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SUCCESS FACTORS FOR IMPLEMENTATION OF ICT IN EDUCATIONAL INSTITUTIONS IN KENYA

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ABSTRACT

The study consists of a literature review of strategies used in the implementation of ICT in the Education sector in Kenya. Management of public schools including allocation of resources and acquisition of infrastructure falls within the mandate of the Director of Education. In private schools, educators lack forums from which they can review guidelines on implementation of ICT in Education. In order to achieve a coordinated approach to implementation of ICT in Education a systematic change management approach needs to be adopted at the national, county and institutional level. This research study provides an overview of the requirements for successful implementation of ICT in Education in order to facilitate planning at the national, county and institutional level.

KEYWORDS: Information; Communication; Technology; Education; Primary Schools; Administration

INTRODUCTION

Background

Education is an important socio-cultural factor that shapes the industrial, technological and socio-economic development of a country. Education nurtures scientists who engage in research and development of scientific and technological innovations. Education increases the human development index, improves productivity and this leads to higher income per capita and improved standards of living.

Determining the challenges facing educators, administrators and implementers at the school level is crucial for successful implementation of ICT in Education. It is important to measure the impact of ICT on student performance, pedagogical practices, curriculum development and improving school administration in order to determine the success. Implementation of ICT in Education involves diagnosing the need for change, and developing strategies that can lead to innovative and integrated processes of increasing student achievement and improving school administration.

The National ICT strategy for Education and Training was formulated by the Ministry of Education in June 2006 in order to facilitate the integration of ICT in Education. The National ICT strategy aims at modernizing the educational system in Kenya, improving quality of education and training and responding to the needs of the economy and society (ICT4E Kenya,). This can be achieved by introducing new pedagogical practicesthat cantransform teaching and learning. Goals of the ICT in Education policy include integrating ICTs in teaching curriculum at all levels of education, establishing e-educational networks for sharing educational resources, promoting e-learning at all levels of education, as well as encouraging ICT training for decision-makers (MoE, 2006).The policy also aims at improving administration in delivery of educational programs and services (MoE, 2006).

Challenges on integration of ICT into African education systems revolve around lack of clear policies and action plans at the national level and school level (Gakuu, Kidombo, Bowa, Ndiritu, Mwnagi, and Gikonyo,). In order to scale up system-wide acceptance of educational change, there is need to evaluate whether ICT policies and strategies areeffective in meeting requirements at the national and school level.

Forecasts on government-led ICT projects in developing countries indicate that most projects have not been successful. Ogembo, Ngugi, Pelowski (2012) suggest that 35% of government-led projects in developing countries fail, 50% of are regarded as partial failures while only 15% of these projects are considered successful. Ogembo et al., (2012) suggest that computerization programs fail to address priority needs of schools in the rural areas and that the schools in the rural areas have difficulties overcoming challenges with acquiring needed infrastructure. According to Forje (2008), in most African countries the National development strategy for Science and Technology and Research and Development fail because of institutional incapacity, lack of theoretical foundation, lack of understanding of technological problems and decision processes, inadequate research resources and research methods (Forje, 2008).

Development, application and utilization of science and technology policiesare fundamental for sustainable development (Forje, 2008). An enabling environment for technology policies incorporates socio-economic, cultural, industrial, political and development forces (Forje, 2008). The technology policies should accommodate for different geographical and societal levels and it should be capable of incorporating the indigenous knowledge of the people into the development process (Forje, 2008).

LITERATURE REVIEW

The provisions needed for successful implementation of ICT include access to computers, network and internet access, national education web portals for sharing resources and experiences, ICT-based curriculum, technical support, staff development, leadership in integrating ICT into teaching and learning process (Pelgrum& Law, 2003).Technological factors, organizational capacity, content and user characteristics influence the rate of adoption and integration of ICT into teaching (Nyamabane&Nzuki, 2014; Stockdill& Morehouse, 1992).

The Benefits of ICT in Education

ICT has revolutionized the education, health, agricultural and financial services sector. In the Education sector, ICT refers to the use of ICT as an essential tool and medium of instruction as it introduces new pedagogical approaches to teaching and learning (Pelgrum& Law, 2003).ICT can also be taught in schools as a subject such as computer science (Pelgrum& Law, 2003).

