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Adoption of Information Communication Technology on Teaching and Learning in Public Pre-Schools in North Rift Region, Kenya

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ABSTRACT
To achieve vision 2030, the Kenyan Government had an ambitious plan to give laptops to school children which was however opposed by parents and various stake holders who said that the money for the computers should instead go toward raising teachers' salaries and feeding children. Given that the implementation of 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 was to evaluate the effect of adoption information communication technology on teaching in pre-schools in North Rift Kenya. The study is informed by diffusion of innovation theory. The study used combination of cross-sectional and descriptive survey and explanatory research design. The study employed stratified sampling. To collect primary data, questionnaires and interview schedules was used. Quantitative data collected was analyzed using descriptive statistical techniques which were frequencies, mean, standard deviation. The researcher used inferential statistics Pearson correlation to show the relationships that existed between the variables. Pearson correlation was used to assess the linear relationship between variables. The findings of the study showed that skilled teachers in ICT have a higher likelihood of using it in the classroom. Moreover, teachers' knowledge together with a positive attitude towards ICT plays a key role in the adoption and use of ICT in schools. The teachers trained to teach ICT are not sufficient to facilitate its adoption. Not to mention the fact that schools in the rural areas lack basic necessities such as electricity and ICT facilities which inhibit the adoption of ICT. Schools need to avail opportunities for teachers to expand their knowledge and skills on ICT
Keywords: Information Communication Technology, pre-school curriculum, Teacher's preparedness teachers, Skills and competences

Introduction

All over the world, different countries have regularly initiated programs that are directed in making teachers adopt and use ICT in their day-today teaching and learning practices in school. According to Jimoyiannis, & Komis, (2007) countries like UK, Singapore, China, Australia and European Union (EU) have established programs that intend to enhance teachers' skills which are important in adapting and using ICT during teaching and learning processes. Planning and integrating efficient ICT teacher preparation programs is an important part essential for successful, wide-ranging school reforms (Khan, Shamim & Clement 2012).

Across Africa, many countries have started investing great amount of money and designing new policies all aimed at making teachers adopt and use ICT in schools. However, there are many challenges some of which could be pointed to the teachers' skills in using ICTs (Zaman, Shamim & Clement 2011). For ICT to be effectively implemented in schools, teachers need to be prepared to manage challenges that come with its implementation. Global projects such as 'one lap top per child has increased accessed to ICT for disadvantaged students in South Africa (One laptop per child 2010). Gudmundsdottir, (2010) urges that existing problem of teacher training in educational technology has affected learners' adaptability and accessibility in Cape Town schools. Leading to Principals, teachers and learners sole maternal access is not enough to increase accessibility; teacher training and self confidence must be addressed for more efficient transfer of learning through the use of technology.

Negroponte (2005) initiated One Laptop per Child (OLPC) for sub-Saharan African countries at the MIT Media Lab in 2005; the idea was embraced by various countries such as Ghana, Rwanda, Ethiopia and Nigeria which showed significant success of implementation. For example in Rwanda the idea has shown a high improvement rate in which 106 laptops were deployed in one primary class (Nugroho & Lonsdale, 2009). 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).

In Kenya, the government recognizes the positive effect of ICT in making the country a middle level economy has is envisaged in Kenya vision 2030. Effort to implement ICT in schools was first initiated by publishing Sessional paper No.1 of 2005 where ICT was given prominence. The idea was to equip public primary schools with ICT infrastructure and integrate it in existing school curriculum in order to meet the challenges of information society. Learning and teaching in schools was to be transformed to embrace ICT skills appropriate for twenty first century (GOK, 2005). In 2010 the Kenya Government under the Ministry of Education re-leased funds under the Economic Stimulus Programme (ESP) for equipping 1050 secondary schools, at least about five schools in every district, with ICT infrastructure and capacity building of teachers. The program me's primary aim was to enable teachers to use modern technologies in their preparation and delivery of curriculum in order to enhance access and promotion of quality of education (Ang'ondi 2013).

