SUCCESSFUL IMPLEMENTATION OF ICT POLICY IN SECONDARY SCHOOLS IN MBOONI EAST SUB COUNTY IN MAKUENI COUNTY, KENYA

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Abstract: Information Communication Technology (ICT) has been used in education and training in most European countries during the last decade although the progress has not been the same in the various countries. The developed countries such as UK, most schools have undertaken the use of ICT in teaching and learning into their curriculum and demonstrate high level of effectiveness in the use and support in teaching and learning organization. The countries that have integrated ICT into their education system have reaped benefits since their teachers and students are able to construct rich multi-sensory, interactive learning environments with far reaching teaching and learning potential as a result of ICT integration. On the contrary, many developing countries in Africa are deficient of technology, that is, the countries lack access to knowledge that is acquired by use of the internet. African countries have invested heavily in setting up ICT infrastructure in readiness for shifting towards embracing its use in schools.

Kenya came up with her National ICT policy that was launched in 2006 in response to the ICT issues raised in seasonal paper No.1 of 2005. The policy was meant to ensure that the nation achieves part of the Millennium Development Goals (MDGs). The policy framework of the Ministry of Education pointed out a number of challenges concerning access to and use of ICT in Kenyan schools, including high level of poverty, limited rural electrification and mains electricity distribution being the major setbacks. The use of information and communication technology (ICT) in Kenyan education is lagging behind expected and desired levels. This was shown by the fact that while a good number of secondary schools have considerable number of computer equipment; only few principals and teachers have basic ICT skills necessary for teaching and learning using the available ICT tools. As a matter of fact, ICT in education is used to promote information literacy that is the ability to access, use and evaluate information from different sources so as to enhance teaching and learning, solve problems and creation of new knowledge. Based on these findings the researcher concluded that the rate of ICT policy implementation in secondary schools in Kenya is sluggish, as characterized by inadequate IT literacy, high cost of funding ICT programmes, inadequate infrastructure, lack of psychological and technical preparedness and insufficient policy guidelines for the implementation process and ICT adoption.

Keywords: Information technology, ICT Policy, Enhancing, ICT Tools, Teaching and Learning, Information and Communications Technology (ICT), ICT Adoption.

1. INTRODUCTION

The acronym ICT means Information and Communications Technology or Technologies. This terminology generally describes the process of creation, modification, storage and transmission of information, in diversified formats, between human beings and machines alike all over the world, using various electronic technologies, to achieve an outcome (Okauru, 2012). Information and communication technology is an umbrella terminology that includes any communication device or application, including and not limited to radio, television, cellular phones, computer and network hardware and software and satellite systems, as well as the various services and applications associated with them, such as videoconferencing and distance learning (Kundishora, 2003). ICTs can have a positive impact on governance and other sectors of the economy of a country including the education sector but there exists a digital divide in the various sectors. The digital divide is characterized by highly unequaled access to and use of ICT and manifests itself both at the international and domestic levels hence needs to be addressed by national policy makers.

Kenya's ICT policy is embedded in the Kenya's Vision 2030. A policy is a given course of action selected from among alternatives and in light of given conditions to guide and determine present and future decisions (Merriam-Webster, 2017). Kenya has had her draft policy framework on ICT drafted and ready to be tabled in Parliament for adoption and eventual enacting of an Act of Parliament on ICT (GoK, 2005). The Government of Kenya appreciates and recognizes that, an ICT literate workforce is the foundation on which Kenya can become a knowledge based economy. In this realization, Kenya laid her strategy to make education and training the platform for equipping the nation with ICT skills in order to create a dynamic and sustainable economic growth. As a result this paper will assess successful implementation of ICT policy in educational institutions in Kenya.

1.1 Background of the study

Information Communication Technology (ICT) has been used in education and training as a priority in most European countries during the last decade although progress has been varying in different countries (Pelgrum, 2005). Some of the countries have adopted use of ICT and perfected infrastructure at a faster rate. In most developed countries such as UK, schools have implemented the use of ICT in teaching and learning into the curriculum and demonstrate high level of effective and appropriate use to support teaching and learning. (OECD, 2004). This is not the case in developing countries where most of them are struggling to put up ICT infrastructure.

