitudes towards ICT will mostly resolve its successful integration, positive, attitudes, during pre-service education.

Study by Drent & Meelissen (2008) states that positive attitude; personal private enterprise and computer experience had a direct positive pressure on adoption and use of ICT by teachers. Huang & Liaw, (2008) highlighted that, teachers' skills, attitudes and perceptions influenced their acceptance of the usefulness of ICT and its implementation in schools. Andoh, 2012) states that involving teachers' use of Acer netbook had positive impact on learning through encouraging individualized learning and helping to increase number of hours for study beyond school hours in schools. Teacher skills and attitudes influence the decisions they make during preparation for teaching. Jimoyiannis, & Komis, (2007) observed that most of reforms and initiatives initiated in schools failed due to teachers' top-down move toward that did not take into description their skills, interest, and accessible knowledge.

While ICT continues to advance in western and Asian countries, African countries lie behind on its implementation. Inadequate preparation of teacher trainees on how to use ICT in classroom could be perceived as a reason why teachers do not effectively adopt and use it once practicing. Teachers training institutions need to change strategy on how they train teachers with a view to giving them an opportunity to practice using technology before they are posted to schools. (Gulati, 2008) Infrastructure may be readily available in more affluence areas, but not automatically guaranteed in disadvantaged schools (Obijioffor, 2009) there is likelihood that teachers could adopt and use ICT in classroom if professional training provided them with ample time to learn, share, practice, and collaborate with colleagues about the technology. Higgins, & Moseley, (2011) posited that inability of teachers to understand why they should use ICTs and how exactly they should use them is a challenge to implementation of ICT in schools.

Kiptalam et.al (2010), observed that access to ICT facilities is a major challenge facing most African countries, with a ratio of one computer to 150 children against the ratio of 1:15 children in the developed countries. The real challenge for educationists is, therefore, how to harness the potential of ICT to complement the role of a teacher in the teaching and learning process. There is an understandable apprehension, even fear, as to the role of a teacher in an ICT-equipped classroom (Lab, 2003). Teachers who lack the chance to develop professionally in the use of modern ICT feel under threat. Many schools face a challenge of shortages of ICT teachers and other IT professional that support adoption and use of it in classroom. Many schools continue losing well trained ICT teachers to private sector which seems to pay higher salaries (GOK, 2010).

Teachers face in the course of implementing ICT integration. Chief among the obstacles are the teachers themselves. Although the majority of teachers believe that ICTs have the ability to improve class-room learning, an almost equal number of them still find it difficult to understand ICTs' specific benefits or how it can be used so as to achieve maximum results (Old-field, 2010) (National Council for Science and Technology, 2010).Lack of qualified teachers to teach ICT in schools hinders implementation of ICT in these schools; the demand for ICT learning has been tremendous and the number of teachers who are trained to teach ICT cannot meet the demand. There are more students willing to be taught computing skills than there are teaches to transfer the skills. Jimoyiannis, &Komis,(2007) Points that, a major challenge identified in many developing countries regarding adoption and use of ICT in schools is that there is no enough staff, and where there are, they are most likely IT professionals without any education experiences, skills, and/or qualifications. To effectively harness ICT for school purposes requires sustained investments in supporting teachers training in order to create new learning environment.

Byron (2008) most of the safety worries may be classified into groups of harmful physical effects; children's learning, cognitive, social, and emotional development; exposure to harmful contents; and new technologies displacing other important learning and play activities. However, most of the risks and dangers, often have in mind solitary playing of computer games and may not have actual in- sight into current modern trends in many innovative pre-school. The role and potential for ICT to enhance children's learning is well documented Ferenz & Brady (2007) points that, broken down computers affects most schools; while a good number of schools have benefited from donated used computers, they have not been adequately equipped with the same on maintenance and repair, hence its very common to see a schools computer lab full of broken down computers, some repairable and some not. This has actually been a major problem, and the government has now put strict measures on any person, NGO or corporate bodies willing to donate second hand computers. (It is seen as a dumping ground); e-waste management

