

Impact of Principals' Leadership in ICT Integration in Public Secondary Schools Management in Bungoma County, Kenya

Anne N. Kukali^{1*} Marcellus Kawasonga¹ Joseph Rabari²

1. Department of Educational Management and Foundations, Maseno University, Kenya

2. Department of Educational Communication, Technology and Curriculum Studies, Maseno University, Kenya

Abstract

In this 21st century, there has been great focus on Information Communication Technology (ICT) integration in educational institutions aimed at realigning operations for global competitiveness and enhanced service delivery. The government of Kenya, through the National ICT Policy and strategic plan of 2006, set strategies and invested in ICT with the objective of integrating ICT in educational institutions. In Public Secondary Schools (PSS), principals' leadership was relied upon to oversee integration. However the impact is way below expectations due to financial constraints, unavailability and inadequacy of ICT equipment and lack of training. The purpose of this study was to assess principals' leadership in ICT integration in Public Secondary Schools Management (PSSM) in Bungoma County, Kenya. Objective of the study was to assess the impact of principals' leadership in ICT integration in PSSM in Bungoma County. This study adopted Hasan (1998) Activity Theory in which whole work activity is broken into subject (person studied), tool (mediating device) and object (intended activity). Descriptive survey design was employed. Study population was 272 Principals and 272 Deputy Principals (DPs) from PSS. Simple random and saturated sampling techniques were utilized to select 82 principals and 245 DPs respectively. Instruments of data collection were Interview schedules, questionnaire, Observation Checklist and Document Analysis Guide. Validity was ascertained by revising the instruments based on feedback from experts in the School of Education, Maseno University. A pilot study was conducted among 27(10%) principals and 27(10%) DPs using test re-test method and this yielded reliability of .74 for DPs' questionnaire which was above .70 threshold and therefore acceptable. Quantitative data were analyzed and presented in terms of frequencies and percentages while qualitative data from interview schedules, open ended questionnaires, Observation Checklist and Document analysis guide were analyzed thematically. The study revealed high impact on effective registration of Kenya Certificate of Secondary Schools (KCSE) candidates and time management, moderate impact on improved communication with stakeholders, provision of easier environment in record preparation while majority rated enhanced financial accountability no impact. The study recommended that the Ministry of Education (MOE) should increase its budgetary allocation to improve on availability and adequacy of ICT equipment and mount an in-service program on financial automated management systems for principals' to enhance knowledge and skills in ICT integration.

Keywords: Impact, Principals, leadership, Integration, ICT, Public Secondary Schools, Management

1.0. Introduction

The rapid technological advancement has brought about the realization of changing times and demands in this information age. The role that ICT plays has manifested itself in great proportions in terms of the end product. The Kenya governments has since committed itself to overseeing transformation of institutions as evidenced in a number of government policy documents to ensure steady ICT savvy operations. The Kenya government documents in line with ICT growth through investment included the KESSP (2005); the national ICT policy (2006) and MOEST (2006) among others to kick start integration process. The National Education Sector Support Program (NESSP 2013-2018) born out of the MOEST sought to bring to functionality the Sessional Paper No. 14 of 2012 to reform education and training sector.

Tehran, Iran by Afshari, *et al* (2010) study through stratified random sampling technique selected respondents from a heterogeneous group of secondary schools. The study revealed that 73.8% principals held positive perceptions regarding the value, relevance and impact of ICT in secondary schools compared to 26.3%. Principals believed computers made a difference to their lives, lives to mean administrative work related experiences.

Andoh (2012) indicated that education institutions are on the verge of restructuring process regarding productive integration of ICTs in school environment to promote professional output in administration processes. This brings on board principals' leadership upon which the success of ICT integration depend. Anderson and Dextor (2005) argued that with the rapid technological changes, principals are expected to have capacity to solve them by embracing institutional culture of learning, learning from current trends to bring about benefits.

In a study on ICT effectiveness on school management with focus on administrators' perception, Oyedemi (2015) employed simple random sampling procedures to select administrators in PSS in Ilesa local government area, Osun State, Nigeria. In one research hypothesis, he opined that introduction of ICT in administration significantly solved poor communication in schools. The hypothesis was thereby accepted and concluded that

administrators' perception towards ICT and school management effectiveness solved poor communication problem. This study did not address impact of principals' leadership for ICT integration which the current study sought to do.

In a case study to establish utilization of computers in management of secondary schools in West Pokot County, Kenya, Merirenga and Koringura (2013) through interviews and questionnaires collected data from principals and teachers. The study revealed that use of computer in administrative work made it easier for both principals and teachers. For instance, 77.3% of respondents observed that students' records were safe in terms of storage and of quality documentation. Computer generated data improved efficiency in performance of school administration as indicated by 100% of respondents. In conclusion it was observed that ICT use had great impact on the work performance for both principals and teachers. If the percentages were anything to go by, there was positive impact on management activities. Merirenga and Koringura sample size comprised of principals and teachers selected through purposive sampling technique while this study sample consisted of principals and DPs who were in administration, selected through simple random and saturated sampling techniques.

Manduku, Kosgey and Sang (2012) carried out a survey on adoption and use of ICT in enhancing management in PSS in Kesses zone, Wareng district, Uasin Gishu County, Kenya. The study established that use of ICT in management improved effectiveness and efficiency, decision making, accountability, communication, record keeping, cost effectiveness and made work easier. In spite of the benefits associated with adoption and use of ICT in management, school management had not fully realized full potential of ICT in carrying out management activities. The survey focused on adoption and use of ICT in enhancing management in PSS but did not address impact of principals' leadership for ICT integration in PSSM, a gap the current study attempted to fill.