(Haggins, 2005) Points out that, countries that have integrated ICT into their education system have benefited by creating enabling environment for teachers and students to construct rich multi-sensory, interactive environments with far reaching implications on teaching and learning potential resulting from ICT integration. Computers and internet are useful in increasing teachers' basic skills and subject mastery, to provide resources that can later be used in classroom, and to help teachers to familiarize with specific instructional approaches. The ICT tools increase interaction and collaboration amongst teachers of a particular subject hence form a platform for sharing teaching and learning ideas.

The fast growth of the global economy and the information based society has put pressure on education systems all over the world to use ICTs to teach the 21st Century skills to learners (World Bank, 2004). The growth of the ICT sector has challenged teachers to prepare for effective use of the new teaching and learning tools in their teaching profession (UNESCO, 2002). In Kenyan case, all teachers periodically undertake in service training commonly referred to as INSETS in professional development.

On the contrary, many developing countries in Africa are living in a state of technological deficiency, that is, lack of access to knowledge that is learnt via the internet (OECD, 2006). African countries have over the years invested heavily in putting up ICT infrastructure in a bid to catch up with the use of ICT which is evolving faster than the countries can manage.

New partnership for African's Development, (NEPAD, 2003) emphasizes that technologies can play an important role in enabling students gain skills and knowledge in the teaching and learning process. In Kenya, sessional paper No.1 of 2005 emphasizes that ICT skills play a key role in Promoting the economic development of a country MOEST (2005). As a result, the government recognized that an ICT literate workforce is the foundation on which Kenya can acquire the status of knowledge based economy.

As a result, the government of Kenya has made education the key to equip the nation with ICT skills in order to create sustainable economic growth.

The National ICT policy was launched in 2006 in response to the issues raised in seasonal paper No.1 of 2005 according to MOE, (2006). It was also meant to ensure that the nation achieves part of the Millennium Development Goals (MDGs). The policy framework of the Ministry of Education in Kenya indicates a number of challenges concerning access to and the use of ICT in Kenya. The challenges include high level of poverty, limited rural electrification and mains electricity distribution among others. Most secondary schools have some computer equipment, however, this consists of a few computers in the schools for office operations. Very few secondary schools have sufficient ICT tools for teachers and students. Even the schools, which have computers, the students-computers ratio is low and principals and teachers lack vital expertise to use them effectively in teaching and learning process.

1.2 Problem statement

The use of information and communication technology (ICT) in Kenyan education has lagged behind expectation and desired status. This was shown by the fact that while most secondary schools have some computer equipment, only few principals and teachers are equipped with basic ICT skills necessary for teaching and learning. ICT in education is useful in promoting information literacy, the ability to access, use and evaluate information from different sources so as to enhance teaching and learning, solve problems and create new knowledge. ICT can increase access to education network for students and teachers besides broadening availability of quality education material for emerging global economies.

According to (GoK, 2006) if secondary schools in Kenya provide access to ICTs, there would be improvement in quality of education that would enable improved productivity and competiveness of Kenya's human resource pool by developing a highly skilled human resource base to respond to social and economic challenges.

However, it was noted that, Mbooni-East sub County of Makueni County like many other sub counties in the county still had limited scope in computer use in secondary schools. Statistics from the sub county Director of Education's office indicated that only eight Secondary schools out of forty eight (48) had established infrastructure for integration of ICT in teaching and learning. This translates to 16.67% of the entire sub county's secondary schools. The significance is that over 83.33% of the schools had not embraced the use of ICT in teaching and learning. Consequently, the use of ICT in Mbooni East sub county can be termed negligible. This meant that learning outcomes of the students in secondary schools in the sub county might be dismal due to the absence of ICT infrastructure in most of the secondary schools.

