Barriers Hindering Implementation, Innovation and Adoption of ICT in Primary Schools in Kenya

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Abstract:
In the recent years, Information and Communication Technology (ICT) has turned out to be an effective educational tool which enhances changes in teaching and learning processes. The teacher's role in technology- rich classrooms is more demanding than ever (Keengwe, Onchwari et al. 2008).This research paper investigated the barriers that are hindering the introduction of ICTs in Primary schools in Kenya. The main objective of this study was to explore on the major barriers hindering implementation, innovation and adoption of ICTs in Primary schools in Kenya in order to enhance teaching and learning processes. This study was guided by the theory of Marcus's Theoretical Model of Adoption and Diffusion of Innovation Theory .The topical areas on the literature reviewed include Education policy framework guiding ICTs in Kenya, definition of ICT in education, the potential of ICTs in the process of teaching and learning in schools, the role of a teacher in ICT integrated class and success in the integration of ICTs into education in other countries .This is a descriptive survey design within mixed method approach. The instruments that were used to collect data in this case were questionnaires and direct observation of information technologies schedules. Stratified random sampling and Simple random sampling were used to select the sample for study. The study findings and recommendations have been discussed extensively therein.

Keywords: Integration, Information communication technology, learning, and teaching technology implementation, diffusion of innovation, change management

1. Introduction

The introduction of ICTs in primary schools is a very important element of development in the field of eduction.This is because of the fact that this is the formative and discovery stage of the learners and at this stage they are very curious to learn new skills. One of the major campaign promises of the present Jubilee Government in power was the introduction of Lap top computers to all standard one pupils in Kenya. This digital idea was highly embraced by the people of Kenya to who many of them are aware of the impotence of ICTs to the present generation. This is in line with the fact that ICT has the potential to transform the nature of education in any given context of learning. The growth of information and communication technologies (ICT) has dramatically reshaped teaching and learning processes in higher education (Pulkkinen, 2007; Wood, 1995). ICT for education is more critical today than ever before since its growing power and capabilities are triggering a change in the learning environments available for education (Pajo & Wallace, 2001). The use of ICT offers powerful learning environments and can transform the learning and teaching process so that students can deal with knowledge in an active, self directed and constructive way (Volman & Van Eck, 2001; de Corte et al., 2003). At present ICT is considered as an important means to promote new methods of instruction (teaching and learning). It should be used to develop students' skills for cooperation, communication, problem solving and lifelong learning (Plomp et al., 1996; Voogt, 2003). Although computers and technology are prevalent throughout our society (Cuban, 2001), developing countries are far from reaping their benefits because of certain barriers that this study investigated so that once they are addressed directly it will open up developing countries for full integration of ICTs into education.

 Adopting and integrating ICT, into primary school curriculum, can offer high quality education that will enable Kenya as a country to realize the its objectives in the vision 2030. Ehrmann (1994) identified four distinct faces of quality education, which can be supported by ICT: learning by doing, real time conversation, delayed time conversation and directed instruction. Hawkridge et al (1990) suggested that the use of ICT could improve performance, teaching, and administration, have a positive impact on education as a whole, and develop relevant skills in the disadvantaged communities - helping in liberation and transformation. The Dakar Framework for Action (World Education Forum, Dakar, Senegal, April 2000) also stressed the use of ICT for achieving 'Education For All' (EFA) goals and recommended, "ICT must be harnessed to support EFA goals at an affordable cost. These technologies have great potential for knowledge dissemination, effective learning and the development of more efficient education services." Technology should be used as a tool to support educational objectives such as skills for searching and assessing information, cooperation,

