The Extend of ICT Integration in the Management of Public Secondary Schools in Kitui County, Kenya

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Abstract
The study sought to determine the extent to which Information and Communication Technology has been integrated in the management of public secondary schools in Kitui County, Kenya. A descriptive survey research design and mixed method approach were used in this study. The study was carried out in 58 public secondary schools in Kitui County that have functional ICT infrastructure. This study used sample size table as proposed by Krejcie and Morgan (1970) and Peter (2005) whereby 58 principals, 58 senior teachers and 266 assistant teachers from schools that have functional ICT infrastructure were selected. All 16 Sub-county Directors of Education and one County Director of Education were selected for the study. The researcher used questionnaires to collect data from principals, senior teachers and assistant teachers while interview schedule was used to collect data from Sub-county Directors of Education in Kitui County. The collected data was analyzed using both quantitative and qualitative data analysis approaches. The study established that (78%,60% and59%) of the principals, senior teachers and assistant teachers respectively only use ICT in school management less frequently. Among those who use ICT, majority (70%) of the principals used ICT for internal exams to a great extent. On internet use the study established that; majority (58%) of principals and 64% of senior teachers used internet less frequently. It was also noted that (18% and 16%) of the principals and senior teachers respectively had never used internet. Majority (90% and 76%) of the principals and the senior teachers respectively indicate that computer use can be improved through training more staff in ICT. The County Director and the Sub-County Directors of Education in their interviews reported that most of the principals relied on their secretaries for computer related communication and some were reported not to have active emails. However the interviews indicated that some principals were indeed using ICT in management of schools and especially in communication with teachers, parents and suppliers. The study recommended that Firstly, the government should introduce compulsory computer training for all principals and teachers. This would equip all the principals with ICT skills. All schools should have internet connectivity to enable principals and teachers to use ICT in the schools. This would help in communication as well as academic research.
Key words: *Information Communication Technology, Public secondary schools, Operational ICT Infrastructure:*

Introduction

The importance of ICT in the educational management is quite evident worldwide and especially in Europe and United States of America (Empirica, 2006). Information and Communication Technology was first used in educational institutions in North America and Europe in 1970s. In these Countries, computers are used to enable successful learning in e-learning and to provide

professional development for multiple staff in a learning institution and school management systems (SMS), enabling them to be more effective. Brannigan (2010) argues that in recent times, there has been a global explosion in the use of computers in schools as an instructional, communicative and informational resource tools by use of databases, spreadsheets, multimedia, email, and network search engines.

Due to these rapid changes there is a growing demand on the educational institutions to integrate ICT in all their management endeavors. Maki (2008) stipulates that ICT integration plays a vital role in supporting powerful and efficient school management in the education sector. In a study in Cyprus secondary schools, the researcher observes that ICT integration is essential for personnel management, student management, resource management, financial management and general management. Maki (2008), in regard to a study by the European Commission in Cyprus reveals that secondary schools in Cyprus integrated ICT as a teaching tool as well as a tool for school management. However, Empirica (2006) observes that although significant steps had taken place in as far as ICT integration in secondary schools in Cyprus was concerned, integration in school management still remained at an early stage.

In Africa, the first computers arrived in educational institutions by the end of th**e** 1970s (Clark & Meyor, 2003). The use of ICT has not been extensive in school management worldwide as found in other fields, such as business and engineering. African countries have only recently begun to show the micro economic stability needed for education development and therefore the need to integrate ICT in educational management has become real more than ever before (Nduati & Bowman, 2005). Information communication technology can improve or enhance management duties of a school principal. For instance, computer as one of the ICT facilities can provide better management results. It is also the duty of the school management to monitor the enrollment of students in the school, availability of educational resources, human labor and availability of finance to sustain the daily activities of the school. Alexis (2003) argues that school management has to monitor all these records of the school activities by entering the details manually on the books and records of the schools. But with the introduction of ICT, there are various programs that can be used to ease the burden of management in monitoring and managing the school activities hence these programs help the school management to monitor daily activities in the school by click of a button.