This short fall in learning outcomes created a "gap in ICT tools availability and use" at secondary schooling where it is important to acquire skills and competencies needed to become empowered to respond to social change in societies. Without ICT in education and failure to restructure education practices to embrace ICT in schools in the sub county, might be the main bottleneck preventing the students from acquiring equitable access of educational opportunities for quality life. This can be attributed to limitation in implementation of ICT policy in educational institutions. Therefore, the researcher intended to find out whether there is successful implementation of ICT policy in secondary schools in Mbooni-East Sub County by embracing ICT integration in teaching and learning.

1.3 Research objectives

(i) To examine the availability of ICT tools for use in enhancing teaching and learning in Mbooni East Sub County.

(ii) To establish the extent to which principals and teachers of secondary schools in Mbooni East Sub County are endowed with skills on ICT use in enhancing teaching and learning.

1.4 Research questions

(i) To what extent had secondary schools in Mbooni-East Sub County of Makueni County established ICT tools for use in enhancing teaching and learning?

(ii) To what extent were principals and teachers endowed with skills on ICT use in enhancing teaching and learning in Mbooni-East Sub County in Makueni County?

2. LITERATURE REVIEW

2.1 Introduction

This chapter discussed literature on implementation of ICT policy in educational institutions through acquisition of ICT tools and equipment and training of principals and teachers for effective use of ICTs in administration, teaching and learning

by ICT integration in line with ICT policy of 2006. According to (GoK, 2006), the vision of ICT policy was "A prosperous ICT-driven Kenyan society" and mission "To improve the livelihoods of Kenyans by ensuring the availability of accessible, efficient, reliable and affordable ICT services."

The main objectives targeting educational institutions were:-

a) To encourage the use of IT in schools, colleges, universities and other educational institutions in the country   so as to improve the quality of teaching and learning;

b) To provide adequate infrastructure in the country for IT   sector to flourish;

c) To facilitate the development of sectoral IT policies and strategies for example: e-education, e-water, e-health, and e-agriculture.

Literature will be reviewed along this line to see whether the ICT policy has been successfully implemented in educational institutions with emphasis to secondary schools.

2.2 Acquisition of ICT tools and equipment

The education sector in Kenya has realized that Information and Communication Technology (ICT) has direct role to play in education provision and has many benefits when used in the classroom as well as education and training processes in general since use of ICT will expand access in education through distance learning and e-learning. However, the education sector is faced with challenges of enhancing access through use of ICT. This is due to high levels of poverty, limited rural electrification and frequent power disruptions, high costs of ICT equipment, inadequate infrastructure and lack of support from well-wishers and donors. The education sector will endeavour to mainstream ICT education and training and adoption across the education system starting from primary schools through secondary schools to colleges and universities in order to enhance ICT skills to both learners and staff (RoK, 2006).

This report points challenges to ICT access since the inception of ICT policy in the year 2006. Despite these challenges, the government has made efforts to enable access in all educational institutions as evidenced by the initiative of providing ICT tools and equipment through creation of ICT Centres in Secondary schools in the year 2011 and the digital learning for primary schools according to the Jubilee Manifesto in the year 2013.□

2.3 Enhancing effectiveness and efficiency of education administration in educational institutions

New technologies like embracing Education Management Information Systems (EMIS) use can help improve the quality of administrative activities and processes including human resource management, student registration and monitoring student's achievements in assessment tests (Mugenda, 2006). The government has also launched National Education Management Information System (NEMIS) where all the educational institutions in Kenya are required to capture students' data comprehensively and the institutions data for ease of management.

2.4 Teachers pedagogical skills in teaching and learning

Teachers are a key component in the learning environment. The impact of ICT on teachers and the strategies they employ to facilitate teaching and learning is critical. Teachers sometimes appear to assume that using ICT to support learning requires change for all whereas some teachers have been creating appropriate learning environment for teaching and learning over the years without using ICT, however, teachers need to use ICT because in doing so, they will provide even better learning environments (Barker, 2000). The use of ICT in teaching and learning has varied impact on teachers and learners and the entire education system. Technology is dynamic and teachers need to update their knowledge in ICT besides subject content to avoid becoming obsolete and irrelevant as concerns 21st century skills.