communication and problem solving - which are important for the preparation of children for the knowledge society (Drent and Meelissen 2008). Cox et al (1999) carried out a study examining the factors relating to the uptake of ICT in teaching. The results showed that the teachers who are already regular users of ICT have confidence in using ICT, perceive it to be useful for their personal work and for their teaching and plan to extend their use further in the future. The factors that were found to be the most important to these teachers in their teaching were: making the lessons more interesting, easier, more fun for them and their pupils, more diverse, more motivating for the pupils and more enjoyable. Additional, more personal, factors were: improving presentation of materials, allowing greater access to computers for personal use, giving more power to the teacher in the school, giving the teacher more prestige, making the teachers' administration more efficient and providing professional support through the Internet ICT enhances higher education in a number of ways: • It enables the effective storing/sorting of information, and can offer new fast ways of communication; • It enables the reduction of information quantity towards a higher quality and better structure; • It can be integrated into teaching and learning strategies – and used to support relative learning theories; and • ICT (computers, Inter and Intranet) can be used to create new types of interactive learning media for improved quality, equity, and access in higher education (Rosswall, 1999). Researchers have also found that computers enhance teaching and learning by providing opportunities to practice and to analyze, offering better access to relevant articles and teaching and learning materials. Every classroom teacher should use learning technologies to enhance their students' learning in every subject - because ICT can engage the thinking, decision making, problem solving and reasoning behaviors of students (Grabe & Grabe, 2001). In fact, innovative use of ICT can facilitate student-centered learning (Drent, 2005), engage students in constructivist classrooms and enhance their social interaction (Dodge, Colker, & Heroman, 2003). It has been shown to improve their cognitive development (Nir-Gal & Klein, 2004), increase creativity (O'Hara, 2008), and improve their problem solving skills (Sarama & Clements, 2001). The International Society for Technology in Educational (ISTE) emphasizes that teachers of today should prepare to provide technology-based learning opportunities for their students (Hamidi, Meshkat et al. 2011). ICT use has increased dramatically over the last few years. In the developed regions, the percentage remains much higher than in the developing world (MDG Report 2010) (see Fig. 1). On the other hand, adoption and usage of ICT are not restricted to the developed countries, and several developing countries have adopted technology in their educational systems (Ihmeideh, 2009). For instance, in 2007, the Minister of Higher Education in Lebanon announced the distribution of 400 computers for public schools, connected to the Web through broadband1 (Nasser, 2008). In Kenya, Wims and Lawler (2008) examined the impact of ICT projects in educational institutions, and found tangible benefits to students from exposure to ICT. Based on the above importance of ICTs both to the learners and teachers every country aiming at entering the digital dispensation and enable its citizen to be part of the global dynamic digital consumers should enhance with speed the implementation, adoption and integration of ICTs to curriculum o seduction to all levels of education. Langat (2009) in his study on the availability and utilization of ICTs in the education and training of teachers in the universities was hindered seriously by lecturers incompetence in the relevant skills of integrating the use of ICTs into the curriculum, insufficient facilities and technologies, large number of students, Shortage of technicians and lack of technology funding criteria. Langat also (2013) in his study on mitigating factors and factors militating against the adoption and integration of ICTs in secondary schools in Kenya found out that the main militating factors against the use of ICT in secondary schools include, shortage of facilities, teachers incompetence in the area of integrating ICT fully into practical classroom teaching,shotage of time and lack of clear ICT utilization policy in schools among others. This study investigated barriers hindering this implementation in primary schools despite the idea being the main manifesto priority of the present ruling jubilee party.

1.1. Statement of the Problem
The background highlighted above shows eminent importance of mainstreaming ICTs into education to enhance greatly the process of teaching and learning. In spite of the belief of policymakers worldwide that ICT is essential for improving the quality of life for individuals in developing countries such as Jordan, research suggests that many factors play a part in effectively integrating ICT into economic and educational systems (Wheeler, 2000) Even though, ICT has a great potential to improve the educational system to a great extent, developing countries are far from reaping these benefits because of certain barriers. Two years down the line since the present ruling Jubilee party took over leadership and it has not fulfill its promise to introduce Laptops in standard one within a hundred days. What could be the real problem? The aim of this study was to investigate comprehensively on barriers encountered when introducing ICT into classrooms in primary schools in Kenya.

1.2. Objectives of the Study
This research was guided by the following objectives:
   i)   To investigate barriers hindering the implementation, adoption and integration of ICTs in Primary schools in Kenya
   ii) To assess the importance of using ICT in the process of teaching and learning in Primary schools.