There is a lot of fear by the administration; there is still a strong perception especially by the older generation that computers require highly skilled personnel to operate them, while this may not be the case, some school administrators also fear that their students will be exposed to adult sites and other undesired sites, through the use of the internet. Some also fear the infection of viruses to their computers leading to data loss, while this may be true to some extent, proper education on the safe use of computers and help alleviate some of this fear. Fear by the teacher, the teacher may fear being rendered irrelevant by the introduction of computers in his/her class. The feel that the teacher still remains an authority and a 'know it all' in class is something that most teachers cherish, and anything that makes them otherwise is deemed an enemy of the classroom (Kiptalam *et al*., 2010).

The socio-economic context of learners and teachers may also affect ICT adoption in disadvantaged schools. In affluent setting, many learners and teachers have access to computer at home; they are more confident regarding use of computers in school setting (Muller et al, 2007). Teachers compute skills incompetence led to computer difficult in teaching and learning situations (Bovee et al. 2007). Knowledge and willingness to TVs adopt and use technology often relates to sociological factors such as age, interest, and teaching experience (Cox & Marshall, 2007).Adherence of traditional models and a fear of change may deter progress while conversely; educators with belief systems more inclined to constructivist principles view learners as active participants and readily adopt ICT into their teaching and learning practices (Fredriksson, Jedaskog & Plomp, 2007). Technology if not well adopted and integrated in the curriculum and daily teaching, instructors may view the use of ICT's as an 'added-on' an riot as an integral component of teaching and learning. It is therefore critical to

understand those factors that affect the process by which teachers integrate I CT's into teaching (Chigona, & Davis 2010).

Assessing teacher computers attitude has a direct link with technology adoption and integration. Capabilities in Africans schools (Agbatogun, 2010). The successful integration of computer in educational environments does as was argued earlier not only depend on learners' attitudes and aptitudes but also on those of their instructors. Institutional management can affect the effective implementation of ICTs in schools. For instance, if the staff members are not comfortable in utilizing ICT, they may not use it effectively if on the other hand, support positive leadership and pedagogical assistance is provided, instructors, and staffs are encouraged to use in their classes and in administrative tasks (CC Zerniuwczx & Brown, 2009). Barriers to effective technology according to Jo Shan Fu (2013) include low teacher expectations and a lack of clear goals for ICT use in schools (Al-Bataineh et al. 2008), lack of teacher collaboration and pedagogical support, as well as a lack of experience among cooperating teachers (Ertmer & Otternbreit-Leftwich 2010), insufficient time to master new software or integrate ICT during a class period (Almekhlafi & Almeqdadi 2010), insufficient skills for managing teaching materials (Frederick, Schweizer& Lowe 2006), low software competence and habitual ways of conceptualizing what and how students should learn (Goktas, Yildirim & Yildirim 2009), limited knowledge and experience of ICT in teaching contexts (Honan, 2008),

In South Africa, the penetration of ICT in curricular delivery has increase equity and this is done through donor fund projects concerned with providing ICT to disadvantaged communities. Equity in South Africa renewed policy focus for addressing ICT accessibility within disadvantaged school environments (Chigona et al 2010). Limited access to home computers for learners is largely influenced by a combination of class, racial and gender divisions inhibiting learner's adaptability to technology rich environments (Lunga et al, 2006). Thomas & Parayil, (2008), describes digital divide as inequalities in access and use of ICT. This is evidence by materials access to computers and giving learners sufficient time to use computers does not automatically lead to increased and better use.

Lack of specific knowledge about technology and how to combine it with the existing pedagogical content knowledge to support student learning (Hutchison and Reinking 2011), excessive focus on teaching technical or operational skills rather than course content (Lim 2007), pressure to improve scores on national examinations (Liu and Szabo 2009), lack of recognition and encouragement of the timely and effective use of ICT (Tezci 2011a), lack of in-service training on the use of ICT (Yildirim, 2007), Technical problems in the classroom (Yildirim 2007), classroom management with large class sizes (Tezci 2011a), lack of motivation, and technical and financial support (Liu and Szabo 2009), uncertainty about the possible benefits of

using ICT in the classroom (Yildirim 2007) and lack of specific and definite ideas about how integrating technology into instruction will improve student learning (Al-Bataineh et al. 2008).