2.5 Access to information

ICT enables teachers to access information for supporting them in trying out new strategies, thinking and reflecting on teaching and learning practice and engaging with new materials. A teacher needs support in making use of new technologies to enhance personal work before learning to use the technologies in their teaching. Much of this support may be accessed more readily using ICT (Reginald, R, & T, 1996). By embracing ICT integration, the teachers will be ambassadors of learning to learn and the same will be passed on to the learners. The 21st century teacher is a facilitator and co-learner hence when equipped with ICT skills, the facilitation of learning would be smooth and enjoyable.

3. METHODOLOGY

3.1 Introduction

This section contains the approach used to carry out the study of successful implementation of ICT policy in secondary schools in Mbooni East Sub County. The section includes the research design, data collection methods, the target respondents and data analysis tools and practices. Being a case study, the research was largely exploratory utilizing qualitative research methods.

3.2 Research Design

A case study methodology was used. A case study research is a method used that focuses on accumulated case histories that are analyzed with a view of formulating general principles. Case studies place emphasis on detailed contextual analysis of a limited number of events or conditions and their relationships with the intention of drilling down the broad subject into a specific case.

The design sought to gather facts on what was already known through previous studies or reports on the subject of study.

The design approach was through reviewing existing literature and information and through conducting interviews from selected respondents in secondary schools in Mbooni-East Sub County in Makueni County. Case studies approach was found to be suitable for the study since it is possible to orderly and efficiently classify the units selected for research based on data and information collected. The key feature in a case study is that multiple methods are usually combined to shed light on a case at different angles through use of a combination of many research methods.

4. RESEARCH OUTPUT

Analysis and findings of the study are presented in this chapter. Information on the secondary school principals who responded on the challenges of implementing the ICT policy in their schools is provided. A total of 20 principals from mixed day and boarding schools were involved in the study.

The objective one was covered by looking at the following areas:-

Initial cost of ICT installation and maintenance costs – it was found out that a good number of secondary schools in Mbooni-East sub-county were not able to do the initial installation of ICT tools since the cost was high and the schools were experiencing funding gaps and were unable to start off. Only 10 schools which were funded under the Ministry of Education had done the installation. The connectivity and maintenance is posing challenges to the schools with the ICT tools.

The schools require funds for hardware, software acquisition, infrastructure – utilities connectivity and service cost for completeness of ICT adoption in secondary schools, the issues of funding need to be addressed and coordinated at National level to ensure equity and universal access among extra county and county secondary schools especially this time when the Government has a policy for Free Day Secondary Education where extra levies are being discouraged.

Analysis of factors limiting implementation of ICT policy in secondary schools in Mbooni East Sub County revealed the following.

(i) There is high cost of initial installation of ICT tools.

(ii) There is high cost of maintenance of ICT infrastructure.

(iii) The schools lack adequate ICT facilities and Equipment.

(iv) ICT support services costly.

(v) There is high cost of Educational support software.

(vi) Most schools lack funds to hire and sustain ICT personnel.

In objective 2, it was noted that, only few Principals and teachers are endowed with skills to use ICT tools in teaching and learning processes. Majority of the teachers indicated that they needed in-service training so as to be able to use the Computers, Projectors and internet services.

This was due to the factor that few teachers attended E-learning workshops/conferences the main reason being they did not see the needs to attend the workshops when their stations lacked the ICT tools hence attendance would be a waste of time.

Access to literacy courses by Principals and teachers was also considered which included ease of use of computer aided applications, exchange and retrieval of information, and use of internet enabled communication.

It was revealed that most of the secondary schools did not have ICT literacy training for teachers which is a strong indicator of low levels of IT competency in the secondary schools leading to absence of ICT driven instructions in classes hence widening the digital divide between the learner of developed and developing countries which slows down full realization of information society in the country towards achievement of vision 2030.

Consequently, most teachers in secondary schools continue to hold on content matter and delivery methods acquired during their formal training where learning was textbook centred and teachers as transmitters of knowledge through chalkboard, discussion and lecture as opposed to current tread which involves teachers as facilitators of learning through interactive white boards, computer aided lessons, LCD projectors and internet enabled content.