Adoption of ICT at the basic school level is the recognition of the tremendous transformation that ICT has undergone in recent times as a result of the rapid changes in technology, coupled with the effects of globalization (Asare, 2010). The teaching of ICT at the primary school level prepares pupils to face future development based on proper understanding of issues (Grimus, 2000). Research has also revealed that ICT can motivate students in their learning by bringing variety into the lessons, and at the same time, sustaining teachers' own interest in teaching (Slaouti & Barton, 2007). It is therefore a step in the right direction for the inclusion of ICT in the school curriculum at the primary school level, where learners will be afforded the opportunity of acquiring life-long experiences in the use of ICT for solving problems.

Problem formulation

To achieve vision 2030, the Kenyan Government had an ambitious plan to give laptops to school children which was however opposed by parents and various stake holders who said that the money for the computers should instead go toward raising teachers' salaries and feeding children. The idea for ICT for all primary school learners will be good since it had worked in Zimbambwe, South Africa New Zealand among others the idea looked good but it will be faced with adoptions challenges. In addition, the debates regarding adoptions of ICT in Kenyan pre-school remain unsolved. Moreover, Castro (2003) further warns on the rush to implement new technologies in developing countries. He argues that the rich countries can afford most if not all these technologies, even if they do not work well. However, the best alternatives for rich countries are not necessarily the same for less affluent countries and despite the domestic controversies surrounding the inadequacy of teachers and teacher training. The nature of the limitations is not the same. Given that the extent to which ICT is adopted in teaching and learning in North Rift Region pre-school learners in the curriculum appears to be an important issue to research on and concern for this study. Adoption of 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.

i. To assess teacher's preparedness to adopt Information Communication Technology in teaching pre-school.

ii. To evaluate practice and use of Information Communication Technology in teaching and learning in pre-school curriculum.

Theoretical Frame work

The study adopted Diffusion of Innovation (DOI) theory whose main proponent was Rogers 1983 and revised by Khong & Eze (2008). This theory is used to explain the patterns of adoption, the mechanism and prediction of whether and how a new invention such as ICT in pre-schools will succeed. According to Rogers (1995), diffusion is a process by which an innovation is communicated through certain channels over a period of time among the members of a social system. An innovation is an idea, practice, or object that is perceived as new by an individual or other unit of adoption. The Diffusion theory has four stages which are; awareness, interest, evaluation and adoption stage. In the awareness stage the teachers and the learner are exposed to ICT innovation but they lack complete information about ICT. At the interest or information stage the teacher becomes interested in the new idea and seeks additional information in terms of skill development about the use of ICT and at the evaluation stage the teachers and learners mentally apply the innovation to the present learning environment and anticipated future situation while during the trial stage learners and teachers make full use of the ICT innovations in pre-schools. Further at the adoption stage, the individuals decide to continue to practice the full use of the ICT innovation.

In the diffusion approach, the Roger's Diffusion of Innovation (DOI) theory is used to explain the role of the ICT and interpersonal contact in providing information that influences learners' opinion and judgment of the

technology that leads to the adoption of the technology. DOI theory was used to view the adoption stages and factors leading to adoption. From the DOI theory, the Rogers‟ Innovation- Decision Process model is used to gain further understanding of the adoption process related to issue of access. ICT adoption by pre-school learners in North Rift Region need to be innovated in schools as teachers need to be prepared to teach learners. Atzeni & Carbon (2006) revealed that weak ICT penetration is due to the teachers' preparedness, interest and limited time to teach ICT. When teachers are trained they will be in a better position to teach the right content with confidence. What most pre-school teachers lack is the ICT awareness? Learners will only benefit from ICT innovation if teachers are well prepared and able to apply the new knowledge gained from ICT trainers.