ICT has a positive impact on educational attainment (Bector, 2002; Aristovnik, 2012). ICT can help raise the quality of education (Zaman, Shamim and Clement, 2011; Nyamabne &Nzuki, 2014). It can strengthen the teaching of mathematics and sciences in Kenyan secondary schools as these subjects are poorly performed (Sulungai, Toili &Amdalo, 2014). ICT enables students to research and thus further their understanding. ICT motivatesstudents and encourages them to be more creative and communicate effectively using social media or email. ICT promotes creativity among learners and enables them to be effective problem solvers (Aristovnik, 2012). ICT has a positive impact on learning outcomes (Aristovnik, 2012). ICT enables educators to achieve better teaching and learning outcomes in the classroom. The benefits of integration of ICT in education include the opportunity to restructure educational curricula and classroom facilities so as to bridge the existing technology gap in learning and teaching (Nyambane & Nzuki, 2014). Key pedagogical methods that

can be gained from ICT applications include experience-based learning, and systems thinking (Paas, 2008). ICT can used to supplement classroom-based activities (Paas, 2008). ICT can also be used to enhance collaborative project-based learning and problem-based learning (Fullan, 1999; Swamy, 2012).

Perceptions on the impact of ICT on educational goals indicate improvements in examination outcomes, rapid expansion of knowledge, improved communication and technical efficiency, capability for developing an enabling learning environment where students gain skills that are fundamental for competing in the global "knowledge" economy (MoE, 2006).

Infrastructure

In Kenya, few schools have the needed ICT equipment. The ratio of computers to students in secondary schools is 1:120 while in primary schools it is 1:250 (MoE, 2006). This has created an uncoordinated approach to imparting ICT skills and competencies to students. Previous studies on preparedness of computerization in primary schools reveal that lack of resources such as classrooms, electricity, computers and reference materials for teachers and students poses as hurdle to integration of ICT in Education in rural schools in Kenya (Ogembo, Ngugi & Pelowski, 2012).

The lack of adequate internet connectivity, computer and network infrastructure poses as a barrier to implementation of ICT in education. Lack of geographical coverage of telecommunication infrastructure causes problems in data transfer and connectivity. A small number of schools have access to high-speed internet connectivity through an Internet Service provider. Few schools can afford the use of VSAT technology (Farrell, 2007). In order to improve connectivity and network infrastructure the ICT in Education policy aims at establishing cost effective and functional networked computer labs in educational institutions (MoE, 2006). This initiative will involve networking public institutions countrywide enabling the institutions to share internet connectivity (MoE, 2006). 90% of schools have established a Local Area Network (LAN) in order to facilitate sharing of learning resources (MoE, 2006).The Kenya ICT Trust Fund and Kenya Education in Network Trust has been working on the bandwidth so as to increase internet access to students at universities and schools both in the urban areas and in the rural areas.

The Kenyan government plans to buy 1.3 million laptops for students in class one in public schools. It is estimated that Kenya will need $1.8 billion in the next five years in order to fund the free laptop initiative program (Okutoyi, 2013). This program will ensure that students in the underserved areas will benefit from the free laptop program (Okutoyi, 2013). The Wezesha laptop project is funded by the World Bank and it is implemented by the Kenya ICT Trust Fund under the Kenya Transparency and Communications Infrastructure Project (TCIP). The program will enable university students to get laptops at subsidized rates. The Badiliko Project has built 14 digital hubs in Kenya providing access to 70 schools. The hubs contain 20 networked desktop computers and they have a lab administrator who provides support with ICT training (Mwenesi, 2013). The Badiliko Digital Hubs are situated in clusters of schools or at community centers and they provide infrastructure, curriculum, and training for educators in Sub-Saharan Africa. PTAs, the government, private sector, NGOs and other developmental agencies provide assistance to schools in setting up infrastructure in primary and secondary schools (Farrell, 2007;).