Oguta, Egessa and Musiega (2014) conducted a study on the effects of ICT application on strategic educational quality standards management in Bungoma County, Kenya. Stratified random sampling technique was used to select the sample size. The findings revealed that ICT enhanced day-to-day management and improved efficiency consequently coping up with rapidly changing world in performing management tasks. It was concluded that use of ICT had a positive impact on strategic educational quality standards management. This study was about effects of ICT application on strategic educational quality standards management and used stratified random sampling technique while the current study used both simple random and saturated sampling technique to ensure each and every respondent was given an equal chance of representation. From the foregoing, it's evident that there is need to assess the impact of principals' leadership in ICT integration in PSSM.

1.2. Statement of the Problem

The onset of ICT in Kenya saw the government develop an ICT policy framework and the implementation strategy to provide road map to desirable outcomes. To make it all inclusive, the government drew in stakeholders and other partners to support variously. Even as the government looks up to principals' leadership for success of ICT integration in school management, the program has had challenges given the inadequacy of ICT equipment and infrastructures, lack of formidable training and technical support. While the advancement of technology today has gained ground and raised expectations in management functions, the impact of principals' leadership in the integration of ICT has been below par. The Internet with its full basket of information has recorded poor performance due to service provider unreliability and cost implications. Proponents of ICT integration argue that the principals' leadership would impact positively with formidable training, adequate and well qualified technical support, availability, functionality and accessibility to ICT equipment. Apparently impact of principals' leadership essential in knowledge and skills on Total Cost Ownership (TCO) to impact on ICT integration in PSSM in Bungoma County is short of expectations hence relatively moderate impact. It was against this background that this study sought to assess principals' leadership for ICT integration in PSSM in Bungoma County, Kenya.

2.0. Literature Review

2.1. Impact of Principals' Integration of ICT on Management

The life of an institution is characterized by documentation/ record keeping for easier and faster access, reference and information retrieval. Al-Sharija (2012) observed that principals by the nature of their work communicate locally and sometimes globally. He argued that ICT integration provides an opportunity to share knowledge, enhance administrative processes and effectiveness on service delivery besides simplifying access. The benefits of ICT make a lot more difference regarding management work processes in an institution.

In a study carried out in Tehran, Iran, Afshari *et al* (2010) carried out a study on principals level of computer use and some contributing factors. The sample size comprised of secondary school principals and a questionnaire was used for data collection. The study established that ICT integration improves principals' ability on school budgeting, monitoring and reporting management skills relevant to current information age. Besides, the Internet provides principals an opportunity to improve management skills like decision making and

problem solving.

A case study was carried out on use of computers and Internet as supplementary sources of educational material in senior high schools of Tema Metropolis, Ghana. Rogers (2003) theory of diffusion, pointed out possibility of members adopting innovations and practice where attitudes towards technology are significant. The study revealed that at least 30% of teachers used computers and Internet for research and database to retrieve students' performance records was rated as faster and easier. The Internet and websites enabled teachers prepare improved professional records, share ideas and retrieve information that was not readily available in text books and environment (Amenyedzi, Lartey & Dzomeku, 2010).

Computerizing reporting system in school saves on time for administrative staffs as reports are generated automatically and in a common format. The management in turn harmonizes reports from teachers and work modalities to monitor and track students' performance in a better way. Through parental alert software, there is faster communication with parents hence cuts on cost implications. Automatically generated Cellphone calls, text messages and emails update parents on school matters (MOE, 2011) faster than print.

Makhanu and Kamper' (2012) study sought to establish relationship between principals' access to ICT and school performance in western province, Kenya. To obtain the sample size, simple random sampling method was used to select principals and DPs from highly and poorly performing schools. They contend that 54.3% of principals had access to database for student performance, admission records plus teachers demographic information. Principals' access to database had a huge role in influencing performance as those with printers, printed examination papers, results and report cards to enhance productivity cut on time and finance.

In a study to investigate the factors influencing principals' integration of ICT in Isinya Sub County, Kajiado County, Kenya used a questionnaire to collect data from principals, DPs and teachers. The study findings revealed that computers as main ICT facility enhanced efficiency in management tasks by making it easy to process information. Internet was rated as being crucial in information sharing; cost effectiveness and that it saves on time as a single email is served on several people and organizations (Nyanchoka, Matula & Kalai, 2017).

Singoro, Odebero and Nasong'o (2012) study assessed the effects of ICT integration in secondary schools management in Bumula and Bungoma South sub counties, Bungoma County, Kenya. Through stratified sampling procedure, administrators, clerks, secretaries, Head of Departments (HODs) and head prefects were sampled from both public and private schools. They observed that majority of administrators (81.8%), HODs (93.9%), account clerks (72.7%) and secretaries (90.9%) indicated that Cellphones and emails improved communication. Besides, a minority forming 25.07% of administrators and 20.11% of accounts clerks strongly agreed that ICT integration improved financial recordkeeping.

In their study, Amenyedzi, Lartey and Dzomeku (2010) adopted Rogers (2003) theory of diffusion which points out that possibility of members adopting innovations and practice where attitudes towards technology are significant while the current study adopted Hasan (1998) Activity Theory which states that whole work activity is broken into subject (person studied), tool (mediating device) and object (intended activity). Makhanu and Kamper (2012) used Spearman's Correlation Co-efficient to analyze relationships between principals' computer literacy and students' performance but did not discuss the impact of principals' leadership for ICT integration in PSSM, a gap the current study attempted to fill. Nyanchoka, Matula and Kalai (2017) used a questionnaire while the present study used methodological triangulation approach which include an interview schedule, a questionnaire, Observation checklist and document analysis to establish in-depth information and confirm situations on the ground. Singoro, Odebero and Nasong'o (2012) sample size included support staff and students drawn from both public and private secondary schools while the current study sample size comprised of principals and DPs from PSS only. Although the studies established various ways through which ICT integration impacted on management, none assessed the impact of principals' leadership in the integration of ICT in PSSM which the current study sought to do.