1.3. Theoretical Framework
This study was well informed by two theories of adoption and innovation of ICT in teaching and learning processes in education namely: Marcus's Theoretical Model of Adoption and Diffusion of Innovation Theory.

1.4. Marcus's Theoretical Model of Adoption
According to Ankem (2004) Marcus's theoretical model of adoption of technology has been derived from the diffusion of innovation theory and the social learning theory.This model highlights the importance of innovative behaviour and the phenomenon of others

modelling themselves on this. Communication channels are a vital component in enhancing this modelling behaviour to other potential adopters. According to Ankem, this model explore three major influential factors in the take-up of innovations including the associated 'costs' - personal and institutional, the availability of necessary 'resources' - money, equipment, training, time, prior experience and relevant skills and the 'value' of the innovation-this illustrates the need to bring together a mix of personal and institutional factors for optimal take-up of innovations. Those factors relating to the institutions' ability to provide the conditions conducive to the introduction and acceptance of IT innovations could be used to map out an institutional framework for adoption. This theory therefore guided the investigation of factors hindering the adoption of ICT in primary schools in Kenya in relation to the financial costs, availability of resources attitudinal behaviours towards adoption among others. This study also investigated political conception and policy framework guiding implementation of ICT in education sector in Kenya.

1.5. Diffusion of Innovation Theory
The second and very closely related theory that informed this study was diffusion of innovation theory. Perry (2004) states that scholars in the diffusion theory field define diffusion as the process through which some innovation is communicated within a social system. Perry introduces the idea that 'time' is an important factor in the rate of diffusion. He also stresses the role of individuals and their social influence in the diffusion process Perry (2004). Scholars, like Rogers, who study communication, have concentrated on more theoretical approaches. Rogers' diffusion of innovation theory incorporates the innovation-decision process, innovation characteristics, adopter characteristics, and opinion leadership Perry (2004). Rogers' theory can be divided into three main components:
1. The innovation-decision process
2. The characteristics of an innovation, and
3. Adopter characteristics

These components are explored briefly below.

1.6. Innovation Decision Process
Every success in any field is largely influenced by the power of decision making. The 'innovation decision process categorizes the steps an individual takes from awareness of an innovation, through the formulation of an attitude to the innovation, on to the decision as to whether to implement, and finally confirmation of this approach. These five categories according to Rogers (2006) are: knowledge, persuasion, decision, implementation and confirmation. This process guided the adoption investigation of this study.

1.7. Characteristics of Innovation
According to Perry (2004) different innovations have different probabilities of adoption and hence, different adoption rates. This shows that, the characteristics of an innovation have an impact on the likelihood of acceptance and adoption of any new technology or behaviour, and also on the rate at which this process develops. These innovation characteristics have been classified into five criteria namely: compatibility, complexity, observability, relative advantage and trialability.

1.8. Adopter Characteristics
Adopters present characteristics plays a potential role in the process of implementation of any new technology. Rogers has defined the socio-economic characteristics of early adopters under three headings Rogers (2006): Socio-economic, personality values and communication behavior. Based on this guideline investigation was done on socio-economic factors, personality values among the instructors and communication behavior.

2. Literature Review

2.1. ICT in Education Policy in Kenya
Presently Kenya's education system is undergoing reforms in order to align itself with the elements of the Kenya vision 2030 and the new constitution. In afford to make the Re-alignment of the Education sector to the new constitution a task force (TF) was formed in January 2011 and commissioned by the minister of education Prof Sam Ongeri. In the context of ICTs in education the presentation on the report by the TF on February 2012 shows that only about 2% of schools in the country have the necessary ICT infrastructure. It recommended that ICT Institution framework be strengthened to allow efficient integration of ICT in the entire education sector with enhanced ICT capacity at all levels and for establishment of a National Centre for ICT Integration in Education (NACICTIE) and be devolved to counties. A survey report titled: 'Are our children learning? Annual Assessment Report by Uwezo Kenya for 2012, notes that there is only one computer out of 10 schools in Kenya and only 5 out of 10 use the for learning purposes..Meanwhile, only one out of ten schools has an e-mail address.