Kenya has deliberately made a number of attempts to develop a national ICT policy. The culmination of these efforts has been the development of the E-government Strategy, National ICT Draft Policy, and the issuance of the National Access Report (Outa, Eta & Aligula, 2006). In the education sector, ICT policy in Kenya is embedded in the E-government Strategy and National ICT draft Policy documents. These documents form the basis for the policy guidelines in the Sessions Paper No. 1 of 2005 which is the policy document that guides ICT integration in education in Kenya. The government recognizes the positive impact of ICT in making the country a middle level economy as is envisaged in Kenya vision 2030. This is envisaged in dissemination of policies and guidelines that guide ICT implementation. The creation of various institutional websites has become the order of the day in the Ministry of Education, Science and Technology (Gakuu & Kidombo, 2010). Considering aspects of education systems like registration for examinations, accessing results and acquiring any piece of information about institutions and programmes require that online operations be engaged for efficiency. For the above benefits to be reaped the school principals should provide technological support and visionary leadership (Hayes, 2007).

ICT integration and Data Management

Educational managers need to have basic information on student and teacher flows, probably also of school supplies, and how much the system is spending on various inputs, in order to make the most basic resource allocation decisions. Undoubtedly, ICT has played an important role in improving data collection in educational systems. It has also made these data more widely available to school personnel, parents, and the public at large through central school management web and in some countries through direct access to central or district databases by school personnel (Organization for Economic Cooperation and Development, 2005). These rudimentary data collection functions are expanded in some countries and regions by more sophisticated quality control data, namely student evaluation data. Maki (2008) in a paper presented in Cyprus on ICT for administration and management of Cyprus secondary schools argues that the Cyprus Ministry of Education implemented a computer programme developed in Greece in order to manage information in secondary schools in relation to students and teachers data. Schools in Cyprus use ICT for managerial purposes such as student management, (enrollment, absenteeism, grades, final exams), personnel management (absenteeism), human resource management and timetabling.

Carnoy (2004) observes that ICT collects information from and distributes information to the different departments in schools and uses the information to extract greater effort from the different parts of the system. In many countries, such top-down use of ICT to monitor performance could be extended to collecting and disseminating information on student and teacher absenteeism, student attainment and other variables, all on a school-by-school basis (Carnoy, 2004). Maki (2008) observes that organizations and consequently schools depend on information systems to support the flow of data, information and knowledge about inputs, outputs, relationships among different environments.

Mugo (2014) carried out a study to examine the factors that impact on data management using Management Information Systems by education administrators in public secondary schools in Thika West district, Kiambu County. The findings of the study indicate that 61% of the institutions never used computer software and 44% always used manual method to manage data. 29% indicate calculators were always used to manage data compared to only 6% indicate never. There is low use of computers in data management as only 20% of the respondents indicate that computers were used. This implies low levels of computer literacy and limited use of computers in data management. The findings also note that (75) percent of the officers at the District Education Office, (66.66%) of the head teachers and (52.7%) of Heads of Departments used computers compared to (50%), (22.2%) and (13.8%) respectively using computer software.

The Use of ICT in Communication

A large scale study by School Net in which 69 secondary schools responded found that only 46 per cent of the sampled schools had computers, with availability of Internet and facsimile rare in these schools (Kenya School Net, 2008). The findings also indicate that email was yet to be recognized as a tool for collaboration among students and teachers, and only one school had a website while other two reported having networked all their computers to the Internet. It went on to affirm that in these schools, access to the Internet was severely limited and when available it was only for administrative use. IT is the evidence of the use of ICT in formalizing co-operative planning via the sharing of curriculum plans and the analysis of students' data. Teachers keep records of students work electronically which has led to clearer target settings and improvements in reporting to parents (Fredriksson & Gajek, 2009).

Etudor-Eyo, Ante and Emah (2011) carried out a study on the use of ICT and communication effectiveness among Secondary School Administrators. The study obtained data from secondary

school administrators through the administrators' use of ICT questionnaire and administrators' communication questionnaire to investigate how the use of ICT predicts communication effectiveness among secondary school administrators in AkwaIbom State, Nigeria. Two hypotheses were formulated to guide the study. Ex-post facto research design was adopted for the research. The population of the study comprised all the 348 public secondary school principals and vice principals in AkwaIbom State, Nigeria. A sample of two hundred and fifty-five (255) principals was drawn from eighty-five (85) public secondary schools through purposive sampling technique.