3.0. METHODOLOGY

Descriptive survey design was adopted and as Cohen and Morrison (2000) suggest, the survey gathers data at a particular point in time and used to describe the nature of existing conditions. This study was carried out in PSS in Bungoma County, Kenya. The study population consisted of principals and DPs and the sample size was selected through simple random and saturated sampling techniques respectively. According to Orodho (2004), for a larger population, simple random sampling technique is appropriate as it provides each and every member an equal chance of inclusion in the study. Table 3.1 shows distribution of study population, pilot sample and sample size.

Table 3. 1: Distribution of Study Population, Pilot Sample and Actual Sample Size

Respondent	*Study Population	Pilot sample size		Actual sample Size	
		<i>f</i>	%	<i>f</i>	%
Principals	272	27	10	82	30
Deputy Principals	272	27	10	245	90

*Source: Bungoma County Director TSC, 2014

Marshall and Rossman (2001) observed that an adequate sample size is the one large enough to respond to research questions but should not be too large to prohibit in-depth analysis. Methodological triangulation approach including interviews, questionnaires, Observation checklist and document analysis were used for data collection. Validity was determined by revising the instruments based on feedback from experts in the School of Education Maseno University and their comments were incorporated in the instruments to make them viable. A pilot study was conducted among 27(10%) principals and 27(10%) DPs using test re-test method, determined by Cronbach alpha (α) and this yielded reliability of .74 for DPs' questionnaire which was above .70 threshold and therefore acceptable. The 10% of the study population for piloting was adopted from Hill (1998), Isaac and Michael (1995) and Treece and Treece (1982). Quantitative data were analyzed and presented in terms of frequencies and percentages while qualitative data from interview schedules, open ended questionnaire, Observation Checklist and Document analysis guide were analyzed thematically. This study adopted descriptive survey design. Quantitative data was analyzed using descriptive statistics while qualitative data collected from interview schedules and open-ended questionnaires were categorized and analyzed according to themes and sub themes as they emerged. Results were presented in form of tables, frequency counts and percentages. According to Piel (1995), in data analysis, percentages have a considerable advantage over complex statistics. Necessary ethical considerations were observed such as briefing of potential respondents on why they were picked on, assurance of confidentiality and anonymity. Sanders, Lewis and Thornhill (2012) opined that informed participants make voluntary decisions and consent either to take part in the study or not without any form of coercion. The guiding principles of research on acknowledgement of any published sources of other authors used in any part of the paper to avoid plagiarism (Kothari, 2004) were observed. Primary data was presented with objectivity regardless of the discrepancies so as to paint a true picture on the ground.

4.0: Results and Discussion

4.1: Impact of Principals' leadership in ICT Integration in PSSM

On a four point Likert scale, respondents were asked to indicate the impact of principals' leadership in the integration of ICT in PSSM and the results were summarized as in Tables 4.1-4.2.

Table 4.1: Principals' Responses on Impact of Principals' leadership for ICT Integration

Principals responses (<i>n</i> =82)	High		Moderate		Low		None	
	<i>f</i>	%	<i>f</i>	%	<i>f</i>	%	<i>f</i>	%
Effective registration and confirmation of KCSE candidates	61	74.4	12	14.6	9	11.0	0	0.0
Improved communication	28	34.2	49	59.8	5	6.1	0	0.0
Improved record preparation and keeping	37	45.1	24	29.3	21	25.6	0	0.0
Saves time	43	52.4*	28	34.1	8	9.8	3	3.7
Improved work quality	36	43.9	38	46.3	10	12.2	4	4.9
Easier sourcing of information	29	35.4	21	25.6	22	26.8	8	9.8
Cost effective	16	19.5	30	36.6	20	24.4	16	19.5
Enhanced financial accountability	13	15.9	17	20.7	14	17.1	28	34.1

The findings revealed that effective registration and confirmation of KCSE candidates 61 (74.4%), time management 43 (52.4%), improved recordkeeping 37(45.1%), simplified record preparation 37(45.1%) and easier sourcing for information 29(35.4%), majority rated as high impact. Improved communication with stakeholders 49 (59.8%), improved work quality 38 (46.3%) and cost effective processes 30(36.6%) were rated as moderate impact. Majority rated enhanced financial accountability 28(34.1%) as having no impact.

Internet connectivity facilitated integration of email and website. The government directive that registration and confirmation of KCSE candidates should be an online activity narrows the digital divide among schools, parents, KNEC and other interested parties. Consequently, online registration was described as faster and current means of communication on students' registration and now transcending into online communication of results. This contributed to the reduction of mistakes that were commonplace before this approach was introduced. For this reason, with or without ICT for integration in schools, principals in their leadership innovatively integrated relevant ICTs in the process. This study was consistent with Muchiri, Ndirangu and Kanori (2014) findings which revealed that 60% of schools integrated ICT in registration of KCSE candidates as compliance to KNEC (2012) requirements.