Policy in all the fields of development provides a roadmap that guide practice. In this case therefore it is very important to see the policy framework guiding the implementation and adoption of ICT in education sector in Kenya .According to the MoE (2006) the vision of the MoEST is to facilitate ICT as a universal tool for education and training. The document continue to state that in order to achieve this vision every educational institution, teacher, learner and the respective community should be equipped with appropriate ICT infrastructure, competencies and policies for usage end progress. It calls for recognition of the fact that ICT provides capabilities and skills needed for a knowledge-based economy. It also calls for transforming teaching and learning to incorporate new pedagogies

that are appropriate for the 21st century MoEST's mission is to facilitate effective use of ICT to improve access, learning and administration in delivery education programmes and services. The principal objective will be to integrate ICT in the delivery of education and training curricula. The existing education policy on ICT is imbedded in three documents namely; e-Government Strategy, National ICT Policy and Sessional Paper No. 1 of 2005 (A Policy Framework for Education, Training and Research). Need therefore arises for consolidation of these documents into one. What guide every project toward it success always are objectives and therefore the overall objective of the consolidation will be to merge and integrate education policy on ICT including the scope, usage, administration and ways to address innovations and attendant Intellectual Property Rights (IPR).

Strategic objective • To provide a framework for the review of the ICT policy and ICT strategy in the education sector. Benefits • Maintain the relevance and currency of ICT policies and strategies • Achieve a broader base for ownership by involving all stakeholders. Expected outcomes • Up-to-date ICT policy and strategy • Sustainable ICT driven programmes that are properly evaluated. These two objectives are very important but not SMART (Specific, Measurable, Achievable, Realistic and Time Bound).This study went out to investigate factors hindering the achievement of the said objectives.

2.2. Digital Equipment
The policy document also highlights on the digital equipment. The document explains that Although not exhaustive, the range of ICT that have been used in the delivery of education to improve access, teaching, learning, and administration includes: Electric Board, Audio Cassette, Radio for Interactive Radio Instructions (IRI), Video/TV-Learning, Computer, Integrated ICT infrastructure and Support Application Systems (SAS).

These systems are in use, at various degrees, in most parts of Africa. This plan envisages use of these digital components to improve access and quality in the delivery of education in Kenya.

The major challenge in respect to this component is limited digital equipment at virtually all levels of education. While the average access rate is one computer to 15 students in most of the developed countries, the access rate in Kenya is approximately one computer to 150 students. In addition, it is noted in the Education Policy Framework (EPF) that there are a number of challenges concerning access and use of ICT in Kenya. These include high levels of poverty that hinder access to ICT facilities, limited rural electrification and frequent power disruptions.

Where there is electricity, hindrances to application of ICT include, high costs of Internet provision, costs associated with digital equipment, inadequate infrastructure and support. The policy makes a commitment for provision of digital equipment to educational institutions, particularly colleges, secondary and primary schools. Whereas most secondary schools in Kenya have some computer equipment, only a small fraction is equipped with basic ICT infrastructure. In most cases equipment of schools with ICT infrastructure has been through initiatives supported by the parents, government, development agencies and the private sector, including the NEPAD E-Schools programme. Attempts to set up basic ICT infrastructure in primary schools are almost negligible.

Strategic Objectives • To equip education institutions with digital equipment to stimulate integration of ICT in education in various regions of the country. • To support initiatives that provides digital equipment to educational institutions, with priority to secondary and primary schools. • To establish a national PC assembly centre in Kenya to build computers specifically designed and earmarked for educational institutions. • To support refurbishment of ICT equipment. • To support establishment of mechanisms for disposal of obsolete digital equipment taking into consideration environmental concerns and regulations.

Expected Outcome The above-mentioned measures will improve equipping of educational institutions with digital infrastructure up to 80% in secondary schools and up to at least 10% in primary schools. The average access will be expected to improve from the current one computer for 150 students to one computer for at least 50 students in secondary schools.

