Effects of Information Communication and Technology (Ict) Application on Strategic Educational Quality Standards Management in Bungoma County, Kenya

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ABSTRACT :*This paper examines the effects of ICT application in strategic educational quality standards management in secondary schools in Bungoma in the Republic of Kenya. ICTs have become part and parcel of educational institutions management yet ICT has not been recognized as a tool for competitive advantage in the education sector in terms of school resources management for quality standards in education. The study was conducted in 32 secondary schools selected by stratified random sampling from a target population of 42 schools. The study employed the cross-sectional descriptive survey design as the data was gathered from the sample population of 32 principals, 32 deputy principals and 32 directors of studies. Data collection tools included closed and open-ended questionnaires, interviews and observation. Descriptive and inferential methods were used to analyse the data and the frequencies which were translated to percentages were emphasized. The study found out that ICT was applied in school financial management (SFM), infrastructure and human resource management (IHRM), students' general welfare and in academic activities management. The study established that a good number of schools (40%) used ICT in SFM, and 69.2% of them recorded improved results in the years 2012 and 2013. The study concluded that ICT had impacted positively on strategic educational quality standards management. The findings pointed to the fact that ICT was a tool for competitive advantage if strategically applied by schools in the management of educational standards. The study recommends that the Kenya government should make ICT training compulsory for all teachers and all government schools should be made compliant to enable the government to create local area networks for cluster of schools among others.*

KEY TERMS: *ICT application, strategic management, educational quality standards management, secondary schools and Bungoma.*

I.   INTRODUCTION

The 21st century is an epoch of ICT and knowledge economy based on the predominant contribution of science and education (Sagitova,2012). Apart from this charge in economic systems of the country affects greatly the management of economic and quality indicators of performing institutions. In this era of speedy information communication and technology development, dynamic TQM dictates that ICT be made part and parcel of quality standards management in our schools. Balanskat (2006) argues that the progress in the ICT application in schools has been uneven leading to considerable variations in e-maturity. As this happens countries continue to invest colossal amounts of money in the ICT in schools. The United Kingdom, according to European Commission Report (2006), for instance, spent €49M in four years only for ICT test bed project in 28 schools.According to Balanskat *et al* (2006) recent studies in UK revealed that only 10 – 15 percent of schools are e-mature (strategically and competitively effectively use ICT to improve educational outcomes). One of the keys to successful management of any organization-educational institutions included is the ability to understand and apply modern management principles and techniques effectively (Valarie and Ashok, 2011). They content that as high-performance organizations, educational institutions may be interested in having an effective low-cost, efficient and multi-user integrates management information system that is aimed at creating an environment which allows for the development of the full potential of its resources.Thus ICT occupies a very central place in modern educational management of the institutions in terms of strategy, policy development and implementation, financial effectiveness and customer satisfaction which can be more possible with computerized information systems, modern methods of communications and the latest achievements in the Theory of Management. Traditional paper-based systems can not serve educational institutions anymore (ibid).

In Kenya today, many educational institutions, particularly secondary schools are embracing technology a lot in the area of ICT. Some schools are also integrating ICT in the management of finances, co-curricular activities and infrastructure and human resources management. The creation of various institutional websites has become the order of the day in the Ministry of Education, Science and Technology (MoEST) (Gakuu *et al*, 2009). Considering aspects of education systems like registration for examinations, accessing results and acquiring any piece of information about institutions and programmes require that on-line operations be engaged for efficiency (Mativo,2009) this phenomenon has been inevitable. According to Redox Technologies Pvt. Ltd, (2013) ICT has a number of advantages. These include improved customer service through greater access to accurate information, increased productivity and job satisfaction among staff members as it eliminates duplication of effort, more economical and safer means of storing and keeping track of information, greater accountability and transparency in operations, improved efficiency and effectiveness in administration and management due to unprecedented access to real-time information and general timely decision making due to easy accessibility to information. Whereas these benefits of the application of ICT in the management of educational institutions has been appreciated, the extent to which it has affected strategic educational standards management in public secondary school sector has not been documented in Bungoma County. Further, information about its effect on building a competitive advantage in these institutions is scanty. This study sought to fill this gap by establishing the effects of Information Communication and Technology application on strategic educational quality standards management in Bungoma county, Kenya

The specific objectives of the study were:
[1] To establish the effect of ICT application in school financial management on quality standards management.
[2] To assess the effect of ICT application in school infrastructure and human resource management for competitive advantage.