According to Principals, integration of ICT in management had an impact mostly between high and moderate levels. Principals in justifying their responses observed that until recently communication was through print and or word of mouth but with the onset of technology, schools worked towards catching up with technological trends of integrating ICT in communication processes. The presence of improved integration made it easy for principals to communicate with relevant stakeholders regardless of geographical differences through website, email, Cellphones and Whatsapp groups. While this study revealed that there was moderate impact, Musambai, Ndirangu and Mukhwana (2017) findings established that through ICTs, 38.1% of respondents agreed that there was massive communication with parents while 33.3% disagreed. While the impact would be associated with availability, functionality, accessibility and technical support for integration, there was recognition of highly improved, fast and easier communication to not only internal recipients but to the external world over as well. A few of principals observed:

“Through technology in this case school website, we have really managed to market and communicate about our schools regarding our academic and co-curricular activity performances. It is worth noting that website, email and Cellphones have reached rapid national expansions and surpassed word of mouth and print in our schools. its just unfortunate that we cannot afford ICTs for all our teachers but we encourage sharing the few that there are”

Most educational institutions communicated by email and principals do so to be within technologically compliant circles. Integration of emails enhanced quality of management which facilitates an advanced form of interaction among diverse audiences. In the same breath, emails narrow down the digital divide by creating networks that over run impediments to timely and uniform overflow of information. Communication through ICTs enabled tools, brought to the fore a paradigm shift in improved dissemination of information from a central point to more persons/ bodies and vice versa. For instance, communication with major stakeholders such as MOE, TSC, KNEC, Kenya Education Management Institute (KEMI) and Kenya Revenue Authority (KRA) improved with email and Cellphones. Without pointing out to specific ICTs, the current study concurs with Manduku, Kosgey and Sang (2012) study findings where 88.1% associated ICT integration with improved communication.

The introduction of the Cellphones undermined barriers of class and status and created a rapid and instant transfer of information given its non discriminatory nature to parents/guardians regardless of literacy levels. This observation was however not unanimous due to language barrier especially in national, extra county and county schools whose catchment area is national. Besides, Cellphones recorded an exceedingly fastest and easiest way of disseminating information to and from BOM and PTA members as was revealed through document analysis. However, divergent views emerged from some principals who argued that with poor network coverage, capacity to regularly charge phones; irregular power supply; individual Cellphone ownership and use habits posed great challenges on effectiveness. Siwel and Malongo (2012) findings in Tanzania resonated with the current findings that using a Cellphone saved on time management, costs and enhanced interpersonal relationships. This study concluded that in spite of the positive impact associated with Cellphones as a communication device; the negative side had equally far reaching effects. In recent times, Cellphone has arguably penetrated institutions as the fastest mode of communication through text messages and voice calls. Besides, texts are viewed as fairly cost effective, saved on time, promoted interpersonal relationship between school and others, fast and embraced diverse ethnic backgrounds with common language use. Document analysis revealed that automated text messages were encouraged and PTA and BOM bought the idea and so to teaching staff.

The surveillance camera a contemporary gadget integrated in management plays an effective role of general monitoring of daily school activities. The respondents observed that embracing surveillance camera would enable communication to interested parties on school activities to a nearly real time experience. A principal quipped “My knowledge on surveillance cameras is that they have capacity to send email notification whenever something peculiar happened rather than the ordinary”. Although the CCTV surveillance has the capacity to deter crime in schools, caution on the importance should not be overrated. The cons of a CCTV camera included short lived information and that in cases of crime, criminals could change tact. The impact was felt only in one school where monitoring was simplified because students, community and staff was in cognizant of its existence and role. One principal observed: “we cannot even think of a surveillance camera for the school when we are short of the basic physical facilities, may be in future”. Bungoma County had a negligible number of schools with surveillance cameras which reflected either lack of knowledge of the equipment or the cost implications. Document analysis and observation checklist data revealed that principals’ leadership on surveillance camera was at infancy hence low impact. Although only a small percent indicated high impact of principals’ leadership in the integration of the surveillance camera, this finding was not in agreement with Makhanu and Kamper (2010) study which established that no principal in western province had access to surveillance cameras.

A functional Internet in school is an important software in crossing borders include majority using one or more devices. Similarly, Mue, Itegi and Kyalo (2014) in their study finding asserted that both computer and

Internet facilitated dissemination of information between school and other learning institutions. Some challenges experienced in integrating Internet included poor service provider and lack of current features in computer/laptop which were incompatible, financial constraints for sustainability contributed to low impact on principals' leadership for integration.

School documentation is one of the core functions of principals' management responsibilities. In the absence of technology, most principals did pen and paper kind of recordkeeping in which more time and energy was spent however in light of technology, devices like computers, laptops, flash disks and email were preferred for recordkeeping. This study established that integration of ICT for recordkeeping had high impact followed by a moderate impact and lastly low in that order. If not interfered with, ICT storage devices enhanced confidentiality of school information and provided an opportunity for school staff to digitally prepare professional records unlike the past where handwritten preparations consumed more time and energy. This finding concurs with Adebisi-Ceasar, Offei and Donte (2014) findings where 50.7% of respondents appreciated the understanding that integrating computers in management as meaningful against a majority (74%) who linked computers to young people. To this end, it was concluded that although age affected respondents' perception of computer as storage device, it was pronounced as valuable in terms of storage capabilities and information retrieval to print, scan or email.

School email address is equally an ideal ICT storage device. The frequent power outages and viruses ignited the storage patterns of important documents on emails besides safety in keeping confidential information and ease of retrieval. Data from document analysis revealed that most schools had one or more flash disks integrated as storage devices with / without alternatives. Flash disk has the advantage of portability and transferability of stored data to other devices which outsmarts print. Many principals with less established ICT programs observed that although schools were not equipped with basic ICTs, availability of flash disks did a great job. Printing and typing services could be outsourced and work stored safely on flash disk.

Majority of the respondents indicated that a flash disk as a storage device enhanced data confidentiality as it could only be accessed by the person in possession. The cellphone in its nature has the capacity to process, store and retrieve information when needed. On the contrary, information stored on cellphones could easily be erased if malicious individuals accessed it. The low impact was drawn from the inability for some to store information in bulk. A respondent argued that although cellphones are important gadgets, schools could not afford to purchase for every teacher and even if they did confidentiality was subjective. Document analysis data did not clearly point out if schools had cellphones, principals used school cellphones or personal.