2.3. The Present Kenyan Government Stand on ICT in Education
Apart from a well establish and supportive ICT policy in the education in Kenya it is also important to explore on the present position of the current political leadership .Right from the campaign period the Jubilee party manifesto had put a lot of emphasis on enhancing digital education through the provision of Laptops beginning with standard one. A laptop for every child joining standard 1 is one of manifesto pledges which President Uhuru Kenyatta reiterated on his inauguration. He promised that in the next 100 days, his government will lay down the ground work for the provision of one laptop per child joining class one. This was in tandem with the realization of the vision 2030.Since education falls within the social pillar of Vision 2030 therefore, the provision of laptops falls within the flagship project on establishment of a computer supply programme. In this digital era, it is important that all Kenyans who are at the age of school going among others are computer literate. It is a great responsibility of all the stakeholders to ensure that our children acquire literacy, numeracy digital literacy and essential life skills. The Jubilee government must have a workable ICT implementation strategy. The implementation must address the issues of quality and sustainability.

2.4. What is ICTs in the Context of Education?
It is very important to understand the meaning of ICT in the narrowed context of education. The United Nations Educational, Scientific and Cultural Organization (UNESCO) use the term ICTs, or information and communication technologies, to describe:
"…the tools and the processes to access, retrieve, store, organize, manipulate, produce, present and exchange information by electronic and other automated means. These include hardware, software and telecommunications in the forms of personal computers, scanners, digital cameras, phones, faxes, modems, CD and DVD players and recorders, digitized video, radio and TV programmes, database programmes and multimedia programmes" (UNESCO Bangkok, 2003, p.75, in Anderson, p.5).

In this case any kind of technology can be understood as a tool or technique for extending human capacity through teaching and learning process. In this sense, ICTs extend our human capacity to perceive, understand and communicate. The mobile phone enables us to speak from wherever we are to others thousands of kilometers away; television permits us to see what is happening on the other side of the planet almost as it happens; and the Web supports immediate access to, and exchange of, information, opinions and shared interests globally.

It is paramount to observe here that in the field of formal education, ICTs are increasingly adopted and integrated as tools to enhance the learner's capacity to perceive, understand and communicate knowledge. Most of the studies show that even though universities were certainly leading in engineering the Internet and interoperable computer systems to connect researchers for e-mail and data exchange, the use of ICTs for education and training has lagged behind other sectors such as medicine, engineering among others in the society. According to White (2005):

 "The use of ICT in education and training has only begun as access to ICT services and higher   bandwidths become more available to learners. The danger is that we ascribe to new technologies the characteristics of previous media and accompanying educational practices without development and reflection on new and better ways to support and evaluate learning outcomes."

Shahadad et al (2012) observed that in order to maximize the use these technologies in education, new pedagogies and learning assessment methods may, and probably will, be required. In this rapidly advancing field, it is worth reviewing the history, current uses and trends in ICTs that will further influence how education practices may be changed in future. Educators are continuing to develop new applications and online resources to support learning objectives in all disciplines. The field of environment and sustainable development education is no exception.

In the current world Information and communication technology (ICT) systems are widely used in various organizations. Their use has many favorable consequences, because they support interaction and collaboration, workplace learning (Andriessen, 2003), and work performance (Ciborra and Patriotta, 1996; Jones and Kochtanek, 2004; Nunamaker, 1997; Orlikowski, 1996). Several studies demonstrate that ICT investments are beneficial for performance and productivity (e.g., Bharadwaj et al., 1999; Hitt and Brynjolfsson, 1996). However, the implementation of an ICT system always entails both organizational and individual changes (e.g., Rogers, 1995, 395; Van de Ven, 1986), and therefore user adoption and establishing the use of ICT systems have proven challenging in organizations (Bullen and Bennet, 1990; Burns et al., 1991; Grudin, 1989; Kwon and Zmud, 1987; Orlikowski, 1993).

The challenges and problems associated with the implementation and adoption of ICT systems have led scholars and practitioners to seek to understand and manage the processes and phenomena related to the topic, spawning an extensive literature on the field (e.g., Jeyaraj et al., 2006).