The application of ICT in schools

The incorporation of ICT into everyday functions of the secondary schools has a remarkable effect on nearly all aspects of school management, structure and dynamics. Therefore the use of ICT in schools can not be complete without considering the competitive place of ICT in schools. ICT is defined as a continuum of skills and abilities in respect of electronic facilities like TV, radio, computers, tablets and ipads in general management of educational performance and standards (Zuppo, 2012). According to Wikibooks "ICT is the diverse set of technological tools and resources used to communicate and create, disseminate, store and manage information. These technologies include computers, the internet, broadcasting technologies (TV and radio)and telephony."The educational management information system (EMIS) can allow effective management of academics, financial and human resource management of academics, financial and human resource management. Application of ICT shows that data can be stored, retrieved and disseminated online with the use of MIS provided ICT is available and applicable.The Adaptive Structure Theory (AST) which can be related to the open systems Theory of management which sees school system as an open socio-technical system composed of five major semi-overlapping and interdependent subsystems made up of: Managerial, structural, psychosocial, goals and values and technical. The five subsystems interact with the external environment in such a manner that bring change in one would necessarily lead to changes in all the others. Thus in the introduction of ICT in schools, one should consider the place of the administration, teachers and the support staff (technicians) and the interdependency that can generate performance and standards (Menjo *et al*,2013). Research shows that adopting and using ICT in schools leads to significant expansion of education and pedagogical outcome which are beneficial to both teachers and students (Mingaine,2003).

The 21st century is an era of information technologies and knowledge economy based on the predominant contribution of science and education as well as of other high technology industries and human operations in economic development (Sagitova,2012.) Every institution of higher learning like secondary schools have no choice but to embrace ICT in the day to day running of academic, students and staff affairs. There is a continuity demand for a larger implementation and integration of ICT to meet the national goals in relation to vision 2030 (Educational Watch April, 2013). To establish the extent of ICT use in secondary schools administration in rural southern Kenya Makewa *et al* (2013) assert that school administration is a key determinant for the realization of desired outcomes and success in both public and private schools. They concur with Gray and Smith (2007) that the main education managers in the schools in the 21st Century encounter myriad forces originating from technology related experiences. It is therefore important to investigate and establish the effect of ICT use in the secondary schools to establish to what extent ICT affects educational performance and standards management.

The current movement towards putting the latest technology into classrooms is causing educators to reexamine the programmes and the policies and the impact of ICT on teaching and learning (Whitchead *et al*, 2013).Since 2005, Bungoma County has been multiplied into nine sub-counties/districts. Bungoma South which is one of the nine has 38 public and 10 private secondary schools. Three quarters of these schools in relation to management of performance and standards of education in the sub-county. The impact vacuum then becomes a need to mitigate. The Government of Kenya in goal number 8 of the Millenium Development Goals (MDGs) for Vision 2030 endeavours to bring to a reality the advantages of ICT. Given the role of ICT in economic development, the Government of Kenya (GoK) has started several projects to benefit the citizens in the technological needs to develop global connections (Ministry of Planning and National Development, 2008). In the Elimu News 2008 Volume 3. (pp 26 -27) the GoK contends that Kenyan schools are to become e-schools. This means that electronic innovations were to permeate the school sub-systems of management which include personnel, student, physical resources, financial and academic resource management (Maki, 2008).Makewa *et al*(2013) referring to Visscher *et al* (2003) and Tearle (2004) studies in the UK, the Netherlands, Malaysia and South Africa emphasize that the school educators require facilities and related infrastructure to optimize the application of ICT in their teaching and administrative endeavours. For serious schools whose focus is proper performance and high standards achievement the various levels of administration and management need Information Technology (IT) and Education Management Information Systems (EMIS). In fact ICT application in the schools is part of the action plan for modernizing educational management (MOEST, 2005) as well as getting towards electronic government (e-government) and electronic learning (e-learning). The innovations are not just mere aesthetics but are meant to establish performance and standards achieved.

Competitive strategic application of ICT

Competitive strategy	Role of information system (ICT)
Cost leadership	Schools can use ICT to fundamentally shift costs of operation (Booth, Roberts and Sikes 2011) or reduce the costs of processes to lower the costs of students (customers) or suppliers by using online service to consumers (students, suppliers, parents) and other schools or government offices, e-procurement systems to reduce operating costs.
Innovation	Schools can use ICT to identify and create new products and services or to attract students from new places via automation (that is, using digital modeling and simulation of product design to reduce the time and cost to the consumer (Chui and Flemming, 2011). For example establish M-pesa accounts for fees payments to save students or parents from having to travel long distances to go and pay fees. Schools can develop cables or wireless networks with re-known libraries in the region and enable students get a wide range of books via internet. These can be co-created with Parents Associations (PAs) and Boards of Management (BOMs).
Growth	Schools can use ICT to expand its operations locally and abroad. For example a school can establish a website and market itself; by connecting with its alumni, donors and other well wishers for funding of projects. This will leverage advantages of both online and offline channels (Rigby, 2011).
Strategic partnership	Schools can use ICT to create and strengthen relations with partners through applications such as virtual organizations and inter-organisational information systems.