School information captured on website such as KCSE results and school successes could be safely stored for future reference and retrieval. Although websites are traditionally a static source of information, marketing tool and apparent avenue to school inner secrets, it was rarely visited in day-to-day activities as most were unmaintained and therefore inactive. Many a times the inadequacies voiced with regard to ICT technician failed schools in understanding the value. Since most schools had inactive websites, principals could not categorically state the impact of school websites in practice rather than in theory. One principal whose school had a fairly maintained website courtesy of a well wisher observed "Despite the challenges experienced in developing and sustaining a website, our school website is open to anybody willing to get information about us and this has been a source of information documentation". Rarely did document analysis information provide discussions on website hence proclaiming the low impact. The role of website was therefore not limited to internal systems per se but to anybody interested in accessing it.

Surveillance cameras as monitoring devices store captured information which the school management retrieves for scrutiny at will. While Makhanu and Kamper (2010) study revealed that no principal in western province accessed surveillance camera, the current study established that at least 1.2% of the schools had surveillance cameras that surpassed its work of monitoring to information storage. There was minimal theft from within and without schools for fear of being captured and recorded on cameras. The disadvantage of having a surveillance camera was engrained in the cry on limited technical support and as such, principal facilitated suppliers to operate surveillance cameras making the facility rather costly. The study concluded that impact of surveillance camera on management was inconsequential as most schools were yet to install.

This study concluded that ICT integration in management functions impacted positively in terms of registration and confirmation of KCSE candidates, recordkeeping of various students' records and in few cases stores and library, supplies and meeting minutes. The result was enhanced efficiency in storage of information and retrieval, time management and enhanced quality work. Access to ICTs required for recordkeeping would translate into effective, efficient and simplified work as opposed to time consuming pen and paper activity.

Although integration of ICT in management tasks were described as expensive in establishment, on the other hand it was understandably cost effective in terms of time spend, financial expenditures and manpower. The use of a single computer, printer or photocopy by one person saved a lot more on time to print several papers, less financial costs and use of operating room. The Internet search was fast and easy in global connection, access information that would not be otherwise easily accessible, provided opportunities to engage in online

benchmarking which again was cost effective. Accessing and appropriate use of a functional computer produces neat work, less time spent, analyzed information, Google/browse with Internet, Smartphone and or modem. Internet connectivity provides a chance for principals to research best administrative leadership practices.

In schools with high enrolment, integration of ICT was a big relief with regard to financial costs. With the computer, printer and or photocopy, typing and printing of work in bulky were at low cost; spend less time and less personnel involved. One principal observed “I don’t have most of these ICTs but some of my teachers have computers/laptops and modems. They assist us in networking and doing administrative work like storage on flash disks and email which sometimes compromised confidentiality anyway”. Another one stated

“The fact that staff could not access ICTs in school doesn’t mean we do not do integration. With the email, we visit cyber café and do our work which is very easy and fast plus we store our work safely on flash disks, retrieve and print when required. Its time consuming and sometimes frustrating especially when you want work done immediately but we can proudly say we are equally ICT compliant”.

This implied that ICT is either cheap or expensive depending on how its accessed.

The administrative work presented was much better in terms of quality than when it was handwritten. This was evidenced in work prepared for various functions including but not limited to BOM/PTA/staff meeting minutes, preparation of school budgets, workers’ payrolls, students’ fee balances and in less than two years teachers’ performance contract records. There was great distinction regarding quality of work where in some cases principals presented work through email, staff Whatsapp groups, CDs and or hardcopies. In some cases there was low/ no impact as in financial accountability where most principals did not integrate ICT because of lack of devices and financial management systems software to improve on work quality.

Some principals with Internet connectivity, modems and or Smartphone had the advantage of browsing information. Through research, adequate and informed decisions are made, downloading of information and enhanced benchmarking on best management practices through Internet browsing. Network system enables principals get in touch with stakeholders on new trends/policies plus enhanced connectivity to information world over. This did not cut across all principals as few still relied on cyber café or borrowed services due to cost implications involved in Internet installation and maintenance.

Concerning enhanced financial accountability, there were divided views with majority of respondents holding on no impact while minority indicated presence. The principals cited lack of financial management software to assist them monitor for accountability purposes and the accounts department narrowed ICT integration to collection of fee payment. In the same vein, the impact was distinct in terms of budget and financial year report preparation and fee balances to parents. This study was corroborated by Muchiri, Ndirangu and Kanori (2014) study that financial reports and budgeting was fast and simplified through ICT integration. Further, although the current study findings were in agreement with Oyier, Odundo, Ganira and Kahiga (2015) study findings which established that that integration of ICT in financial management improved accountability and provided an explicit record of funds in and out, most sample schools did not have automated financial systems. This raises questions in the principals’ leadership in financial accountability with regard to contemporary financial management practices.

From the findings it was concluded that ICT integration in management functions had a positive impact regarding communication, safe recordkeeping, minimized costs and easily accessible research activities. The efficiency of school management improved, minimal time spent, faster preparation of administrative and professional tasks and increased transparency in work done. This study concurred with Wanjala, Adhiambo and Ngumbi (2013) on impact of ICT integration in management processes as positive some challenges notwithstanding.