Scholars with a lot of interest in the field of information communication technology have reviewed many literature addressing ICT implementation and adoption in organizations. Among them are: Jeyaraj et al. (2006) reviewed 115 empirical studies focusing on the coding of dependent and independent variables affecting ICT adoption. Venkates et al. (2003) reviewed user acceptance literature and discussed eight prominent models in order to propose a unified theory of the acceptance and use of technology. The Technology Acceptance Model (TAM) in particular has given rise to many reviews. Lee et al. (2003) made a meta-analysis and survey on 101 TAM studies. They focused on the progress, limitations, and future directions of TAM. Legris et al. (2003) reviewed 22 TAM articles. Their meta-analysis focused on the incremental development of TAM, and addressed the strengths and limitations of the model. Turner et al. (2010, analyzing 73 publications), King and He (2006, analyzing 88 papers) and Ma and Liu (2004, analyzing 26 studies) also performed meta-analyses of the results of TAM studies. Yousafzai et al. (2007) made a narrative literature review of 145 TAM papers to progress towards a unified view of TAM. Somewhat earlier reviews focus on Diffusion of Innovations (DOI). For example, Fickman (1992) performed a critical review of 18 empirical DOI studies. Largely most of the literature reviewed here focuses on the challenges of implementation integration and adoption of ICTs into various contexts of education sector. Prescott and Conger (1995) reviewed 70 DOI studies. They focused on the comparison of the research results in order to evaluate the appropriateness of using DOI theory. In conclusion it is vital to note that these reviewed literature provided a basis and a more focused roadmap for this study. It also clarified the problem and created a gap of knowledge in the present situation in Kenya's context.

3. Research Design and Methodology

 The use of survey was appropriate to this study because it `provided accurate information (Kerlinger, 1978). This design was used to collect descriptions of the existing phenomena. Cohen and Manion (1994) assert that the intention of a survey research is to gather data at a particular time and use it to describe the nature of existing conditions. The purpose of this design was to provide quantitative and numeric descriptions of some part of the population. This considered issues such as economy of design rapid data collection and ability to understand population from part of it. This is suitable for extensive and intensive research. (Oso and Onen 2005:32). Therefore it was relevant for this study.

This study took place in one of the counties in Kenya. The target population was 40 primary schools in with a population of 450 teachers. The sampling techniques that were used to select representative unit of the population were Purposive, stratified and simple random sampling. The researcher purposed 40 head teachers of all the primary schools in the county. Stratified random sampling was used to divide the nature of primary schools into private schools and Public schools sponsored by government. There were 10 private primary schools and 30 public schools. Simple random sampling was used to select 50% of the private schools and 50%of the public schools in total 20 schools were selected. Simple random sampling was also used to select 225 teachers to be administered with questionnaires.

Research instruments that were used to collect data were Questionnaires which were design to solicit information on the feelings, beliefs, values, attitudes and level of computer knowledge and skills among the teachers. Observation schedules were also design to guide the researcher in assessing the existing ICT equipments and facilities in support of the implementation of ICTs in the 40 Schools. Ethical considerations were put in place to make sure that research went on with full trust and protection of the respondents.

4. Research Findings and Discussions
Research findings of this study were guided by the following research objectives:
  i)   To investigate barriers hindering the introduction of ICTs in Primary schools in Kenya
  ii) To assess the importance of using ICT in the process of teaching and learning in Primary schools.

4.1. Barriers to the Implementation of ICT in Education
Although the Government of Kenya is committed to implementing ICT in education, the process is hindered by a number of barriers. The barriers hindering can grouped into: i) Shortage of infrastructure and Resources ii) Political barriers iii) Lack of clear digital curriculum iv) Poor Timing and poor planning v) communication barriers vii) high cost of implementation viii) teachers shortages ix) corruption and x) Moral issues and increase in crime rates.

4.1.1. Shortage of Infrastructure and Resources
Lack of equipment ICT equipment which include hardware, software and telecommunications in the forms of computers, scanners, digital cameras, phones, faxes, modems, CD and DVD players and recorders, digitized video, radio and TV programmes, database programmes and multimedia programmes   in most of the schools .In fact 94% of the schools observed do not have the said ICT equipment. One array of hope here is that 71% of the schools have been supplied with sufficient and reliable electricity which was mentioned by the respondents that it used to be the greatest barrier. It is worth nothing that the effective use of ICT would require the availability of equipment, supplies of computers and their proper maintenance including other accessories. All the schools observed have got shortage of good classrooms, the existing ones are not lockable and therefore pupils are forced by circumstances to carry their property to and fro school on daily basis. Of all the schools observed only two private schools had functional computer laboratories with computers which were donated by well wishers. Teachers noted in line with observation the issue that physical infrastructure in most of the schools is undeveloped and others are dilapidated.