Educational technology can be used for instructional purposes and to encourage independent student-centered learning. Some of the obstacles encountered by countries worldwide include the fact that the educational software may be complicated to use because it may not be curriculum compatible, adaptable or the software may be culturally incompatible

(Pelgrum& Law, 2003). As a result the education ministry launched an ultra-modern laboratory to test and monitor modern technology before adoption into school programs. The center hosts a national educational portal for teachers, website and a national helpdesk site and other applications.

Curriculum Development

The ICT curriculum targets all levels of education including primary, secondary schools, and institutions of higher learning. The Teachers Service Commission (TSC) curriculum guide for ICT integration guides the implementation of ICT in primary schools. TSC targets Education Managers, Head Teachers, Quality Assurance Officers, District Education Officers, TAC tutors and teachers. The ICT integration curriculum is integrated with UNSECO ICT competency standards for teachers so as to guide the technology literacy approach.

National policies for ICT should incorporate strategies for supporting curriculum change. Curriculum change is instigated by political influences, technological influences, economic influence and social influences (Abiero, 2009). Important considerations in the development of ICT -related curriculum include evaluating the extent the traditional curriculum will be dropped in favor of new content and processes (Pelgrum& Law, 2003). Educators need to determine the extent at which the curriculum revisions will account for the rapid changes in technology (Pelgrum& Law, 2003). Effective implementation will involve assessing the impact of the new pedagogical approaches on student learning outcomes (Pelgrum& Law, 2003). The assessment methods need to be content-sensitive to enable educators to evaluate the student's abilities and student achievements (Pelgrum& Law, 2003). An assessment of preparedness of implementation of ICT should involve an assessment of the pedagogical, psychological and cognitive barriers (Benzie, 1995; Nyambane & Nzuki, 2014).

The Kenya Institute of Curriculum Development (KICD) is preparing syllabuses, publishing and printing materials, developing digital curriculum content and providing teacher in-service training.A literature Review reveals that there is a parallel with curriculum change in general despite differences in content and approach to change in technology education globally. These tenets that influence change perspectives include:

- Economic imperative to match the content of learning to the needs of the economy
- Similarities in strategies across national systems
- Disappointment with change at the school level
- The role of teacher development and the need of a strategy that deals with their attitudes and motivation

Staff Development

Of the targeted 300,000 teachers, 150, 000 teachers have been trained (Murute, 2013). Teachers need to develop technical competencies not only in ICT but also in new pedagogical approaches (Pelgrum& Law, 2003). Teacher training institutions need to systematically integrate ICT into teaching education programs. The teacher training institutions need to support the systematic integration of ICT for education purposes (Pelgrum& Law, 2003). The Teacher Education and Professional Development (TEPD) program provides ICT materials and training to 20 public primary schools, 3 secondary schools and 3 teacher training colleges. 32, 000 teachers have been trained through TEPD.

Impact of ICT in Education Management and Administration

Education management refers to the application of management theory and practice to educational institutions while educational administration refers to the process of acquiring and allocating resources for the achievement of predetermined educational goals (Okumbe, 1999). Education management and administration is fundamental to achieving educational goals.Education management ensures that there is proper organization and coordination of the various sub-units within the organization so as to achieve overall educational goals. The functions at the managerial level are to provide an enabling environment for an efficient and effective achievement of institutional goals and objectives (Adeyemo, Oladipupo, Adeotun, 2013).

ICT in educational institutions streamlines operations in student administration, resource administration, personnel administration, financial administration and general administration (Makewa, Meremo, Role & Role, 2013). Administrative staff can utilize ICT applications so as to achieve good financial management. Financial management involves planning and utilization of school funds in accordance with regulations and procedures. Efficient and effective financial management determines the overall school performance. Schools need financialmanagement procedures that can monitor funds disbursed to primary and secondary schools by the government. An accounting system that is linked to budget as well as financial management information system enables the administration to produce statements, schedules, orders, invoices, audit assessment reports, keep records on income and expenditures, and roll-over balances to the next year.

The School Management Information Systems can be used to manage student financial and academic records and monitor expenditures. The administrative staff utilizes the information system to manage financial records such as audit reports, payroll reports, and financial statements. School administrators can use data to monitor changes in demographics, maintain updated records of school and student performance, and retrieve academic and financial records from school archives for financial analysis, student evaluation or for future reference. ICT enables educational administrators to achieve in operational efficiency within the institutions.