Kiptalam *et al. (*2010) observed that, ICT facilities is a major challenge facing most African countries, with a ratio of one computer to 150 children against the ratio of 1:15 children in the developed countries. The real challenge for educationists is, therefore, how to harness the potential of ICT to complement the role of a teacher in the teaching and learning process. There is an understandable apprehension, even fear, as to the role of a teacher in an ICT-equipped classroom. Computers are still very expensive in Kenya, makes them a target for thieves who usually have ready markets to another party at a much less figure. This has made many schools to incur extra expenses trying to burglar proof the computer rooms. This extra expense makes some schools shy away from purchasing computers for their classrooms. Lack of electricity affects many schools in the rural areas which pose a great threat; many schools are still not yet connected to electricity; Kenya being a developing country, the government has not been able to connect all parts of the country to the national electricity grid. Consequently those schools that fall under such areas are left handicapped and may not be able to offer computer studies (Farrel, 2007). (Ford 2007) Lack of computers is another major problem facing adoption of ICT into pre-school; Computers are still very expensive and despite spirited efforts by the government agencies, NGO, corporate organizations and individuals to donate computers to as many schools as possible, there still remain a big percentage of the schools unable to purchase computers for use by their pupils.

Despite these challenges, the adoption of ICT in teaching pre-school learners has worked in various parts of the world but little has been seen in the Kenyan pre-schools and even other levels of education.

RESEARCH METHODOLOGY

The study used a combination of explanatory and descriptive survey research design. Therefore, a descriptive study would look at what is going on, while an explanatory study seeks to explain why it is going on (Sekaran, 2003). The researcher used theories or hypothesis to account for the forces that caused a certain phenomenon to occur (Cooper and Schindler, 2003).The study focused on North Rift Region.

The target population comprised teachers and head teachers drawn from six thousand seven hundred and twenty eight (6728) pre-school in the six (6) counties in North Rift Region (MOE, 2014). A random sample of 363 pre-school was selected using Cochran's sample size formula, cited in (Mugenda & Mugenda 2003).Simple random sampling procedure using the lottery technique was used to pick the sample size in every stratum.

This study used questionnaires, interview schedule and observation to collect data relevant to the study. To determine the content validity of interview schedule and questionnaire items, expert's judgmental panel was used. Split half method was used to determine a reliability index through Pearson's Product Moment Correlation coefficients where the researcher piloted the instruments once in the field where the questionnaires were randomly divided into two halves. Co-efficient alpha of 0.84 was obtained indicating that the research instruments were reliable and therefore adopted for data collection. According to Oluwatayo (2012), a reliability index of 0.84 was considered ideal for the study.

Quantitative data collected was analyzed using descriptive statistical techniques which are frequencies, mean, standard deviation. Qualitative data were categorized and reported in emergent themes; measures of central tendency gave expected summary statistics of the variables being tested.

ANALYSIS AND FINDINGS

Availability of Resource for Adoption of ICT in Pre School

Findings from table 1 showed that Electricity was available for adoption of ICT in pre schools. However, there were inadequate fund, classes were not renovated to for use of ICT, there was no installation of computer laboratories, less availability of multimedia resources for instance projectors, white boards and printers in their school. More surprising, almost every teacher said there was no book manuals recommended by KIE for laptop adoption of ICT in pre primary school.