4.2: Deputy Principals’ Responses on Impact of Principals’ Leadership in ICT Integration

Table 4.2 is a presentation of the DPs responses on impact of principals’ leadership in ICT integration

Table: 4.2: Deputy Principals’ Responses on Impact of Principals’ Leadership in ICT Integration

Deputy Principals responses (n=212)	High		Moderate		Low		None	
	f	%	f	%	f	%	f	%
Improved communication	21	9.9	97	45.8	80	37.7	14	6.6
Easier record preparation	19	.9	111	52.4	68	32.1	14	6.6
Saves time	19	.9	112	52.8	70	33.0	11	5.2
Faster accessibility to information	7	3.3	74	34.9	71	33.5	60	28.3
Improved record keeping	16	7.5	102	48.1	73	34.4	21	9.9
Improved access to school documents	13	6.1	105	49.5	78	36.8	16	7.5
Effective KCSE registration and confirmation	98	46.2	59	27.8	45	21.2	10	4.7
Faster analysis of exam results	79	37.3	64	30.2	61	28.8	8	3.8

According to Table 4.2, major findings were improved communication 97(45.8%), easier school record

preparation 111(52.4%), saved time 112(52.8%), improved record keeping 102(48.1%), improved accessibility to school documents 105(49.5%) were rated as having moderate impact. Effective KCSE registration and confirmation 98(46.8%) and analysis of exam results 79(37.3%) cited high impact.

The DPs in most schools are charged with the responsibility of public relations where they do communication on some issues to particular stakeholders. Earlier on in this study, it was observed that most DPs had no school Cellphones assigned to them however some were facilitated by principals on airtime for purposes of communication. In this item, a slightly below average number of respondents rated integration of ICT in their offices as moderate followed closely by those in their view was low. The DPs without access to any form of ICT rather than their Cellphones, observed that there was no impact of principals' leadership in ICT integration. To this category, it was assumed that a Cellphone was not part of the ICT in their offices although its integration improved communication. Document analysis, observation checklist and interviews revealed that DPs offices were not well equipped with ICT for lack of finances. However DPs were allowed and indeed free to access any available ICT in school with regard to school management tasks. This study finding associated with Alouch, Ajowi and Bosire (2015) findings where 100% of DPs cited adequate ICT in departments and lack of finances for ICT (100%) acquisition as limiting factors in usage. To this end, there was low or no impact in principals' leadership in ICT integration in PSSM with regard to DPs office.

Preparation of school records like timetable, duty roster, BOM/PTA/staff meeting minutes and teachers' performance appraisal reports, financial and students' administration is the DP's prerogative. Accordingly ICT integration made it easier for DPs to prepare such records than manual processes and even with moderate and low impact demonstrates enthusiasm to integration despite availability. Muriko, Njuguna and Njihia (2015) study established that 76.6% of principals, DPs and HODs in PSS in Kiambu Sub County, Kenya knew benefits of ICT integration. To this end, 55(71.42%) observed that ICT was fast, was keen on time management and efficient while 40(51.95%) opined that it was easy for storage and access to information.

Time is a valuable resource in any organization or institution. Integration of ICT in management functions basically saves on time and hastened work process and reduced paperwork hence rendering daily administrative operations effective. Besides administrative work, DPs have other duties to perform which requires more time to integrate ICT. This study finding established that 52.8% of the DPs observed that ICT integration in management had moderate impact. This finding partially corroborated with Wanjala, Adhiambo and Ngumbi (2013) study findings that computer usage saved on time as agreed by a mean of 4.92. With ICT there was high speed of doing things and enhanced convenience than pen and paper. With availability and accessibility to ICTs in DPs office, official confidential documents could be scanned within school, while cellphones communication was easy and fast to reach more audience to enhance effectiveness. Inaccessibility to ICTs would certainly require more time accessing, regular power outages and virus infections and lack of prompt technical support could be the reason principals' leadership had low impact on integration of ICT in DPs offices. Well established schools with ICTs registered high impact because of easy access, technical support and regular maintenance which more often than not was credit to principals' leadership.

Technology is more often than not associated with change in practices but the effective nature of association is determined by the school's ICT status. Consequently, integration of ICT had other demands like adequate infrastructure (hardware and software) where most schools were hit by acute shortage hence low and no impact of principals' leadership for integration in DPs office. This finding was in disagreement with Muchiri, Ndirangu and Kanori (2014) study findings in Githunguri, Kiambu County, Kenya that 70% of DPs accessed ICT to integrate in their offices. Based on this finding, it was concluded that DPs did not access various ICTs however moderate impact was indicative of fairly progressive direction towards integration. Through observation it emerged that majority of DPs did not access various ICTs in their offices hence low and or no impact while document analysis data revealed that under the principle of delegation of duties, some of these administrative tasks meant for DPs were distributed to other staff members like the DOS. The integration of ICT in preparation of school records, regardless of venue for preparation enhanced efficiency, competitiveness in technological world and produced quality work.

Accessibility to information with regard to ICT integration is guided by the level of Internet connectivity for enhanced browsing. A school with good Internet connectivity extended to DP's office or available modems would enable DPs retrieve information to keep abreast with current MOE/TSC policy issues and other associated contemporary trends in management. However due to high costs of Internet maintenance, power outages; poor/slow Internet services, lack/inadequate ICT resources associated with the low and no impact ratings in DPs offices. Lack of ICT resources and administrative support affected integration of ICT which in the current study findings could be associated with principals' leadership in ICT integration.

According to the results from DPs, there was moderate impact on recordkeeping with reference to enhanced safety and confidentiality, nature and quality of recordkeeping standards, high speed documentation and retrieval. Due to these favorable benefits, most respondents cited majorly moderate impact and closely followed by some indicating high impact that saw improved efficiency and effectiveness in administrative processes. This finding

resonated well with Manduku, Kosgey and Sang (2012) study finding which established that 61.9% of ICT uses was storage of records and 71.4% stating simplified work in the event. The ICTs like flash disks, computers/laptops, email and or websites had the advantage of storing information on staff, students' registration and important meeting minutes which provided an assurance to easier document retrieval.