The results of the study reveal that the extent of administrators' use of ICT and the extent of administrators' effectiveness in communication are high. It notes that there is a significant positive relationship between administrators' use of ICT and administrators' effectiveness in communication; the effectiveness of secondary school administrators in communication is significantly predicted by the use of ICT. Based on the findings, the researcher concludes and recommends that government should make ICT tools available in all secondary schools for the administrators; workshops on the use of ICT should be organized from time to time by the governments and NGOs for school administrators who are not yet ICT literate; a constant power supply should be made available to schools so that administrators would be able to make use of ICT for communication.

ICT integration and Personnel Management

Raby (2004) conducted a study on ICT integration in public secondary schools in Uganda. The sample of the study consisted of 12 secondary schools, 12 principals, three education officers, three curriculum developers and 20 students. Qualitative data were collected using interviews of principals, education officers and curriculum developers whereas questionnaires were administered to students. The results of the study reveal that in most public secondary schools, ICT application in human resource management is the responsibility of the school principal.

According to the study, ICT could aid instructional supervision through facilitating decision making process, planning, organizing, communicating, influencing, coordinating and evaluating. Further the study observes that for a principal running a big school or institution, running various human resource areas like curriculum development, instructional supervision, staff and student, personnel administration, guidance and counseling, finance, community relations, construction and maintenance of facilities and special services could be tasking and time consuming. The study stresses that for the principal to function efficiently and effectively in the present computer age, he/she must rise to the challenge of adopting new technological resources and services in the management of the school. According to Telem (2001) ICT helps in streamlining management processes of the human resource especially in the area of communication. This is whereby, teachers used to refer to big log books to know which rooms were available for booking and who booked same and for how long, but with ICT, they could see the schedule for an entire month and know who booked them and which date the rooms may be vacant. He further notes that ICT is a very important tool for information dissemination. This is because it helps communicate whatever information is available to the staff the moment they log in as they read, know, and act.

Abuga (2014) conducted a study on the influence of principals' characteristics on integration of information communication technology in management of human resources in Nyamira County, Kenya. The study sought to establish the influence of principals' exposure to training in ICT, to establish the principals' level of education and to determine the influence the principals' age and the influence of gender on ICT integration. The findings of the study indicate that majority of the teachers (52 %) do not use any form of ICT in their schools. In terms of human resource management, 77 % of the principals do not have any formal training in human resource

management. Other teachers indicate that they use some forms of ICT in their schools such as laptops, desktop computers, and cellular phones among others. The majority of the principals who were respondents reported that they do not use ICT to monitor human resource. Majority of teacher respondents 74.1 % reported that they have not been through any form of ICT in-service training. Those who underwent any form of training only did it once in a year as 74.1 % of the respondents report. On the question whether teachers use ICT in recruitment and selection of human resource, majority 55.6 % reveal that they do not use ICT in recruiting and selecting the human resource. The study suggests strategies to put in place for expansion of ICT in these schools which include: increase the number of computers as indicated by 63% of the respondents. Training of teachers on ICT, having adequate forms of ICT and requesting the government to offer donation to public schools to facilitate ICT integration in management of human resource in public secondary schools. Further the researcher points out challenges of ICT integration in management of human resource in public secondary schools such as inadequate facilities and inadequate funds for installation as reported by 29.6 percent of the respondents, negative attitude towards ICT by the teachers, lack of trained personnel, high cost of installation and maintenance of computers and computer breakdown. Only 3.7 % of the respondents said that there are no challenges facing ICT integration in the management of human resources in public secondary schools.