Empirical review

Teacher's preparedness to adopt ICT in teaching pre-school

Pre-service education is not adequate for teachers to be able to handle their job for the rest of their lives; rather, they require ongoing expert development and support. In the information age, where innovations are continuously introduced and change is happening fast, the demand for ongoing professional development is in high precedence (World Bank, 2002). When introducing ICT in schools, all teachers need to: emphasize contented and pedagogy not the level of sophistication with hardware and technical skills, engage learners in consequential and relevant learning, allow students to construct knowledge, bring exciting curricula into the classroom, blend technology into the curriculum and devise alternative ways of assessing student work, adapt to a variety of student learning styles to cater for individual learning differences; and continuously expand and welcome further opportunities for teacher learning.(Chirambira,2013). Further 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. Robinson (2010) points that children cannot be troubled to concentrate because what has been taught is not new to these generations and are irrelevant given that they already know what teachers are trying to teach, which 45 minutes. Is being noisy the student's way of boycotting or protesting to what is being taught within preschool class

Keengwe & Onchwari (2011) points out that, if teachers recognize ICT programs are either satisfying their own requirements or their learners' needs, it is likely they would implement it in school. Teachers' adequacy, skills, and attitudes pressure successful implementation of ICT in schools. If teachers' perceptions are positive toward use of ICT, there is a higher possibility that they provide useful approach on ICT implementation with ease. Simonson (2008) points that teacher' skills, perception and attitudes were linked to their use of ICT in teaching and learning. The more skilled teachers were in ICT, the more likely they were to use it in classroom. Further 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.

ICT training of teachers

Adoption and use of ICT in schools needs a practiced teaching staff and creative thinker school guidance. Teachers and school leaders need to be knowledgeable about the potential that ICT presents during teaching and learning in schools. Where this knowledge is lacking, policies formulated by government and investments made towards execution of ICT in schools, regularly miss opportunities to realize the desired school reforms (Higgins & Moseley, 2011). Investment and planning for training ICT teachers seems to be treated as an added cost rather than as an essential level for changes in teaching and school reforms. He further argues that schools should be equipped with technology and teachers should have technological pedagogical content knowledge (TPCK).This was one of the components that were missing in the training that went on for teachers in schools. Although the training was based on integrating ICTs in the classroom, some of the facilitators, ICT Champions, did not know the TPCK model. In the ICT Champions' training that took place at the KIE and KEMI, there was no mention of

TPCK and so there was no way the teachers would have heard about it. Some literature like that of Bingimlas (2009) identifies lack of effective training as a major barrier to ICT integration. As noted by Becta (2004), the issue of training is complex because one has to consider several components to ensure the effectiveness of the training. It would therefore mean that lack of training in digital material, pedagogic and didactic training in how to use technology in the classroom and particularly in subject specific areas was truly an impediment in the integration of ICT in teaching and learning.

Ayere, Odera & Agak (2010) on E-learning in Schools in Kenya, reported that a number of teachers in schools had not received any training in ICT use during their shaping years at teacher training institutions before joining the teaching profession. Drent, & Meelissen, (2008) observed that the stage and quality of teachers training has a positive influence on how effective ICT is adopted and used in classroom. Hennessy, (2010) ascertained that most of programs towards teachers training in ICT, centered on basic literacy skills rather than on adoption and use of technology in teaching. According to Andoh, (2012) teachers training colleges have continued to emphasis teaching about the technology rather than on how to use technology to teach and concluded that these colleges were not adequately preparing their teacher trainees to effectively use technology in teaching and learning. Peeraer, & Petergem, (2011) noted that the method of combining practical training and working on attitudes predicts use of technology in classroom. Letting teacher trainees use ICT during their training constitutes another way of making them acquire technology skills in other courses.