Many a times school documents in their traditional form of print disappeared incidentally or accidentally from school but with ICTs, it was unlikely to lose everything. Integration of ICT basically contributed towards easy accessibility to school documents, enhanced time management practices as it was easier than searching for hardcopy files. In this regard, majority of the respondents asserted that ICT integration pronounced moderate and low impacts respectively in the DPs office. Access to school documents enhanced management services on time usage and networking. Schools where DPs recorded high impact had well updated and maintained computers with Internet connectivity which was evidence of principals' leadership in ICT integration. In other schools, the situation was different there was low impact suggestive of lack/inadequate equipment, inaccessibility or lack of technical support which again depicts principals' leadership. From document analysis and observation checklist, it was observed that most DPs offices were inadequately and in some cases not equipped at all which was attributed to financial constraints.

In Kenya, the government policy on registration and confirmation of KCSE candidates was a directive that required purely online (KNEC, 2012) activity. In this study finding, online registration and confirmation of KCSE candidates posted moderate and no impact in the DPs office. This did not however imply that some principals were not adhering to the policy. In most schools, registration of candidates as a delegated duty is assigned to Director of Studies (DOS) and in some cases depending on the staffing status of the schools, DPs carried out registration process. Whoever processed registration was guided by availability and accessibility to updated ICT equipment such as computer/ laptop, activated school email address, reliable Internet connectivity services and availability of electricity. This finding was divergent to Mutysia and Mwanja (2017) findings where DPs' responses did not mention ICT integration in registration and confirmation of KCSE candidates. The impact as a matter of policy, simply complied regardless of whether they accessed ICTs for registration in school or not, somehow it was effectively done. The fact that most schools lack Internet connectivity and computers did not post low impact on KCSE online registration but the office charged with the responsibility. Data in document analysis, showed registration of KCSE candidates was done by DPs but observation checklists revealed that majority of DPs offices were short of the required ICTs to facilitate the process. Then the question was how did the process happen? The answer was engrained in the principle of outsourcing services and school ICT policies on teamwork and sharing of available ICTs in schools.

With mean score as the guiding principle to ensure school management keeps track of students' performance, this study established that ICT enabled easier and faster analysis of exam results. Most of the computers on purchase come already equipped with software packages such as excel and word which facilitates exam results analysis. A good number of respondents however recorded low and no impact either based on the principle of shared responsibilities or for lack of relevant ICTs to do exam analysis. In most schools though exam analysis under the DPs responsibility, it was done in by the DOS office. Unlike the current study finding, Muchiri, Ndirangu and Kanori (2014) established that all DPs used ICTs in exam results analysis however the sample consisted of only two respondents unlike the current study where a large sample of 245 participated.

Conclusion

This study sought to assess the impact of principals' leadership in integration of ICT in PSSM in Bungoma County, Kenya. Based on the study findings, it was concluded that there was high or moderate impact in situations where ICT was available and accessible which enhanced effectiveness and efficiency in management service delivery. Integration saved on resources such as time management, financial costs and produced quality work besides improved communication with stakeholders.

Recommendation

Based on this study finding, it was recommended that:

1. The MOE increases its budgetary allocation to improve on availability, accessibility and adequacy of ICT equipment
2. That the MOE mounts an in-service program on financial automated systems management for principals' to enhance knowledge and skills in ICT integration in management.

References

- Adebi-Cesar, T. E., Offei, M. & Dontwi, I. K. (2012). Assessment of ICT Situation in Senior High Schools, A Case Study in Lower Manya Krobo District. Published MBA Thesis. Kwame Nkrumah University
- Afshari, M. Abu Bakar, K. Wong, S. L. & Afshari, M. (2010). Principals Level of Computer Use and some Contributing Factors in *the International Journal of Education and Information Technologies, issue 2,*