ICT integration and Management of Organizational Resources

Olukunle (2008) carried out a study on the perceived effect of Information and Communication Technology (ICT) adoption in Botswana organizations. The study was carried out using a survey method. The main instrument was a personally administered questionnaire. Data was collected from a judgment sample of 29 business and public sector establishments, drawn from nine towns and cities of Botswana. The respondent in each organization was either the IT manager or the chief executive. The study notes that ICT application improved records keeping as well as information security, confidentiality, and retrieval. It also necessitated organizational restructuring, and brought flexibility and adaptability in organizational activities. The study reveals that while ICT adoption is not seen as increasing employee redundancy, it is perceived as increasing the total wage bill of the organization as well as reducing the inventory of both finished goods and input materials. As such, respondents perceived ICT adoption as beneficial to the quality of information and cost control.

A study by Mue (2014) reveals that (55.7%) of the students indicate that ICT is being used in the management of the school physical facilities. Majority of students (68.9%) indicate that it is applied either to a very great extent, greater extent or to some extent. In terms of laboratory facilities, 68.9% of the students are positive that ICT is being applied in the monitoring of laboratory facilities in the school either to a very great, great or some extent, while (33.0%) indicate that ICT isn't utilized in the monitoring of kitchen facilities. A (58.5%) of students are positive that ICT is applied in monitoring classroom facilities either to a very great, great or some extent. Slightly more than a third of the students (35.8%) indicate that they don't know the extent to which it is being applied. On the other hand, 35.9% of them are positive by indicating that it is being applied either to a great extent or to some extent. A good percentage of the students (47%) indicate that ICT application in the management of physical facilities is effective. On the contrary, 39% of them indicate otherwise. The study concludes that public secondary schools in Lang'ata do apply ICT in the management of physical resources but to a limited extent

Purpose of the study

The purpose of this study was to investigate the extent to which ICT has been integrated in the management of public secondary schools in Kitui County, Kenya. Specifically the study is to

establish the extent to which ICT has been integrated in; Data management, communication, personnel management and organizational resources management in public secondary schools in Kitui County, Kenya.

Methodology

This study adopted descriptive survey research design. According to Mugenda (2011) descriptive survey design is useful in describing the characteristics of a large population, makes use of large samples, thus making the results statistically significant even when analyzing multiple variables, many questions can be asked about a given topic giving considerable flexibility to the analysis. In this research mixed approach method was used that is qualitative and quantitative data was collected. According to Kothari (2011), qualitative methods provide greater depth of understanding about a limited number of subjects, while as quantitative methods give a less in-depth understanding, but cover a wider scope of subjects. Using mixed approach gives a more powerful research (Guba & Lincoln (2005). Therefore, a complementary mixture of quantitative and qualitative data was sought in the methods used where the strengths of each approach was fully utilized.

This study targeted only schools which have functional ICT infrastructure. According to reports at the Kitui County Education Office, only 58 public secondary schools in the County had functional ICT infrastructure (Kitui County Education office, August, 2015). The target population for this study was therefore the 58 public secondary schools principals, 58 senior teachers, and 870 assistant teachers, 16 Sub-county Directors of Education in the 16 Sub-counties and one County Director of Education in Kitui County. This study used sample size table as proposed by Krejcie and Morgan (1970) and Peter (2005). The study sampled 58 principals, 58 senior teachers and 266 assistant teachers from 58 public secondary Schools in Kitui County that have functioning ICT infrastructure. All the 16 Sub-county Directors of Education and the County Director of Education were sampled for the study. The study used questionnaires and the interview schedule as tools for data collection. The questionnaires were administered to principals and teachers while interview schedules were administered to the Sub-county Directors of Education and the County Director of Education.

Findings of the Study

In order to establish the extent to which ICT has been integrated in the management of public secondary schools in Kitui County, questionnaires were administered to 58 principals 58 senior teachers and 266 assistant teachers. The interview guide was used to collect data from 16 Sub-county Directors of Education and one County Director of Education. The data was then analyzed on the basis of these questionnaires and interview guides.