4.1.2. Political Barriers
Political goodwill play a very important role in the development of a country particularly in Kenya's context. Political Factors Sharma (2003) states that the most notable of the barriers to the use of ICT in education in developing countries seems to be the political will of the people in the corridors of power. The allocation of sufficient funds for the educational sector and ICT does not seem to be very attractive to the leaders. It can be seen from the budgetary allocations in third world countries that greater allocations may be for the defense forces rather than education. In Kenya the idea of the introduction of Laptops in primary schools has received strongest opposition from the rival political parties and the case now in the law courts. The award of the sh 24.6 billion laptop tender to Olive Telecommunications has been cancelled by the public procurement Review Board on lack of financial capability to implement the project Wahito Margaret (2014) in Capital FM. Opposition parties were of the opinion that there is need to ensure that our children acquire literacy, numeracy and essential life skills. The Jubilee government must have a workable implementation strategy. The implementation must address the issues of quality and sustainability. The government should focus on expanding the ICT infrastructure to ensure wide access to power, infrastructure to provide widespread connectivity and equipment. They observed that most of the schools in rural area do not have sufficient classrooms and priority should go to that. They also questioned the sustainability of the laptop projects.

4.1.3. Lack of Clear Digital Curriculum
According to the teachers, the Government has not provided digital curriculum content for standard one. Teachers mentioned that the government should have started with training the within a period of two years so that they become prepared to implement the digital programme. They strongly believed that the project was political and populist in nature.

4.1.4. Poor Timing and Poor Planning
Most of the teachers mentioned that the project was ill timed. They mentioned that there are other pressing issues that need to be addressed instead of spending money on purchasing laptops for every child. They talk of critical issues that include childcare, building conducive and secured classrooms, enhancing of quality of education by hiring more teachers and increasing teachers pay to motivate the existing lot who are heavily overloaded and demoralized. Teachers mentioned that the laptop project was political and professionals in education were not consulted. Poor planning is another challenge. The introduction of most of the ICT programmes is based on copy and paste foreign programmes and not based on needs assessment. They lack in context and mostly they are based on political emotional promises.

4.1.5. Teachers' Preparedness to Implement the ICT in Schools

The findings of this study show that 98% of the teachers do not have computer and other digital skills leave alone adoption and integration skills. Most of the were not trained on the computer literacy skills and they have not been in-serviced. They have an opinion that the government should have prepared them first and build a well equipped ICT Resource centre in every school for all the pupils to use to ensure sustainability of the project. Most of the teachers however, are aware of the great potential that ICT brings to the learning process. They only complained of lack of effective planning by the Government and failure to be consulted in what will involve them in the long run.

4.1.6. Communication Barriers

Most of the failures in proper implementation of various policies in various organizations is as a result of communication breakdown or rather communication barriers. Respondents mentioned strongly that the government has not communicated to them effectively or professionally on the issue of laptop they only heard during political campaigns and over the media.

4.1.7. High Cost of Implementation

Another challenge is the high cost of implementation. The private schools mentioned that the cost of purchasing laptops and training teachers on ICT skills to enable them to adopt, implement and integrate ICT into the system successfully is very expensive. The greatest challenge here is balancing educational goals with economic realities. ICTs in education programs in most of the developing countries require large capital investments. Most of the existing ICT equipment were donated by private sectors and the greatest challenge is on maintenance of sustaining them.

4.1.8. Teacher Shortages.

Shortage of teachers is another challenge. Inappropriateness also comes in the situation whereby there is a shortage of teachers. The teacher pupil ration in most of the standard ones will not allow effective coaching. Individual attention will not be realized. The teachers mentioned that even normal teaching of simple literacy and numeracy skills in lower primary school is getting increasingly impossible due to high numbers of the pupils since the introduction of free primary education programme.