Skills and competences appropriate in adoption and use of ICT in school curriculum

Prestride, (2012) indicated that computer aided teaching is the most appropriate skill required of a teacher, unfortunately, it is the least possessed by many. This may be because it is barely been part of their training course. According to Andoh, (2012) training should be directed to "using ICT to teach" rather than "learning to use ICT" Prestride, (2012) outlined some of ICT packages required teacher to learn data processing, word processing, use of internet, use of spreadsheet, use of presentation software like PowerPoint and e-mail. These ICT packages are important to teachers because they assist in creating lesson plans, analyzing and setting students' tests, acquiring new knowledge and presenting lesson in a clear way among others. To acquire these skills, teacher educators should prepare teachers properly, as Higgins, & Moseley, (2011) noted, teachers who used ICT tools in classroom have experimented or observed their own teachers use ICT tools during formative days in initial teachers training institutions. Teachers need to adopt and renew the old methods of teaching. The impact of ICT on current generation of children is more important than, that of earlier generations so far. As it happens, today's children grow up with all the facilities that information technology has to offer. Such as; Smartphone's, computers, digital cameras, interactive whiteboards, surf pads not to forget the audio and video gadgets such as mp3 and mp4s just to name a few, today's generation of children are very good at communicating, illustrating, and conceptualizing . Teachers need to imagine outside the box. Teachers need to communicate with the learners of today and fit into ICT gadgets in the market. Ability to communicate, with learners well, to work as role model to both within a group as well as individually in a society.

Teachers resort to the Web for innovative ideas and games. However, it is their role to develop awareness and competencies to effectively integrate technology in their daily practices. They need to keep up to date with the recent technological innovations to comply with the needs of the modern world (Churchill, 2007).According to Keengwe & Onchwari, (2011), teachers' adequacy, skills, and attitudes influence successful implementation of ICT in schools. If teachers' perceptions are positive toward use of ICT, then they can easily provide useful insight about its implementation Von Braak, Tondeur, & Valcke, (2008) argued that positive computer attitudes by teachers are expected to foster implementation of ICT in schools

Practice and use of Information Communication Technology in teaching and learning in pre-school curriculum

Rosen (2010) highlights that learner's work well with digital media much easier than textbooks, and tiresome lectures by their teachers. Further current generation of learners does not want to learn if it is not fun, not like in the yesteryears. The blow of lifelong learning is apparent when one is interested and having fun. Learners use keyboards and monitors screen much more than pen and paper so it becomes all the more important that such gadgets are readily available as early as in preschool class. Further, such gadgets not only for playing but can also be used during learning activities. (Bolstad & O'Hara, 2004). Research cited in Ministry of Curriculum Development (2005) documents indicate that "ICT if well used, can enhance children's learning and encourage purposeful and exploratory play, collaboration, cooperation, discussion, creativity, problem-solving, risk-taking and flexible thinking". According to O'Hara, (2008), ICT in pre-schools hardware and software; computers including desktop, laptop, and hand held computers; digital cameras and digital video cameras;

creativity and communication software and tools; the Internet; telephones, fax machines, mobile telephones, tape recorders; interactive stories, simulated environments, and computer games; programmable toys and control technologies; videoconferencing technologies and closed-circuit television; data projectors, electronic and whiteboards.

Beavis & O'Mara (2010) states that, computer games support and drive the limits of Literacy; playing computer games at school can be useful for literacy. As it happens in both game-based learning and the conventional learning, one becomes motivated by the challenges one meets. Adopting computer games within classrooms, learners are simulate and cooperate, where age-old knowledge such as narratives, character direction, genres such as scene setting, music & sound production, lighting, and most of all literary and script writing are used. Basing learning on something most school goers know at schools, learning will be easy. Through play, the act of learning becomes fun and everlasting. Playing on computers is not only interactive but also requires learn to communicate, create, as well as work together with their friends.