ICT Integration in Data Management

The first objective for this study sought to determine the extent to which ICT has been integrated in the data management in public secondary schools in Kitui County, Kenya. Firstly the principals were required to indicate their opinion on school type with the highest level of ICT integration. The responses were presented in Table 1 below;

Table 1: School Type and Integration of ICT

Frequency	**Frequency**	**Percent**
Boys Boarding	23	46.0
Girls boarding	15	30.0
Mixed boarding	7	14.0
Mixed day	5	10.0
Total	**50**	**100.0**

Table 1 shows that majority (46%) of the principals indicated that boys boarding schools had the highest level of ICT integration compared to other school types. This was followed by girls boarding with 30% responses. The least were the mixed boarding (14%) and mixed day (10%) respectively. These results imply that the boarding schools were integrating ICT in management of their schools to a great extent compared to day schools. This shows that the school type was influencing the ICT integration.

The principals were further required to indicate the extent to which they had integrated ICT in the management of school records by indicating; 1 – Great extent, 2- some extent. 3 – Undecided, 4 – less extent and 5-No extent on the given resources. The results are presented in Table 2

Table 2: Extent of ICT integration in the management of school records

ICT Integration	**1**		**2**		**3**		**4**		**5**		**Total**	
Frequency	**F**	**%**	**F**	**%**	**F**	**%**	**F**	**%**	**F**	**%**	**F**	**%**
Accounting	6	12.0	10	20.0	28	56.0	4	8.0	2	4.0	**50**	**100**
Personnel management	5	10.0	12	24.0	19	38.0	9	18.0	5	10.0	**50**	**100**
Students registration records	12	24.0	20	40.0	10	20.0	7	14.0	1	2.0	**50**	**100**
Timetabling	18	36.0	15	30.0	12	24.0	5	10.0	0	0.0	**50**	**100**
Internal exams	35	70.0	10	20.0	5	10.0	0	0.0	0	0.0	**50**	**100**
Record of physical materials	10	20.0	16	32.0	20	40.0	4	8.0	0	0.0	**50**	**100**
Library records	4	8.0	7	14.0	10	20.0	25	50.0	4	8.0	**50**	**100**

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Table 2 shows that majority of the principals used ICT for internal exams to a great extent. This was followed by the principals who used ICT for accounting purposes to less extent. According to the results some principals used ICT for students' registration records to some extent. Some principals also reported use of ICT in recording physical materials to some extent while other reported using ICT in library records to some extent. This may be attributed to the fact that principals are certain that ICT integration in management enhances job satisfaction.

Further the senior teachers were requested to indicate the extent to which ICT has been integrated in the management of the following physical resources in their school, using a scale of 1 – Great

Extend, 2- Some Extend, 3 – Undecided, 4 Less Extend, 5-No extent. The responses were presented in Table 3;

Table 3: Senior Teachers Responses on Extent to which ICT is used in the Management of Physical Resources

Resource	1		2		3		4		5		Total	
	F	%	F	%	F	%	F	%	F	%	F	%
Books (Text/Exercise)	22	44.0	12	24.0	5	10.0	6	12.0	5	10.0	**50**	**100**
Classroom facilities	10	20.0	12	24.0	6	12.0	10	20.0	12	24.0	**50**	**100**
Lab facilities	18	36.0	12	24.0	4	8.0	10	20.0	6	12.0	**50**	**100**
Kitchen facilities	5	10.0	9	18.0	15	30.0	11	22.0	10	20.0	**50**	**100**
Sports facilities	4	8.0	6	12.0	12	24.0	18	36.0	10	20.0	**50**	**100**

Table 3 shows that, majority of the senior teachers indicated that ICT was used in the management of records for text books and exercise books to a great extent compared to the other facilities. This was followed by the laboratory facilities. However, it was observed that the ICT was rarely used in management of classroom and kitchen facilities.

The senior teachers and assistant teachers were requested to indicate the extent to which their school management uses ICT using a scale of; 1- Great Extent, 2- Some Extent, 3- Undecided, 4 - less Extent. 5- No extent. The responses were presented in Table 4.