4.1.9. Corruption

Corruption rates in Kenya in all sectors are a major stumbling block to progress. Ministry of education in the recent years has experienced a lot of big scandals. Teachers expressed great fears and doubt if the project will survive the monster of corruption in this country. Kenya has been consistently ranked by Transparency International as one of the most corrupt among the researched countries (Bhuiyan 2011). As a result, corruption can be identified as one of the strong barriers to the implementation of ICT in education. The misuse of government funds which could have been used to develop other sectors like the integration of ICT in education is channeled in other directions i.e. few people benefit from those funds by pocketing all the money (Kessy et al, 2006). Mamun & Tapan (2009) state that the budget for the newer technology was misused and reduced due to corruption in the administration. Huge budgets are passed to buy modern teaching and learning materials for the improvement of the teaching and learning process, but in the end only minor improvements are found in the overall technical and vocational education sector.

4.1.10. Fear of Moral Issues and Emergence Crime

Most of the schools administrators also fear that unless effective ethical structures are put in place first the introduction of ICTs might impact negatively on the learners' behavior particularly if they are to carry them home every day. Fear also exists on the security matters. Administrators fear that these expensive cachets with poor infrastructure may attract high rate of crimes related to stealing and robbery.

5 Conclusion and Recommendations

5.1. Conclusions

This study on the investigation of the barriers hindering the implementation of ICT in Kenya's primary schools was guided by Marcus's Theoretical Model of Adoption and diffusion innovation theory. Literature reviewed was based on the actual meaning of ICT in the actual context of education being the tools and the processes to access, retrieve, store, organize, manipulate, produce, present and exchange information by electronic and other automated means. These include hardware, software and telecommunications in the forms of personal computers, scanners, digital cameras, phones, faxes, modems, CD and DVD players and recorders, digitized video, radio and TV programmes, database programmes and multimedia programmes. Review also covered the policy framework guiding implementation, adoption and integration of ICTs in Kenya and various potentials of using ICT in education. The findings of this study revealed that the main barriers hindering implementation of ICT in primary schools in Kenya include: Shortage of infrastructure and Resources, Political barriers, lack of clear digital curriculum, poor timing and poor planning, communication barriers, high cost of implementation, teacher's shortage, corruption and fear of moral issues and emergence crimes.

6. Recommendations

Based on the findings of this study the following recommendations are therefore suggested:

- Needs assessment analysis: this should be done whereby all the stakeholders will be involved in the process. These will ensure that the introduction of ICTs addresses the relevant needs on time. Technology should also not drive education; rather, education goals and needs, and careful economics must drive technology use.
- Proper communication channels: this should always be used to reach all the stakeholders on sensitive issues in education sector. This will clarify issues and avoid ambiguity and political stereotypes. Feedback in the communication process should also be encouraged from the stakeholders and consumers of the technology. Today's paradigm of production of goods and services is based on consumer needs and education sector is no exception.
- Professional development of teachers and technicians: Afshari et al, (2009) states that professional development is necessary for teachers to enable them to effectively use technology to improve student learning. Staff development should be collaboratively created, based on faculty input and school needs. It must prepare teachers to use technology effectively in their teaching. Langat (2013) in his research finding based on professional development of teacher educators discovered that the greatest challenge facing teacher training in Kenya lies within teacher educators who have not updated their training skills in line with the current trends and paradigm shifts in education sector. Teacher preparation through intensive, interactive and continuous in-service teacher education and development should be done by the government, private organizations and teachers themselves. Teachers should continuously develop their skills in order for them to be relevant.
- Partnership in education matters: The government should further strengthen partnerships to encourage participation of local institutions and civil society in ICT in education. Other than assign each child in standard one a laptop, the Jubilee government should set up an ICT Resource centre in every primary school.
- Digital curriculum: The government through the Kenya Institute of Curriculum Development should also prepare an effective and sustainable digital curriculum and involve teachers who are the implementers of the said curriculum. This special curriculum should have a place of ICT ethical considerations, etiquette and safety measures.

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