There is need for teachers to be retrained in pedagogical skills in the use of technology in classroom if potential of new technology is to be realized in improvement of teaching and learning. Unavailability of the ICT literacy training in secondary schools is a wide barrier for attaining requisite skills and huge impediment for ICT integration.

Most schools have ICT policies but on close scrutiny, the policies are not operational since observable indicators point out a very low level of usage of ICT tools in teaching and learning. ICT policies in secondary schools have not been institutionalized fully mainly because of absence or unavailability of ICT tools and equipment, electric power and where installation has been done, maintenance challenges.

All is not lost in secondary schools on ICT use a part from the integration bit. Other computer aided educational activities which include production of examinations. Teachers and students information storage has been adopted in most schools since one computer/laptop can perform the tasks.

The use of ICT technology in offices is evident. Use of database management systems, EMIS management software has improved school management capability and hastened production of vital documents like students' progress reports, newsletters, and budget statements among others.

Absence of observable electronic aided class activities is a major drawback to ICT integration and makes the country to lag behind on real diffusion of computer for instruction in secondary schools and implementation of National ICT policy.

5. SUMMARY, CONCLUSION AND RECOMMENDATION

5.1 Introduction

The study aimed at establishing effective implementation of ICT Policy in educational institutions particularly secondary schools in Mbooni-East Sub County in Makueni County, Kenya. Two specific objectives and corresponding research questions were used to guide the study. This chapter is organized in the following sub-sections; Introduction, summary of the findings, conclusions and recommendations.

5.2 Summary of Findings

The role played by Information and Communication Technology (ICT) in education sector is vital for boosting teaching and learning and for effective administration. However despite recognition of its role by government through national ICT policy, e-government and ICT for education strategies in promoting effectiveness and efficiency in service delivery, its implementation in Kenyan secondary schools has taken a snail's pace. This study assessed the factors affecting the successful implementation of ICT policy in secondary schools in Kenya through a case study of schools in Mbooni-East Sub County.

Results show that there is high student to IT teacher ratio, with one IT personnel against entire school population including other teachers in need of basic skills; high student to computer ratio, with most of the schools in Mbooni East Sub County having only one computer laboratory equipped with 20 computers against a population of 400 to 600 students. However most of the schools with this facilities, very few have internet access and utilize less than 40% of available infrastructure due to lack of connectivity and requisite human capital.

The findings show a significant and a fairly positive linear correlation between ICT Policy implementation pace with: IT literacy, connectivity and availability of ICT tools and equipment. The aspects used to assess the pace of ICT Policy implementation are summarized below.

5.2.1 Initial Cost of ICT Installation and Running

The findings show lack of sufficient funds for ICT driven activities in secondary schools in Kenya. There are few resources that are directed towards ICT enabled programmes with less than half of the schools in both public and private showing some sufficiency of funds for implementing ICT to support education activities. However, the high cost of installing ICT programmes is highly slowing the rate of its integration in learning institutions. Through multiple response analysis, the study established that the main source of funds for installation and running ICT projects in schools is School fees paid by parents, therefore there is a great need to adequately address the importance of ICT uptake to parent so as to enhance their support.

The high cost of ICT installation, high maintenance cost ICT, inadequate ICT facilities and equipment, high cost of ICT support services, high cost of educational soft-ware and lack of funds to hire and sustain ICT tools in the secondary schools limit implementation of ICT policy. This means that high cost of installing ICT related programmes is an immense barrier to universal access, usage and implementation of ICT for educational programmes in secondary schools in Kenya. For all secondary schools to fully embrace ICT the high cost has to be addressed critically by all stake holders and interest groups for realization of a mutual social, economic and political growth that is all inclusive irrespective of social class, gender, religion or race. The government should develop a mechanism of schools ICT Fund subsidy which should be forwarded yearly to all schools specifically for ICT programmes.

5.2.2 Competency in Information Technology

Thorough knowledge of computing, communication and internet use is an educational ingredient for the 21st s century that schools can't just ignore. Despite wide awareness of its high potential, secondary schools are yet to fully embrace ICT in their core educational activities. This has left teachers with no requisite skill on ICT usage in their teaching subject while school managers seem to be silent and slow on the issue, since on average, schools which have embraced some ICT do not have any ICT-literacy related training for teachers. This has not only hindered access to more rich content but has made teachers to view ICT as a complex subject which should be handled just like other subjects of the curriculum.