Klerfelt (2010), shows that utilization of IT and ICT does not mean that one stops using conventional methods such as paper and pens. By including computers and digital technology, students interact and reflect on a different level than that of their predecessors. Since current generation of children are grown up with watching their parents and elders communicating with such gadgets rather than pen and paper it is important that preschool class teacher make use of them as part of pedagogical and didactical methods from the very start. The new electronic gaming landscape offers a vast array of new opportunities and choices for children in playing electronic games in many different ways, including excitement, learning and communication. Home video has an interactive gaming content on children's psychosocial development. Video-games have also been suggested as promoting co-operative behaviour and reinforcement in more educational activities. Thus, gaming activity using home videos can be a veritable educational tool for learning capable of making formal learning more pleasurable, motivating and effective. There are different kinds of game content (e.g. violent games, competition games, fantasy games, etc.). Different ICT facilities have their different effects on children learning abilities.

Brandtzaeg and Heim (2009) revealed that, games are associated with both high scholastic and athletic competence, as well as parental monitoring. A preference for fantasy gaming is positively related to scholastic competence, while preferences for competition games are strongly associated with athletic competence". There is need for parental monitoring to ensure that children are not involved in watching videos that will have harmful effects on them. Active parental involvement, such as rules limiting the use of home video, and active mediation will encourage children to embrace the technology for creative, educational and developmental purposes. However the analyses of ICT use in pre-school, there is little acknowledgement of the nature of ICT in relation to how it fits with technology teaching and learning. There is also little acknowledgement of teachers' perceptions and attitudes of the place of ICT in technology teaching and teaching (O' Hara, 2004).

For teaching and learning experiences to be successful, it would be advantageous for teachers' perceptions of ICT and technology to be congruent with the approach advocated by the Ministry of Curriculum Development (2005). ICT also offers a variety of ways for children to weave together words and pictures. Teachers often send home digital photos of children's activities and field trips. Working with children to put captions on these photos offers an opportunity to develop children's written language skills, while photos with captions deliberately left off can promote children's oral language skills, as children use their own words to describe what the photos show. Head Start kindergarten points that English support children's oral language development in their native language (Boss, 2002).

In the behavioral domain, the computer contributes to the ability to address the different learning styles of the children and their variety of information interests, and also promotes children's game competencies (Mohammed & Mohammed, 2012). The teachers' positive attitudes towards ICT contribute to their higher Office tools skills and higher assimilation of ICT in the classrooms (Magen-Nagar& Peled, 2013) Siraj-Blatchford and Siraj-Blatchford (2006) identify four key areas of learning in ECE and reflect on how integration of ICT could support them. These are communication and collaboration they naturally appear in collaborative problem solving, drawing, video recording, or construction.

The early childhood education sector encompasses young children, practitioners and parents or other people connected to the early childhood setting. There are three reasons why ICT matters in early childhood education. The first reason pertains to the pervasive quality of ICT by virtue of which it has an effect on the people (family members, caregivers and early childhood educators) and environments (physical and social) that surround young

children's learning (Becta, 2004). ICT technologies strengths children are learning and play experiences of ICT into education policy, curriculum, and practice. Children today live in a communication-rich environment. The models of communication they encounter in their everyday lives include a whole range of electronic and digital methods of communication (Siraj-Blatchford & Siraj-Blatchford 2003). Children's early literacy and play experiences are shaped increasingly by electronic media.

Researchers, academics, and practitioners in early childhood education have also published books, articles, and guidelines which provide information and guidance about ICT in early childhood, and aim to support early childhood education practitioners to make well-informed decisions and choices about ICT (Siraj-Blatchford &Siraj-Blatchford, 2006). For development and policy-making, it is essential to critically examine the role and potential introduction and use of ICT in pre-school purposes, practices, and social context. (O'Rourke & Harrison, 2004).

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. Adopting and using ICT in schools leads to significant expansion of education and pedagogical outcome which are beneficial to both teachers and learners. When used properly, ICT can help to enhance the importance of education to the society and raising quality of education by making learning and teaching an active process connected to real life (Zaman, Shamim & Clement, 2011). Further Khan, Hasan & Clement, (2012) argued that the adoption and use of ICT in schools can promote collaborative, active and lifelong learning, increase learners' motivation, offer better access to information and shared working resources, deepen understanding, help learners think and communicate creatively. In other words, ICT seems to change the way teaching and learning is carried out in schools. With emerging uses of ICT in schools, teaching could be changed from emphasis on teacher centered to student centered, hence creating interesting and interactive learning environment. ICT facilitates a pedagogical shift entailing an educational interaction between teachers and learners.