Source: Developed from O'Brien and Marakas 2011, pp. 49 – 51, Manyika 2009, Chui and Flemming, 2011, Booth Roberts and Sikes 2011; the researchers own knowhow.

II.   STUDY METHODOLOGY

The research employed the descriptive survey design. That was due to the fact that the study used qualitative and quantitative data to explain or describe the current state of ICT application in QSM in secondary schools in Bungoma South Sub-county. This design is simple and easier to carryout and can lead to gathering the relevant information required by a study (Borg and Gall, 1996). Kothari, (2003) further contents that "descriptive studies are not just simple data collection but involves measurement, classification, analysis, comparison and interpretation of data." This implies that therefore that detailed information can be gathered by subjecting the respondents to several items of a questionnaire or interviews. The descriptive survey-design is important in the originality of data collected from a population that is too large to observe effectively directly. In respect of this, data was gathered from the secondary school principals, deputy principals and directors of studies.

Findings and discussions
ICT and School Financial Management (SFM)
The main respondents were the principals who were the accounting officers in schools. They responded to questions regarding ICT and school management as shown on table 1.

Table 1: Availability and actual use of computers in SFM in the school

Variable indicators	Agree	Percentage (%)	disagree	Percentage (%)
Available computers used for SFM	13	40.625	19	59.375
Installed programmes for SFM	14	43.750	18	56.250
Improved educational quality standard due to ICT use	13	40.625	19	59.375
ICT reduced time for fees balances processing	15	46.875	17	53.125
Enhanced procurement process to ICT use	09	28.125	23	71.875
Average	12.8	40%	19.2	60%

Source: Research Study,2014

With regard to SFM, the findings on Table 1 indicated that only 13 schools (40%) had embraced ICT for SFM. Nineteen others (59.36 %) either very rarely or did not at all employ ICT in SFM. The possible reasons were that the accounts personnel lacked knowhow on ICTs application in SFM. The other possible reason was that most principals and accounts staff were more comfortable with manual accounting systems compared to automated ones. The schools auditors interviewed in this respect indicated that school administrators still liked the manual accounting processes compared to computerized systems of accounting and SFM, a fact that showed that most school did not see ICT as a tool for strategic financial management. Passey (2002) attests that school administrators have a major impact on major changes in school administration and curriculum management.

ICT for competitive advantage

When asked the place of ICTs as a tool for competitive advantage,the various personnel interviewed responded as shown in Table 2 below;

Table 2 :ICT as a tool for competitive advantage.

Response	Frequency (N=96)	Percentage (%)
Very well	45	46.876
Well	35	36.458
Fairly well	09	9.375
Only a little well	07	7.292
Total	96	100

Source:Research Study,2014

From this table it was observed that a great number of respondents (83%) confirmed that ICT gave them advantage over other schools as they were able to acquire information, process and store it and retrieve it at will for quality standard teaching and learning. Processing examinations and analyzing results had been made easier. The few schools that did not have the ICT facilities like computers still sought search services from the vendors who operated printing shops or cyber cafes. That was inconveniencing and exposed even classified information. This observation showed why most schools in the sub-county had tried to acquire computers. From the sample of 32 schools only two schools did not even a single computer. This was a paltry 6.3% and were the ones that did not see ICT as a tool for competitive advantage.Porter's theory of competitive advantage shows that endowment with the factors of production is critical for an organization (school) but the competitive advantage is created, it is not inherited (Negritoiu,1997 as cited by Frasineanu,2013).

Gaining competitive is critical for organizations, in our case, a school. Baltzan and Philips (2010 p.16) define competitive advantage as a product or service that an organization's customers value more highly than similar offerings from its competitors. That is, the organization has something (product, service or capabilities that other organizations (schools) do not have. In order to stay ahead of competition, organizations (schools) have to continually develop new competitive advantages. Thus, if schools adopt ICT application, the one that

will gain a competitive advantage is one that will use ICT to embrace more than common applications. For example if several schools apply ICT only in normal clerical word processing and examination management but does not pedagogically apply ICT, school(s) that will start using ICT to teach and connect with other stakeholders is likely to attract interested students and so gain a bigger enrolment than others. O'Brien and Marakas'2011, pp. 49 – 51,Manyika, 2009; Chui and Flemmin,2011, Rigby, 2011, Booth, Roberts and Sikes, 2011 argue that information systems can apply in a number of ways for an organization like a school. For instance,information systems can be applied in daily management of programmes, students' profiles and academic issues.