Currently, computers are widely used in schools for office work mainly in examinations processing, analysis and data repository. However, schools which have embraced ICT have adequate literacy course for students, though offered as a subject rather than a tool of learning, putting the policy guidelines on literacy course for student in question. On the other hand use of internet for acquisition of materials for use in teaching and learning such as online tutorials and reference notes in regards to lesson preparation and instruction was very relevant though most of schools are yet to establish a website and an e-mail system which emphasizes the importance of improving internet connectivity in learning institutions as outlined in the National ICT Policy. However, the use of e-mails for communication in secondary schools to parents and guardians in most schools was not possible, implying that email is not a frequently used means of communication within the schools.

In terms of IT competent personnel in the secondary schools, the findings show that most schools had only one qualified information technology personnel/computer teacher against the entire school population. This limit use of a very reliable and compatible tool of learning as established by this study, thus disadvantaging the leaner and future human capital who are key for knowledge economy.

The significant positive linear correlation between the pace of ICT Policy implementation and IT literacy in secondary schools imply that the higher the levels of IT literacy in secondary schools the more quality and enhanced applications that are used and the higher the rate of ICT Policy implementation in the learning institutions. To promote IT literacy in secondary schools the study proposes that, the schools , governments and civil society should work together in leveraging IT workshops and conferences for teachers through incentives, constant monitoring and evaluation of implementation mechanisms as well as offering alternate affordable solutions. Retraining of secondary school teachers in IT courses is paramount for the nation to drive the economy from developing to a middle level economy.

The ministry of education developed ICT strategy for education to guide integration in education sector and the strategy point that ICT policy for education is embedded in National ICT Policy and e-government strategy is a condition that has

made the policy document and strategy inaccessible to secondary schools. Despite this documents being accessible on-line, very few schools have the requisite infrastructure and human capacity to efficiently inter-twine it content.

National ICT policy recognizes the importance of integration of emerging technologies in education sector through general and hanging statements on electronic learning and infrastructure, for instance the policy statement like, "there is need to encourage the use of IT in schools, colleges, universities and other educational institutions in the country so as to improve the quality of teaching and learning" lacks the how-to aspect. This requires the ministry of education to develop a more focused policy since their current strategy contains mainly unclear general and hanging statements just a borrow from the national policy. The education ministry ICT strategy is a bold step in the right direction though it contains a lot of mix-up of objectives for its staff, tertiary, secondary and primary schools thus it is necessary to make adjustments and address every institutional level separately for easier distribution and implementation of identified strategies.

The ICT strategy for education has rich objectives for education sector such as "ICTs adoption and utilization to improve access, quality and equity in delivery of education services through deployment of ICT equipment to schools and conduct workshops/seminars as well as review the policies" the question here is how is operationalization being undertaken? Since most of the objectives timelines has already passed and very little is happening in learning institutions. This implies that the document is formulated by ministry officials and for their offices and the few with capacity to access the internet, while its use has not been realized.

However as ICT permeates education system, the indicators that are used for assessing adoption pace may vary and thus learning outcomes depends on concomitants variables which have to change or be changed to accommodate the expected or the actual impact of ICT integration.

From an operational perspective, while it is expected that students learning outcomes are influenced by pedagogical practices, there is need to acknowledge that the outcomes influence the successive instructional decisions of the teacher. Where the school and system factors influences teacher characteristic, the later influences pedagogy and learning outcome of a system. Thus integration of ICT in education involves inter-relationships between; policy/strategy – input – process – output / outcomes of the system. The following statements illustrate ICT inputs and expected outcome in education sector.

1. Provision of ICT policy for education, goals and incentives – this would raise education standards.

2. Providing schools with ICT facilities – this would increase access and enhance usage of ICT in teaching and learning activities.

3. In service training of teachers on ICT enabled pedagogy – results to a more enhanced learner's performance evaluation, monitoring and improved achievements.