Critical Review

From the review of the literature many gaps need to be considered. Developments from pre-school teachers is lacking particularly in developing countries, one of them Kenya. Thus, the question today is not "if" but rather "how" technologies, current and new, can be exploited to flexibly support a more diverse child population in the 21st century (Moon et al., 2002a). Teachers' competencies in ICT skills as argued by researchers such as Keengwe & Onchwari, (2011); Higgins, & Moseley, (2011) and Andoh, (2012) have shown that familiarity with technology and training could make them use and regard ICT more positively resulting in teachers' self-efficacy on ICT use (Papasterigiou, 2010). These researchers did their studies in secondary and primary schools; however, little has been done on teachers' preparedness to adopting ICT in pre-schools especially in developing countries .On the other hand, adopting and using ICT in schools leads to significant expansions of education and pedagogical outcome which are beneficial to both teachers and learners as cited by researchers such as Zaman, Shamim & Clement, (2011); Khan, Hasan & Clement, (2012); Dzidonu, 2010 and Keengwe, & Onchwari, (2011). Despite these studies were inconclusive as they were done in developed countries which have contrasting characteristics as developing countries such as Kenya. While ICT continues to be adopted in schools, there are challenges which are associated with its implementation as noted by Kiptalam (2010), Ford (2007), Agbatogun, (2010) amongst others. 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.

METHODOLOGY

The study used combination of cross-sectional descriptive survey and explanatory research design. Geographically, the study focused on North Rift Region. North Rift is part of the Rift Valley Province which lies in the western part of Kenya. In this study, the target population comprised of teachers and head teacher drawn from six thousand seven hundred and twenty eight (6728) pre-school in the six (6) counties in North Rift Region (MOE, 2014) In recruiting participants for the study, the main aim was to gather a wider representative range of respondents from the pre schools in North Rift Region.a random sample of 363 pre-school will be selected. According to Cochran's sample size formula cited in (Mugenda & Mugenda, 2003) Kasomo, (2006) explain that a sample contains characteristics present in the target population and have independent chances of being selected. To distribute the random samples to all categories of pre- schools, the study sampling frame is as shown in Table 3.1. Simple random sampling procedure using the lottery technique was used to pick the sample size in every stratum. One head teacher and one teacher from every pre-school school in the sample categories were selected for the study. The total sample size of this study was therefore 726 respondents. This study used questionnaires, interview schedule and observation to collect data relevant to the study. Questionnaires used for

collection of primary data from pre-school teachers. To determine the content validity of interview schedule and questionnaire items, expert's judgmental panel from University of Eldoret examined them. Suggestion and advice offered was used as a basis to modify the research items and make them more adaptable in the study. Their feedback was used to revise the instrument. In addition, the researcher conducted all the study in person in order to ensure systematic validity. 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 questionnaire was randomly divided into two halves.

Data analysis

Quantitative data collected was analyzed using descriptive statistical techniques which are frequencies, mean, standard deviation. Qualitative data was categorized and reported in emergent themes; measures of central tendency gave expected summary statistics of the variables being tested. The findings were presented by use of frequency distribution tables that give record of a number of times a score or a response occurs. The researcher used inferential statistics Pearson correlation to show the relationships that exists between the variables. From the frequencies and observation the researcher made conclusions and recommendations.

Findings

Study findings showed that teachers increasingly rely on technology to accomplish their work, capture and make sense of data and focus their efforts on measurable results in student achievement. For instance, teachers were moderately competent in the use of word processors (mean = 3.35, SD = 0.934). Similarly, teachers were averagely competent in regard to the use of spread sheets (mean = 3.13, SD = 1.285).