The ICT applications will help improve school administration (Ghavifekr, Afshari, Siraj, &Seger, 2013). Previous studies sought to measure the importance of ICT applications in teaching and administration (Lusike, 2006; Makewa, Meremo, Role, and Role, 2013). Training programs that target school administrators is essential in order to optimize the application of ICT in education management and administration.School administrators and educators need to develop positive attitudes, perceptions and plans on ICT in Education as this has an impact on the school administration and performance (Makewa et al., 2013). Training on change management is effective in enabling school administrators and educators to create and manage an effective ICT integrated learning environment.

Change Management

Jones (2013) defines organizational change as the process by which organizations progress from their present state to the desired state so as to increase their effectiveness. Planned organizational change aims at improving effectiveness in human resources, technological capabilities, functional resources and organizational capabilities of the organization (Jones, 2013). Socio-technical systems theory emphasizes the need to optimize each dimension rather than maximize one at the expense of the other.

Leadership is needed in order to determine the most effective approach to change management. The approach for change management maybe systematic and logical approach or it may be planned change which involves designing and implementing strategies in an orderly or timely fashion. Leadership is essential in evaluating the interdependencies in the technological advancements. Change should emphasize on goal attainment and student achievements in all facets of development. ICT's play a role in changing and modernizing educational systems and approach to learning. The implementation of ICT will introduce changes with teacher and student roles, new forms of professional support and support to tools that can support teachers to monitor students in the independent student –centered learning activities.

Administrators, faculty and staff need to realize that change is an ongoing process. Ediger & Rao (2003). In order to have a profound impact change has to address the issues faced by a school (McCormick, 1999). Change has to be aligned with institutional priorities and it has to be related to the socio-economic context (Pelgrum& Law, 2003). It is important to identify the widening gap between policy directions and the classroom reality (Skilbeck, 1990, p.57).

THEORETICAL FRAMEWORK

Lewin's Force –Field Theory of Change posits that organizational change is influenced by two opposing forces of change such as competitive, economic, political, global, demographic, social or ethical forces (Jones, 2013). Lewin's Change model of unfreezing, changing and refreezing can applied to the educational context. It involves individuals learning something new and discontinuing current attitudes, behaviors and organizational practices.

EMPIRICAL REVIEW

Ten institutions participated in a study that aimed at investigating the status of ICT equipment, connectivity and access to the internet. Of the schools that participated, 9/10 had computers, but only 6/10 had access to the internet (Gakuu, Kidombo, Bowa, Ndiritu, Mwangi & Gikonyo,). 8/10 of the institutions that participated had an ICT advisor/technician. 5 of these schools had a strategy for maintenance of ICT equipment. The teachers used ICTs for pedagogical purposes with 54.29% of courses taught using ICTs.

In a study involving 100 primary schools in Western Kenya, only 13.5% of schools utilized computers and 38% had an ICT compliant teacher (Ogembo, et al., 2012). 79% of the schools had intentions of utilizing computers for record keeping and administration while 71% of schools had planned to use computers for a computer studies program (Ogembo et al., 2012).In a study involving 35 secondary schools in Kuria district, only 15 schools had a desktop in the administrative offices (Makewa, 2013).

CONCLUSIONS AND RECOMMENDATIONS

While the Government of Kenya is overseeing the tendering process for procurement of computers to public schools, the private schools have organized workshops and travel to countries where they can purchase required equipment at discounted prices. Private schools are faced with the challenge of equipping their computer laboratories and recruitment of ICT teachers and technicians. Standardization of policies that facilitate implementation in the private and public schools is crucial so as to ensure equitable growth and development.

Educators and implementers need to prioritize needs between the use of ICT applications in Education Administration and Management vis a vie ensuring high performance of schools in national examinations. Educators and implementers need to determine the capabilities of ICT in improving teaching methodologies and teacher morale by

measuring the impact of ICT on teaching and learning outcomes and in Education Management and Administration on schools. Educators need to determine the extent of which ICT applications can enhance student's academic achievement.

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