volume 4, 2010, PP. 121-128

- AL-Sharija, M. (2013). Leadership Practices of Kuwaiti Secondary School Principals Embedding ICT. Published PhD Thesis, Queensland University: Australia.
- Amenyedzi, F. W. K, Lartey, M. N; & Dzomeku, B. M. (2011). The Use of Computers and Internet as Supplementary Source of Educational Material: A Case Study of Senior High Schools in Tema Metropolis, Ghana. *Contemporary Educational Technology 2011, 2 (2), pp.151-162*
- Andoh, C. B. (2012). Factors Influencing Teachers' Adoption and Integration of ICT into Teaching: A Review of literature in *International Journal of Education and Development using ICT*, Vol. 8, Issue 1, PP. 136-155.
- Cohen, L. M; & Marrison, K. (2000). Research Methods in Education. New York: Routledge Flamer Publishers. County Director of Education Office, Bungoma County, 2014.
- Hasan, H. (1998). Activity Theory: A Basis for the Contextual Study on Information Systems in Organizations. In Hasan, E. Gould & P. N. Hyland (Eds.), *Information Systems and Activity TheoryL Tools in Context*, PP.19-38. Wollongong: University of Wollongong.
- Hill, R. (1998). What Sample Size is "Enough" in Internet Survey Research? *Interpersonal Computing and Technology; An Electronic Journal for the 21st century*, 6(3-4).
- Isaac, S., & Michael, W. B. (1995). *Handbook in Research and Evaluation*, San Diego , Ca: Educational and Industrial Testing Services
- Kenya National Examinations Council (2012). *New Policy Regulations to Improve Management of National Examinations*. Nairobi: KNEC.
- Kothari, C. R. (2004). *Quantitative Methods: Methods and Techniques (2nd Edn.)*. New Delhi: New Age International Limited.
- Kukali, A. N. (2013). Opportunities and Challenges for Use and Integration of ICT in Management of Public Secondary Schools in Bungoma South District, Kenya. In *International Journal of Science and Research Vol. 2, Issue 8, PP. 215-221*. Available on: www.ijer.net
- Makhanu, S. E. & Kamper, G. D. (2012). The Relationship between Principals' Access to ICT and School Performance in Kenya in the *Journal of Education and General Studies Vol. 1 (1), pp. 038-47*.
- Makhanu, S. E. & Kamper, G. D. (2010). Principals' Literacy in ICT: Towards Improving Secondary School Performance in Kenya. Published Doctor of Education Thesis, University of South Africa
- Manduku, J. Kosgey, A. & Sang, H. (2012). Adoption and Use of ICT in Enhancing Management of Public Secondary Schools: A Survey of Kesses Zone Secondary Schools in Wareng District of Uasin Gishu County, Kenya.
- Marshall, C., and G. B. Rossman. 1999. *Designing qualitative research*. London: Sage. Marshall, C., and G. B. Rossman. 1999. *Designing qualitative research*. London: Sage.
- Merireng, S. & Koringura, J. (2013). Effect of Computers in Management of Secondary in Kenya: A Case of West Pokot County. Unpublished Master of Project Planning and Management Research Project. University of Nairobi: Nairobi.
- Ministry of Education. (2011). Kenya Education Staff Institute: Diploma in Education Management for Secondary Schools, Distance Learning Course. Nairobi: Government Printers
- Ministry of Education.(2006). Kenya National ICT Strategy for Education and Training. Nairobi: MOE.
- MOEST, (2006). Ministry of Education Strategic Plan. Nairobi: Government Printers.
- Ministry of Education. (2005). Kenya Education Sector Support Program. Nairobi ; MOE
- Muchiri, G. M., Ndirangu,C. & Kanori, E.(2014). Factors Influencing School Principals' Integration of ICT in Administration of Public Secondary Schools in Githunguri Sub County, Kiambu County, Kenya. A Published M.Ed Project. Kenyatta University: Nairobi, Kenya
- Mue, S. J., Itegi, F. & Kyalo, D.(2014). Application of ICT in School Administration in Public Secondary Schools in Lang'ata Division, Nairobi County, Kenya. Published M.Ed Project. Kenyatta University: Nairobi, Kenya
- Muriko, G. L., Njuguna, F. W. & Njihia, M, (2015).Factors Affecting Utilization of ICT in Administration of Public Secondary Schools in Kiambu Sub County, Kiambu County, Kenya. Unpublished M.ED Research Project. Kenyatta University: Nairobi, Kenya
- Musambai, E. A., Ndirangu, M., & Mukhwana, F. (2017). Influence of ICT on the Quality of Educational Management in Secondary Schools in Kakamega County, Kenya. *In the International Journal of Science And Technology, Vol. 5, Issue 6, PP. 90-97*
- Mutisya, A. M., & Mwanja, J. M. (2017). The Extent of ICT integration in the Management of Public Secondary Schools in Kitui County, Kenya. *In International Journal of Education and Research, Vol.5, No.1, PP. 193-204*. Available on web: www.ijer.com
- National Education Sector Support Program (NESSP, 2013-2018) Nairobi: Retrieved from, kenya.usaid.gov/sites

- Nyanchoka, M. O., Matula, P, D. & Kalai, J.M. (2017). Factors Influencing Principial ICT Integration in Administration of Public Secondary Schools in Isinya Sub County, Kenya. Unpublished Research Project: University of Nairobi: Nairobi
- Oguta J O., Egessa R K. W., & Musiega D. (2014). Effects of ICT Application on Strategic Educational Quality Standards Management in Bungoma County, Kenya. *International Journal of Business and Management Invention*, 3(5), 11-17.
- Oluoch, D. A, Ajowi, J. O. & Bosire, J. (2015). Factors Limiting Usage of ICT in Delivery of Management Services in Public Secondary Schools in Siaya County. In *Mediterranean Journal of social sciences, MCSEER Publishing, Rome-Italy, Vol. 6, No. 2.*
- Orodho, J. A. (2004). Techniques of Writing Research Proposals and Reports in Education and Social Sciences. Nairobi: Masola Publishers.
- Oyedemi, O. A. (2015). ICT and Effective School Management: Administrators' perspective. In the Proceedings on the World Congress on Engineering. London: United Kingdom
- Siwel, Y. N. & Malongo, R.S. M. (2012). Factors Influencing Use of Mobile Phones in Communicating Agricultural Information: A Case of Kilolo District, Iringa, Tanzania in *International Journal of ICT Research, Vol. 2 No.7*. Retrieved from www.esjournal.org
- Saunders, M, Lewis, P. & Thornhill, A. (2012). "Research Methods for Business Students" (6th Ed.). Pearson Educational Limited
- Singoro, B. Odebero, S. O. & Nasongoo, J. W. (2012). The Effect of Integration of ICT in Secondary School Management in Bungoma County, Kenya. Unpublished M.ED Thesis, Masinde Muliro Univeristy of Science and Technology, Kenya.
- Treece, E. W., & Treece, J. W.(1982). Elements of Reseach in Nursing (3rd ed.). St Louis, MO: Mosby.
- Wanjala, A. S., Adhiambo, J. M. & Ngumbi, E. (2013). Teachers Perceptions on Use of ICT in Administration of Public Secondary Schools in Kimilili District, Bungoma County, Kenya. Unpublished M.ED Thesis, Catholic University of East Africa: Nairobi