Table 1: Availability of Resource for Adoption of ICT in Pre School

	Mean	Std. Deviation
Electric power ready for ICT adoption	4.22	1.35
Appropriate classrooms in readiness for ICT adoption	3.53	1.28
TICT qualified teachers ready for teaching ICT	3.18	1.31
Renovation of classrooms in preparation for the ICT adoption	2.49	1.2
Installation of computer labs ready for ICT adoption	2.47	1.15
Adequate funds to adopt ICT	2.31	1.15
Multimedia resources e.g. Projectors, white boards and printers in preparation ICT use	2.13	1.25
Book manuals recommended by KIE for ICT adoption	1.99	1.12

Teachers' Attitude toward Adoption of ICT Pre-schools

Positive attitudes towards use of information and communication technology in teaching may make teachers more interested in adopting new technology, learning new technology and more

willing to cope with the challenges of the new technology. Study findings showed that teachers think that technology supported teaching and makes learning more effective. Also, teachers think that the usage of instructional technologies makes it easier to prepare course materials for instance assignments. However it is hard for teachers to explain the use of computer application to students. In conclusion, teachers think that technology makes effective use of class time. The teachers' positive attitudes and perception for integration of ICT products is greatly agreed to increases knowledge and skills in teaching and learning in pre primary schools.

Table 2: Teachers Attitude toward Adoption of ICT Pre-schools

	Mean	Std. Deviation
ICT support teaching makes learning more effective	4.27	1.284
Use of ICT increases the quality of courses and productivity of teacher	4.25	1.169
Usage of ICT makes it easier to prepare courses materials	4.17	1.099
Tools like E-mail will make commutation with my colleagues and students easier	4.02	1.354
Use of ICT offers more opportunities	3.99	1.192
I can use ICT in class activities more effectively day by day	3.84	1.245
ICT makes effective use of class time	3.6	1.575
It is hard for me to explain the use of computer application to my students	3.37	1.532

Awareness of ICT Policies

Basing on the findings, policies put in place are not clear to everyone. Moreover, teachers cannot easily understand and comprehend the ICT policies put in place. Teachers agreed that the ICT policies in place are not favorable and just and they are not inclusive. Further, the ICT policy do not advocates for operation of the components in compliance with Health & Safety requirements for both teachers and pupils.

Table 3: Awareness of ICT Policies

	Mean	Std. Deviation
The ICT policy advocates for operation the components in compliance with Health & Safety requirements for both teachers and pupils	2.46	1.09
The ICT policies put in place are clear to everyone me	2.62	0.84
The ICT policies hare supportive to teachers on use of ICT	2.69	1.19
The ICT policies are fair and just	2.96	1.24
I can easily understand and comprehend the ICT policies put in place	3.05	1.24
The policies on ICT in pre primary school are inclusive	3.17	1.06

CONCLUSIONS AND RECOMMENDATIONS

Basing on the findings in the previous chapter, schools lack adequate funds to adoption of ICT in pre schools, classrooms have not been renovated in readiness for the ICT adoption, computer labs are not in place and there is also lack of book manuals by KIE for ICT adoption. However, electric power has been availed and the schools have appropriate classrooms in readiness for the ICT adoption such as laptop project implementation. Lack of these resources makes it difficult for the implementation of the laptop project to take place.

Also, the study findings revealed that teacher training on ICT is essential if ICT adoption in pre primary school. It was clear that training levels of teachers in the use of computers in public pre primary schools are wanting given that only a few had trained in computer usage due to the fact that teachers did not rely on computers in the learning process. Basing on the findings, the ICT policies in school have not prioritized on availability of ICT services and its accessibility, the policies are not clear to everyone and they do not advocates for compliance with Health & Safety requirements for both teachers and pupils hence it is a major hindrance to the ICT adoption.

Pre schools must focus on making available sufficient energy sources to meet the needs of the school in supporting the ICT use in pre primary schools. Pre schools should also establish public private partnership so as to avail funds to implement the ICT use, renovate class rooms and build computer labs in readiness for the ICT adoption. Since teachers are central in the adoption of ICT in pre primary schools, there is need to provide them with necessary knowledge, skills and understanding to successfully integrate ICT into everyday educational practices. The Ministry of Education should develop a policy to guide the use of computer in public pre primary so as to heighten ICT knowledge and competence in all public pre primary schools in the country. Teacher training institutions (universities and other Teacher Training Colleges) should evaluate how teacher trainees could be prepared to be computer literate so as to improve their effectiveness and efficiency.

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