Table 4: Use of ICT in school

ICT use	1		2		3		4		5		Total	
	F	%	F	%	F	%	F	%	F	%	F	%
Communication with teachers	25	50	15	30.0	3	6.0	5	10.0	2	4.0	**50**	**100**
Keeping teachers records	6	12	6	12	2	4	15	30	31	62	**50**	**100**
Communication with parents	20	40.0	11	22	9	18.0	5	10.0	5	10.0	**50**	**100**
Timetabling	26	52	20	40.0	2	2.0	2	2.2	0	0.0	**50**	**100**
Internal exams	33	66.0	14	28.0	2	4.0	1	2.0	0	0.0	**50**	**100**

Table 4 reveals that, majority (66.0%) of the respondents reported that ICT was used to a great extent in internal examination. This was followed by 52% who indicated that to a great extent ICT was used in timetabling. Other uses included; communication with parents and teachers with 40% and 50% respectively. The results can be attributed to the fact that respondents viewed ICT integration in management as a tool that makes them perform their management tasks with ease. On internet use, the principals and senior teachers were requested to indicate how often they used internet. The responses were presented in Table 5.

Table 5: Principals' and senior teachers' responses on internet use

Internet use	Principals		Senior teachers	
	Frequency	**%**	**Frequency**	**%**
Every day	12	24.0	10	20.0
Some time	29	58.0	32	64.0
Never	9	18.0	8	16.0
Total	**50**	**100.0**	**50**	**100**

Table 5, shows that majority (58%) of principals and 64% of senior teachers used internet less frequently. Those who used internet on daily basis were 24% for the principals and 20% for the senior teachers. It was also noted that some principals (18%) and 16% senior teachers had never used internet. These results were corroborated by those of both the County Director and Sub-County Directors of Education who had both served for more than three years in the county. In an interview with the researcher, they both reported that some schools were indeed using ICT in the management of their schools. They also reported that the principals used ICT in communication to teachers, parents and suppliers. The principals and senior teachers were also required to indicate how principals could improve ICT integration in management of schools. The responses were presented in Table 6.

Table 6: Principals' and Senior teachers' Responses on Improving ICT use

	Principals		**Senior teachers**	
How to improve ICT	**Frequency**	**%**	**Frequency**	**%**
Training more staff	45	90	38	76.0
Buying More computers	4	8.0	10	20.0
Teaching computer class	1	2.0	2	4.0
Total	**50**	**100.0**	**50**	**100**

Table 6 reveal that, majority (90%) and 76% of principals and senior teachers respectively indicate that computer use can be improved through training more staff. The same results were given by the County Director and Sub-county directors of Education during their interview. They reported that, very few principals were using ICT in the management of the public secondary schools. Most of the principals were said to be computer shy and were so busy such that they did not take time to learn and as a result they relied on their secretaries for computer related communications and some were reported not to have active emails.

Further the researcher sought to establish the challenges facing ICT integration by posing an open question to teachers on the same. Majority of the teachers (48 %) indicated that the greatest challenge relating to ICT integration was lack of internet connectivity. This was because most of the schools were not connected to internet. In the case where there was internet, the schools did not allow the teachers to freely use the internet for fear of the high cost of buying bundles. Teachers (30 %) also reported that schools did not have enough computers and in some cases the teachers were not allowed to access the school computers. These computers were only used by students for

learning purposes. There was also lack of updated programmes in schools as well as active anti-virus as reported by 12% and four percent of teachers respectively.

Conclusion

From the findings of this study it was established that school type influence ICT integration in management of public secondary schools in that boys boarding schools had the highest level of ICT integration compared to other school types. It was also revealed that ICT was used in the management of records for text books and exercise books to a great. It was however observed that ICT was rarely used in management of classroom and kitchen facilities. The study observed that there was moderate use of ICT in communication with parents and teachers. It was noted that internet was rarely used while some teachers and principals had no active emails. The study suggests that computer use can be improved through training more staff.

Recommendations

Based on the study finding, the following recommendations were made;

1. Firstly, the government should introduce compulsory computer training for all principals and teachers. This would equip all the principals with ICT skills.
2. The government should also increase its supply of computers to schools and make it compulsory for all schools to integrate ICT in the management tasks as well as build computer laboratories to all the schools. This will enable most schools to acquire computers which can be used for ICT integration in management of the schools.
3. All the schools should have internet connectivity to enable principals and teachers to use ICT in the schools. This would help in communication as well as academic research. The schools should also have alternative source of power in places where there is no electricity so as to enable effective ICT integration in school management.

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