ICTs application and performance in National Examination
The study made an attempt also at relating examinations performance to ICT application in the secondary schools and made the following observation as shown in Table 3 in the next page.

Table 3: Relationship between ICT application and examination performance

Response	Frequency (N=32)	Percentage
Improved	19	59.4
Not improved	12	37.5
Not applicable	01	3.1
Total	32	100

Source: Research Study,2014

The study established that most schools 59.4% attributed their improved performance to, among other factors, ICT application. The respondents indicated that ICT application had helped them to have many exercises and examination tests which increased the level of exposure of candidates to examination experiences. The storage and retrieval of information also enabled them to establish the students' challenges and found ways and means to mitigate the individual challenges hence making them do better in the national examination. 37.5% indicated no improvement in the national examination performance. Their arguments were that although there were other factors attributed to the non-improvement, ICT application in their schools had challenges such as over restriction of access and use of the equipment due to perceived high expenditure costs of materials, appliances and maintenance. 3.2% of the schools reported lack of knowhow in ICT application due to the fact that they were yet to acquire ICT facilities and had only attempted KCSE once. They however indicated optimism that in future, with ICT they would do better. The observation that ICT application had positive impact on performance tallied with the studies done by Kulik (1999), Attwell and Battle (1999), Sosin *et al,*2004 and Talley, 2005 although Banerjee *et al*, 2004 and Leuven *et al*, 2004 disputed the relationship between ICT application and performance in examinations.

Summary of findings
The study aimed at ascertaining the effect of ICT application in school financial management on educational quality standards management and accessibility levels in secondary schools in Bungoma South Sub-county. The research revealed that 40% of the schools had embraced ICT for SFM compared to 60% which partially or totally did not apply ICT in SFM. The schools that had embraced ICT for SFM were those with student population of five hundred and above and were the county schools (former provincial schools). 69.2% of the schools which had embraced ICT for SFM recorded improvement in the standards achieved at national examinations in the last two years. The schools also recorded improved enrolment of students. ICT was also applied in matters of tendering and the respondents were unanimous that ICT reduced the costs of the tendering processes. The study established that the 60% of the schools that partially or totally did not apply ICT in SFM had accounts personnel with no ICT skills and feared the accuracy of such a system. They did not perceive ICT as a tool for strategic financial management in schools. Cited among other reasons, by the schools without ICT skilled personnel in accounts was the cost implications on remuneration of the personnel. Others cited the simple administrative structure and limited number of personnel in the schools although ICT had helped in processing of salaries and statutory deductions like National Social Security Fund and National Health Insurance Fund. The school with no computers for SFM hired the services of ICT specialists once every term for the statutory accounting requirements. One school did not have any computer and therefore did not apply ICT at all.

III. CONCLUSIONS

From the findings of the research, the following conclusions were made: Most secondary schools in Bungoma South Sub-county had ICT equipment like computers and used them in one way or the other for some academic, administration and management applications.With regards to the first objective which sought to establish the effect of ict application in school financial management(SFM),40% of the respondents confirmed that ict was applied in SFM and 69.2% of schools that used ict in SFM recorded improvement in enrolment, performance and procurement procedures.This concurred with Matovu,2009 who attests that application of ICT in education can lead to improved performance. With regards to objective two on the effects of ict on infrastructure and human resource management(IHRM) the study established that ict was used to manage time tables,duties inventories and ledgers.This helped to control time use and other resource utilities which cut down wastage. Again,the respondents indicated that schools which applied ict in managing IHRM did well in examinations and had more staff and student numbers. Ict was thus regarded as a tool for competitive advantage. Valarie and Ashok,2011 contend that one of the keys to successful management is the ability to understand and apply modern management principles which includemodern technology like ict. Therefore ICT was a tool for competitive advantage although most of the ICT applications,were in the area of word processing which was more of clerical work. That indicated that the relevance of ICT in EQSM had not been understood fully although ICT had been used in for such applications as KCSE examination online registration very successfully.

IV. RECOMMENDATIONS

From the above conclusions, the study made the following recommendations:

[1] The government should insist on ICT training in appointing school principals to help enhance administrative support in the application of ICT in schools management. For those who are already serving principals and deputy principals should be capacity built and sensitized through frequent seminars/workshops and conferences on ICT and school matters. Together with this the government should train and employ more ICT teachers.

[2] The government should digitalize all government schools to make ICT application a matter of no choice. This will ensure that all secondary schools acquire ICT equipment and assign vote-heads for their maintenance. This will also make it easy for government to establish a local area network for several schools in a locality (Bungoma County).

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