Findings also showed that teachers were averagely competent in the use of databases (mean = 3.33, SD = 0.97). In addition, teachers were moderately competent in the use of Computer Aided Instruction Software as revealed by a mean of 2.67 and a standard deviation of 1.047.Also, teachers fairly use presentation software such as power point (mean = 2.91, SD = 0.737) as well as web browsers (mean = 3.33, SD = 0.97).

Furthermore, teachers were not fully competent in terms of use of the hardwares (mean = 3.35, SD = 0.934) and instructional films (mean = 3.35, SD = 0.934). In regard to use of the electronic mail, teachers were very competent in its use (mean = 3.96, SD = 0.823). Additionally, the use of keyboard and mouse is also common among the teachers as affirmed by a mean of 4.08 and standard deviation of 0.572.On the contrary, the use of LCD projectors with external speakers was not common among the teachers as supported by a mean of 2.47 and standard deviation of 1.153.

Table 4.1 Software Usage

	Mean	Std. Deviation
Word Processors (Word etc.)	3.35	0.934
Spreadsheets (Excel etc.)	3.13	1.285
Databases (Access etc.)	3.33	0.97
Computer Aided Instruction Software	2.67	1.047
Presentation Software (PowerPoint etc.)	2.91	0.737
Web Browsers (Netscape, Explorer etc.)	3.33	0.97
Electronic Mail (e-mail)	3.96	0.823
B: Hard wares	3.35	0.934
Instructional Films (video, CD, VCD, flash disk etc.)	3.35	0.934
Use of keyboard , mouse	4.08	0.572
Use of LCD projectors with external speakers In instruction e.g. when teaching human body systems (respiratory system).	2.47	1.153

4.1 Practice and use of ICT in pre-school curriculum

Teachers affirmed that teachers service commission trains more qualified ICT pre-school teachers as revealed by a mean of 4.2 and standard deviation of 0.404.However, teachers were not sure if K.I.E provides quality, relevant and affordable educational and training programs for pre-school teaching (mean = 2.49, SD = 1.186). In addition, teachers denied that KNEC develops and assesses Human ICT Resources through National

Examination for pre-school integration in all levels of learning (mean = 1.78, SD = 0.414). Furthermore, teachers disagreed that K.I.E designs and develops ICT curriculum for pre-school for all level of education and training (mean = 1.82, SD = 0.474).Moreover, teachers disagreed that K.I.E develop learning ICT resources for pre-school e.g. Books manual, Multimedia resources, conducting in service training of teachers and trainers in new curriculum trends in education and training (mean = 2.25, SD = 1.031).In conclusion, teachers were not sure if the Ministry of Education has set clear vision and policy statement concerning the role of ICT in pre-school (mean = 2.58, SD = 0.496).

Table 4.2 Practice and use of ICT in pre-school curriculum

	Mean	Std. Deviation
K. I. E provide quality, relevant and affordable educational and training programs for pre-school teaching	2.49	1.186
KNEC develop and assess Human ICT Resources through National Examination for pre-school curriculum in all levels of learning	1.78	0.414
TSC recruit qualified ICT pre-school teachers	4.2	0.404
K.I.E design and develop ICT curriculum for pre-school for all levels of education and training	1.82	0.474
K.I.E develop learning ICT resources for pre-school e.g. Books manual, Multimedia resources, conducting in service training of teachers and trainers in new curriculum trends in education and training	2.25	1.031
Ministry of Education has set clear vision and policy statement concerning the role of ICT in pre-school.	2.58	0.496

4.2 Correlation Analysis

Study results in table 4.3 reveals that practice and use of ICT was positively correlated to adoption of ICT (Pearson product-moment correlation = 0.638), this correlation between practice and use of ICT and adoption of ICT was indicated to be significant at 0.01 (confidence interval).

In addition, ICT competency was revealed to be positively correlated to adoption of ICT (Pearson product-moment Correlation = 768), this relationship was strong and significant at 0.01 confidence interval. This implies that ICT competency influences successful implementation of ICT in pre-schools.