4. Digital content provision – makes teaching and learning more efficient.

This case study identified key aspects affecting implementation of ICT policy for educational institutions as in secondary schools as: high cost of funding required, user's complex perception in usage, low IT literacy, inadequate connectivity and absence of a sufficient policy framework that addresses ICT implementation in schools. Despite having promulgated the national ICT policy half a decade ago, and having formulated ICT strategy for education sector, these policy documents do not adequately address ICT implementation needs in secondary schools. While the national ICT policy remains silent on the cost, perception and competency, the ICT strategy for education is unclear, patchy and inconclusive on areas of infrastructure, cost, and IT literacy as it remains silent on user's attitude and how it shall be operationalized in secondary schools.

5.3 Conclusion

On the basis of the research findings, it was concluded that the pace of ICT policy implementation in secondary schools in Kenya is very slow, as characterized by inadequate IT literacy, high cost of funding ICT programmes, inadequate infrastructure, lack of psychological and technical readiness and insufficient policy guidelines. Accordingly the major factors affecting ICT policy implementation in public secondary school are the IT literacy; connectivity and policy aspect. The statements below respond to the two research questions that guided this study.

☐ the cost of funding ICT programmes at the start is high and high running cost has led to low rate technological advancement in secondary schools in Kenya.

☐ Sluggish perception change as a result of inadequate psychological preparedness has led to reduced technology acceptance and usefulness in secondary schools.

☐ Information technology literacy deficit in secondary schools has limited the usage of emerging technologies in leveraging teaching and learning.

☐ slow connectivity and unreliable network speeds has hindered full access to internet resources, e-mail use and resource sharing in secondary schools in Kenya.

5.4 Recommendations

1. This study recommends the ministry of education to improve on the current ICT strategy for implementation frame work to address specific needs of individual institutions per level. Tertiary institutions, secondary schools and primary schools' needs to be addressed regarding their priorities. These levels in education sector have different needs, both in their core duties, infrastructure and human capacity requirement and thus need to have specific targets, mechanisms and timelines addressed separately for Education Sector to attain any tangible and observable ICT diffusion levels.

Accordingly different institutions within levels may be at different stages of ICT policy implementation hence the policy frame work should be whole inclusive to address needs of different implementation stages.

2. The researcher recommends the government to increase the ICT budget to address implementation challenges in secondary schools since the findings showed that high cost of funding of ICT programmes is highly negatively influence ICT integration. Increased ICT budget should be provided to empower the operations of ministry of information and communication as well as the ministry of education with a focus of bringing down the cost of ICT policy implementation.

In addition, the government need to set an ICT funds kitty alongside the free education tuition fees to address specifics like; maintenance cost of ICT, cost of facilities and equipment, cost of support services that enhance ICT learning activities, prices of educational support software and funds to hire and sustain ICT personnel in schools since these were found to slow the rate of ICT adoption and policy implementation in secondary schools.

3. The study recommends use of internet connectivity in the learning institution to enable resource sharing among them. Establishment of standard local area networks (LANs), wireless systems such as VSAT technologies and institutionalization of EMIS should be prioritized. The government to reconsider her policy target of ensuring all secondary schools and tertiary institutions have affordable internet access by the year 2010 since it did not become a reality. This should be done through use of strong and effective servers that are able to transfer data at high speed or use of the recently launched internet through the use of fibre optic connection for improving the connectivity efficiency, learning environment, e – mail access and enhance sharing of resource like; online examinations and online dissemination of other educational curricula.

4. The study established that negative user attitude inhibits achievement of ICT potential. It was also observed that there is dismal IT literacy levels in secondary schools, thus the researcher recommends the government through its ministries, agencies and other stake holders to improve the ICT infrastructure in schools especially in relation to; educational support software, ICT interconnectivity, internet connectivity speed, and policy guidelines regarding ICT workshops and conferences as well as retraining programmes for high school teachers to enhance implementation of ICT policy in schools. This will ensure both psychological and technical skill readiness of teachers are addressed so as to reverse the slow rate of ICT policy implementation trend and improve the pace of diffusion in the secondary schools in Kenya.

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