Moreover, ICT literacy was also positively correlated to adoption of ICT (Pearson product-moment Correlation = 290), this relationship was also strong and significant at 0.01 confidence level. Preferably, the more skilled teachers were in ICT, the more likely they are to practice it in the classroom.

Finally, that academic qualifications was positively correlated to adoption of ICT (Pearson product-moment correlation = 0.892), this correlation between academic qualification and adoption of ICT was indicated to be significant at 0.01 (confidence interval).Thus, the useful knowledge of teachers with a positive attitude towards ICT is instrumental in the adoption of ICT in preschool.

Table 4.3 Correlation Analysis

	Adoption of ICT	Practice And use of ICT	ICT competency	ICT literate	academic qualifications
Adoption of ICT	1				
Practice and use of ICT	.638**	1			
ICT competency	.768**	.564**	1		
ICT literate	.290**	0.06	.297**	1	
Academic qualifications	.892**	.847**	.708**	0.21	1

** Correlation is significant at the 0.01 level (2-tailed).

Conclusion

The findings of the study show that skilled teachers in ICT have a higher likelihood of using it in the classroom. Precisely, teachers' ICT skill affects the decision they make as well as their interest to implement changes to their work. Moreover, teachers' knowledge together with a positive attitude towards ICT plays a key role in the adoption and use of ICT in schools. This infers that, when teachers upgrade their knowledge and skills on

information and communication technology and have a positive attitude towards it, there are higher chances of adopting ICT in teaching in pre-schools.
Despite numerous efforts made towards the implementation of ICT in pre-school, there are wide arrays of challenges that have impeded the adoption of ICT. For instance, there is lack of technical and financial support along with lack of qualified teachers to teach ICT in pre-school. In most cases, the teachers trained to teach ICT are not sufficient to facilitate its adoption. Not to mention the fact that schools in the rural areas lack basic necessities such as electricity and ICT facilities which inhibit the adoption of ICT.

Finally, the study has established that the use of ICT tools such as the keyboard and mouse is quite common and the aforementioned gadgets are readily available at the pre-schools. The higher assimilation of ICT in the classroom has resulted to increased learner motivation especially for the young children who are able to develop mathematical thinking through the use of mathematical software. Learners have thus been able to think and communicate creatively and motivated to practice what they have learnt outside the classroom. This is especially the case with story books in video set-up that helps children to develop their reading behavior as well as deepen their understanding.

Recommendations

The results of the study have delivered insights on the positive influence of teacher preparedness on ICT adoption in pre-school. As such, it is imperative for teachers to upgrade their knowledge and skills on ICT so that it is possible for them to adapt to a variety of learning styles provided for by ICT. Moreover, schools need to avail opportunities for teachers to expand their knowledge and skills on ICT. Attitude towards ICT also has to be changed by teachers so that it is possible to blend technology into the curriculum of pre-school.

The plausible areas that need immediate consideration pertaining the use of ICT include financing so that pre-school can have access to ICT facilities. Specifically, government agencies, NGOs and all other relevant stakeholders need to take an initiative towards donating computers to schools that are unable to purchase. Also, there is inadequate preparation of teachers pertaining the use of ICT in the classroom. As a result, teacher training institutions need to change strategy on how they train teachers and allow teachers to expand their knowledge and skill on ICT before they are exposed to it in the classroom. Teachers also need to be made aware of the potential of ICT and how it can be made to ease the teaching and learning process.

Finally, the pre-school curriculum needs to be reorganized in such a way that it promotes the practice and use of ICT in the classroom. Also, learners need to have access to online tools since they deepen their understanding and also motivates them to practice what they learnt in class. There is also need for use of well-designed on-screen applications in pre-schools so that young children can develop positive learning experiences.

Areas of further research that were identified include a similar study to be carried out but increase the period of study. Also, including more pre-schools outside the North rift region can also be made by scholars in future. This way, future scholars can complement this result to obtain further insight in this area.

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